Conference Proceedings

Masters in Teaching Program 2010-2012 Teaching Toward a Better World: Embracing the Challenges

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Introduction to Conference Proceedings

The papers in this collection are reviews of the professional literature conducted during late fall and winter 2011-2012 and professionally presented to colleagues, faculty and invited guests at the Master in Teaching Program's Master's Project Conference March 10-12, 2012, on the Evergreen State College's Olympia campus. The topics of each paper emerged from questions of practice that arose during teacher candidates' fall student teaching internships. Based on their questions, these 35 graduate students conducted literature reviews that included a minimum of 10 empirical studies. Two papers offered unique structures – one as an action research project and the other as a conceptual argument to frame future research. The papers were structured and written in accordance with the documentation style of the American Psychological Association.

The purpose of writing these literature reviews was clear: to inform important questions that emerged from the candidates' thoughtful experience. On another level, the faculty's vision was that this would be a capstone experience in helping our student's become teacher leaders who, among other attributes, would be grounded in educational research. Trends in education come and go. The phrase, "research based" is often used loosely. It is our expectation that our graduates are now prepared to be appropriately discerning and critical users of research in their practice and in their ongoing professional development. It is our hope that these graduates will be inclined to read and discuss the strengths and limitations of research studies that will emerge in the future in support of new educational movements. It is our belief that these graduates are now prepared to effectively communicate with their colleagues and administration about research studies and to seek out original research when they have educational questions.

We invite the reader to take time to peruse the array of issues that the teacher candidates have explored in their research. There is great wisdom and stories of hope within these pages.

Congratulations to the Master in Teaching Program class of 2012 for work well done!

Sincerely,

Heather Bandeen, Scott Coleman, Andrew Gilbert, Anita Lenges

The Arts in School: Social and Emotional Implications for Students At-Risk

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Rose Ackman

Abstract

Often seen as frivolous, the arts have been marginalized by the culture of assessment in today's schools. The impact of the current curriculum climate is the loss of in-school art time, and the subsequent reduction of arts access for students. Students who are economically disadvantaged, or at-risk, are most impacted by the cutting of the arts. This literature review examines current research on arts and schooling success, the impact arts education has on at-risk students' social and emotion development, and additional implications of arts engagement. The research findings indicate that students who are at-risk and engaged with the arts have higher retention rates, lower truancy, greater graduation rates, and increased motivation and engagement. There is also evidence that students who are at-risk benefit socially and emotionally from engagement in the arts. Overall these findings call attention to the positive influence the arts have on students who are at-risk.

Keywords: at-risk, art education, school, success, social, emotional, development, youth.

The Arts in School: Social and Emotional Implications for Students At-Risk

Often seen as frivolous, the arts have been marginalized by the culture of assessment in today's schools. Under the provisions of the No Child Left Behind Act (NCLB), art education was included as part of core curriculum requirements (U.S. Department of Education, 2002). In concept NCLB would protect the arts from disappearing in schools by making them on par with other core subjects, but in practice, time dedicated for the arts in school is being traded in for subjects seen as more important, subjects which are tested. The high-stakes testing sanctioned by NCLB ushered in a new attitude and perspective on curriculum priorities in education. According to a report by the Center for Education, and social studies. Districts reported that they had changed their curriculum *somewhat* or to a *great extent* to emphasize content and skills which are covered by state tests as mandated by NCLB. Eighty-four percent of districts changed curriculum to include more reading, and 81% altered curriculum to emphasize math. With more time allotted to tested subjects, the arts have lost their place in many classrooms and districts.

A recent study from Washington State determined that 33% of elementary students receive less than an hour a week on average for the arts, and 10% receive no arts instruction at all. A majority (63%) of principals are dissatisfied with the amount of arts education at their school (Reinvesting in the Arts, 2011). Despite federal mandates calling for the inclusion of the arts as core curriculum, strong public support, and research that support the arts as beneficial, the arts are marginalized and often the first to be cut during budget shortfalls, and are the last curriculum priority (Presidents Commission on Arts and Humanities [PCAH], 2011). These reports demonstrate the effects educational policies and practices in the United States have on

arts education, and furthermore the significant reduction of access to the arts for students in today's public schools.

Creativity is found and valued outside of the arts classroom, and children are universally drawn to the arts and creative experiences (Day & Horowitz, 2012). The arts provide us with training to ignite our imaginations, to think and see things differently. The arts provide a means to see the world or experiences through other peoples' eyes. To live vicariously through the arts can be an empathetic experience. The arts allow us to express our ideas beyond what our words can provide. The arts therefore are a vehicle for self-reflection and metacognition. The simpler an environment, the simpler the behavior it calls for. We are now in an increasingly complicated and sophisticated environment, which demands more elaborate and complex behaviors. Think of technology innovation, science, literature, or problem-solving skills. These are made possible with creative thinking, a skill which is inherently fostered through the arts (Eisner, 2002). According to Arne Duncan, U.S. Secretary of Education (PCAH, 2011),

Education in the arts is more important than ever. In the global economy, creativity is essential. To succeed today and in the future, America's children will need to be inventive, resourceful, and imaginative. The best way to foster that creativity is through the arts.

In order to examine the influence of arts education on students, one must first seek to identify the overarching purpose of schooling. Schooling aims to cultivate personal, social, and cognitive development, in addition to academics and content, as well as prepare students for post-secondary school or work. In this literature review, I explore the question *How do the arts influence at-risk students*? with a particular focus on the impact the arts have on students' social and emotional development, and students' school success. For this review, *at-risk* will

encompass students who are at-risk of not graduating or dropping out of school, disengaged, consistent misbehavior, and those who are economically disadvantaged and experience the stressors associated with poverty. For this literature review school success is not defined primarily in terms of academic achievements. Rather the term *school success*, as it is used here, encompasses student truancy, retention, graduation rates, engagement and motivation. *Arts* will be defined as including visual arts, music, and theater.

I have chosen to examine the influence of arts education on students who are at-risk academically, socially, and emotionally. As an artist and visual arts educator, I have experienced firsthand the impact art has on development and engagement in school, for my current students and as a student myself. I have seen access to the arts awaken otherwise disengaged students. I have seen groups of students come together through the arts and form a community where they are safe to express themselves, and process their emotions. Students who are at-risk often lack role-models and are suffering in struggling school systems (NGA, 2002). Because of this, students who are at-risk are in greater need of educational programs and workplace training. Where the arts can be most beneficial, they are often lacking due to budget shortfalls in economically disadvantaged areas (Israel, 2008).

The Arts in School: Social and Emotional Implications for Students At-Risk

The research that I will be discussing is organized into three main sections. The first section will review research on the effects arts engagement has on students' success in school. The second section will review studies which present findings on the influence arts engagement has on students' social and emotional development. In the final section I will review additional implications of arts engagement.

School, the Arts, and Students At-Risk

This first section includes discussion of five studies that looked at how the arts influence student success in school through retention rates, graduation rates, attitude, and attention and motivation. First, I examine arts implications on student attendance, and general achievement. Then, I will review two studies on arts engagement and the influence on retention and high school graduation rates. Finally, two studies are reviewed which examine engagement in the arts and the influence that participation has on motivation, with a particular focus on the potential of transfer.

School success. Heath, Soep, and Roach (1998) studied non-school youth organizations in low-income neighborhoods between 1987-1998 using both quantitative and qualitative methods. The sample population ranged from children eight years old to young adults 20 years old. Data collected from this longitudinal study was compared to national samples from the United States Department of Education. Students in the study sample were over five times as likely to come from families on welfare within the past two years, more than twice as likely to have parents who are divorced or lost their jobs in the past two years, and are attending schools where the potential for violence is more than twice as high than the national average. Initially Heath et al. (1998) did not intend on studying the effects of the arts on development, but the relationship between arts engagement and development which arose from the study were too significant to ignore. The researchers investigated the process of creating art, the level of abstraction that is inherent in the creating, and how practicing such higher levels of thinking would transfer and affect the children and youth involved.

Heath et al. (1998) identified three verbal aspects of engagement in the arts in the community which prevailed during their longitudinal study: 1) Theory-building and checking out

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the possible. This can be defined as the process of reformulating and revising efforts in the production of a work, and the subsequent carrying of emergent ideas to other works and projects. 2) Translating and transforming. This refers to the process of translating perception of reality through different media, which gives new form to existing observations and ideas. This process is also interactive in that the researchers observed the constant sharing of works and ideas. And 3) Projecting and reflecting. This refers to the process of artists considering how their work influences and creates possible ideas or worlds in the minds of others who view or engage in their work. Part of this third process that the researchers observed were participants practicing getting to know how listening and viewing audiences resonate with their work. When artists view others reflecting on their work, they in turn were observed to reflect back on their art as well. In addition, observations indicated that young artists involved with this program used language to pose problems, created methods and approached, specified steps, as well as worked towards deadlines while maintaining a clear focus of goals. Qualitative data indicated that the ways in which participants were critically thinking and communicating became habituated, in that these skills transferred to other domains of their life.

Quantitative data also showed that youth involved in arts programs had higher achievement in school culture than non-arts involved youth. Specifically, the researchers found that youth who were involved in the arts for nine hours a week, when compared to the national sample, were four times more likely to have high academic achievement, three times as likely to have high attendance, are elected to class office more than three times as often, perform community service more than four times as often, are more than three times as likely to win an award for school attendance, and more than four times as likely to participate in math and science fairs (Heath et al, 1998).

Research has examined the potential influence that arts education has on truancy, school retention, and high school graduation rates. The Center for Arts Education in New York City (Israel, 2008) gathered data on arts education and student retention from 189 high schools in the 2006-2007 school year, and 239 schools in the 2007-2008 school year. The schools were grouped as having low, medium, or high graduation rates, and then were examined for the presence of 1) certified arts teachers, 2) dedicated arts classrooms, 3) appropriately equipped arts classrooms, 4) arts and cultural partnerships, 5) eternal funds to support the arts, 6) coursework in the arts, 7) access to multivear art sequences, 8) school sponsorship of student art participation, and 9) school sponsorship of arts field trips. The data revealed that the New York City high schools which were struggling most to keep their students on track to graduate offered the least arts, with schools offering students the most access to arts education having the highest graduation rates. Additional benefits of art education were also noted, including higher retention rates, increased student motivation, and better attendance. This study found that in economically disadvantaged schools, where the arts could have great impact, students had the least opportunity to engage in the arts because of lack of access and availability, in part due to funding. The findings suggest that an increase in student access to arts instruction in schools with low graduation rates may be a successful strategy to boost graduation rates and put struggling school on the right track. A limitation to this study is that no control was used, meaning that other influences on the higher rates indicated in the study were not controlled for.

Catterall (1998) analyzed information on student participation in the arts from data gathered by the United States Department of Education of about 25,000 secondary school students. The analysis indicates an association between students' participation in the arts and positive behavior, academic achievement, and attitude. The researchers found that students

between grades 8 and 10 involved in arts, referred to as *high-arts*, had a 1.4 percent dropout rate whereas students with significantly less involvement in the arts, referred to as *low-arts*, were four times more likely to drop out of school. These significant findings resonate with the findings from Heath et al. (1998) discussed previously which found that students involved in the arts had greater school achievement. Collins, Sutherland, and Waldman (2010) also found that arts programs, specifically arts therapy, had a positive impact on student graduation rates. Students involved in arts program having 78% graduation rate verses 56% for students who were not involved in the program.

The most significant difference in academic performance was found between artsengaged low income students and non-arts engaged students (Catterall, 1998). Catterall (1998) found that arts-engaged low-income students were more likely than their non-arts engaged peers to have attended and done well in college, been community volunteers, voted, and obtained employment that had future prospects. In addition, these findings were particularly significant for English Language Learners, where schooling successes were demonstrated. These studies demonstrate that the benefit of arts engagement surpasses socio-economic status when students are given the opportunity to work with the arts.

Motivation and engagement. In present schools, there is a tendency to emphasize extrinsic rewards and motivation through grades and test scores. Intrinsic motivation is one of the only predictors that an activity will be sought out voluntarily by the individual (Eisner, 2002). The arts create a space where students are able to gain intrinsic and aesthetic satisfaction. Because the arts facilitate intrinsic satisfaction, the arts have the potential to subsequently influence motivation.

Anderson and Overy (2010) examined the effects that music and arts classes had on young offenders to test their hypothesis that initial engagement in the arts would influence continued participation in education. The sample population was inmates between the ages of 17 and 21. Fourteen men participated in either music (n=4), art (n=5), or a control group studying numeracy and math or literacy and communication (n=5). The researchers found that inmates who participated in the music class had a 1200% increase in course enrollment after the music class, the arts group had a 325% increase in enrollment afterwards, while the control group had a 12.5% decrease in enrollment after the initial course. During the 10 week study, 11 of 14 men signed up for more educational course without prompting from educators. In interviews with the participants, men in the music and art group revealed that they found the sessions engaging and meaningful. These results indicated that there was an increased engagement with education during as well as after the study for both the music and the art group.

This research is particularly influential because the sample population represents students who are at-risk and incarcerated. In this study, the arts have the potential to positively influence the incarcerated youth in future academic decisions and motivation for involvement (Anderson & Overly, 2010). Additional research on the impact of arts on at-risk youth found that arts education has a significant impact on deterring delinquency and recidivism (Clawson & Coolbaugh, 2001), which is particularly important for youth who have criminal records and are rehabilitating. However, because the sample population (Anderson & Overly, 2010) was incarcerated young adult males, these findings may not necessarily be applicable to school-aged, non-incarcerated populations.

Catterall and Peppler (2007) studied 179 grade 3 students working with out of school arts centers. One hundred and three students participated in the arts programs, and 76 students from

three control classrooms did not participate. Students were from Los Angeles, California and St. Louis, Missouri. The schools' surrounding areas were severely impacted by high crime rates, poverty, and drug-trafficking. Participants (n=103) received regular art instruction from skilled artists at the Inner City Arts (ICA) in Los Angeles or the Center of Contemporary Arts (COCA) in St. Louis. At ICA 99% of students were Latino. At COCA 100% of students were African-American. The students participated in a variety of arts. The study took place at the ICA and COCA over periods of 20 to 30 weeks. The study used a treatment-comparison group design in which the learning measures for arts participants at COCA and ICA were compared to learning measures for students in the general education classroom not participating in outside arts programs. Pre and Post surveys were completed and regular structured classroom observations were made.

A 13 item global self concept scale was used, as well as a seven item self-efficacy scale. A two item attribution scale was also used. Children responded using four point Likert scales indicating levels of agreement or disagreement with each statement. Creativity was tested using the Torrance Test for Creativity which included originality, fluency, flexibility, and elaboration. The last qualitative item was a single question asking students about their world view (Catterall & Peppler 2007).

The results for this study were mixed (Catterall & Peppler, 2007). As far as general selfconcept, gains were made with both ICA and COCA students, but no comparative advantage was found over the control group. Self-efficacy beliefs were analyzed and the researchers found that over half of the arts students made gains whereas only a third of the control group made gains, which was a significant difference. The results from the Torrance Test of Creativity were unexpected by the researchers, because both experimental and control groups made overall gains.

Therefore the findings were not significant, with one exception: the originality focus, where visual arts students significantly out-gained control by 55% to 33%. Catterall and Peppler (2007) proposed that the overall gains made by all students could perhaps be due to their age and that gains in self-expression is a normal and appropriate development for the sample population.

Researchers conducted interviews and made observations to compile qualitative data that was presented in this study (Catterall & Peppler, 2007). The researchers found that students were able to maintain higher focus and engagement in ICA or COCA than their home classrooms. This is a significant finding in that research on the influence of arts engagement is now beginning to explore more than the potential academic benefits of arts on other content areas, but rather developments that enrich the overall schooling experience, which relate to social and emotional development. The findings from this study demonstrate the potential for arts engagement to influence students' perception or attitude towards schooling, and the influence on their creative development as was demonstrated by their tested originality.

Social and Emotional Development and the Arts

The arts have also been used to support the social and emotional development of students who are at-risk. Collins, Sutherland, and Waldman (2010) researched the Art Therapy Connection (ATC) program in inner-city Chicago which worked with 150 students in grades 3-12 for one academic year. The program was established to work with at-risk students who had limited or no access to mental health care. Students in the program exhibited truancy, uncooperative behavior, and poor grades, as well as social and emotional characteristics such as sadness, inattentive, withdrawal, aggression, and attention seeking behaviors and attitudes. Students worked in group art therapy sessions with professional therapists. The program goals were to keep students in school, change their attitudes, foster positive relationships among

students, therapists, school staff, and parents, and offer students rewarding and successful experiences. Other main goals of the program included teaching students useful emotional regulation, coping skills, encourage both positive and responsible behavior, and anger management. The researchers found that group projects facilitated a sense of belonging and students exhibited greater connection to peers in the program. ATC built students' confidence, and students were given an outlet to express themselves without words to help them process their experiences.

A seventeen year old youth who was involved in ATC for two years was positively influenced (Collins et al., 2010). This case study student failed grade 9 three consecutive years in a row, and was involved with drugs and gangs. The student worked with the art therapy program for two years, and focused on self-awareness. After art therapy he no longer used drugs and graduated high school. In this study and case study, the arts were demonstrated to foster self-awareness and reflection for students who were at-risk, to help them regulate their own reactions and emotions. The researchers compared the graduation rates in an ATC participating school and found that 78% of ATC participating students graduated high school whereas the graduating rate for the entire student body was 56%. Overall, this program has had positive outcomes in supporting students at-risk in their social and emotional development, as well as healing or processing past events in their lives.

Informal program evaluations (Collins et al., 2010) have found that five public schools in Chicago using ATC have increased in four areas: cooperation, trust, attachment, and participation, with the biggest increase in student participation and trust. The program also found that students who are involved in the arts therapy program experienced success in academic, social, and emotional areas of their lives. Limitations to this study include the lack of

a control group to compare the findings and results. In addition, there have only been informal internal analyses of results, as data is still being collected.

Spier (2010) researched the influence that in-school arts therapy had on grade 8 students who were at-risk and transitioning into high school. Group art therapy was used to develop and strengthen student coping skills, as well as offer a place to practice appropriate classroom behaviors. The art groups were also focused on helping the adolescents address disruptive as well as their inappropriate responses to stress. Two girls and four boys attending a private kindergarten through grade 8 school were used in this study. The sample group exhibited very poor coping skills, and used disruptive behavior that had significant negative impact on students' school experience and academic achievement.

The researcher used both qualitative and quantitative methods (Spier, 2010). The sample group completed the Adolescent Coping Orientation for Problem Experiences (A-COPE) 54item assessment, and each student was prompted to draw a picture of themselves in grade 9 at the beginning of the four week art therapy session and at the end. This was done to measure the student's readiness for high school, as well as their ability to visualize a positive transition. Parent/guardians were interviewed before and after the four week sessions. The session took place twice a week for four weeks, for 45-60 minutes per session. Because the sample population was heterogeneous with varied abilities and at-risk behaviors, the research design measured each individual's change, rather than the changes across the whole group.

The interviews with parents/guardians indicated that after the sessions they perceived their children as being less frustrated, increased confidence, better attitude at the impending transition, decreased disruptive behavior, and overall positive results. One parent could not be contacted for the post-interview. Four students A-COPE scores increased, and two scores

decreased, showing mixed results. Overall, there was a decrease in disciplinary referrals for all participants during the time when they participated in the art therapy sessions compared to the time before the sessions began. Limitations to this study include the small sample size, and the lack of statistical analyses of the A-COPE scores. The lack of a follow up study on the sample population also is a limiting factor, in that the long-term effects of the arts therapy program were not reported. In addition, the study is limited in that there was no control group to offer comparison of the effectiveness of the in-school arts therapy program (Spier, 2010).

Hill and Wallace-DiGarbo (2006) studied the effects of an arts based intervention program on 12 at-risk middle school students from a small sized city in a mid-Atlantic state. The program was modeled after the Project Self Discovery, and had goals which included student creation of art as a form of self-expression and community building. The researchers focused on the question of whether engagement of at-risk youth in arts programs impacts those students' sense of self and works to promote their confidence to act effectively in the world. The 12 participants ranged in age from 13-16 years old, and 11 of the 12 were females, 1 participant was a male. All students were considered at-risk by their school. The program was scheduled during school hours because participants typically avoided after-school programs. The program met 10 times over six weeks. Participants worked together as well as independently, and the project culminated with a mural. The participants completed two assessments. The 225-item Adolescent Self-Assessment Profile (ASAP) was taken and six of the 20 basic scales of the ASAP were analyzed which included 1) family adjustment 2) psychological adjustment 3) peer influence 4) school and 5) attitude. The Outcome Inventory (OI) was taken during the study as well as a six-month follow up. The OI retests risk factors assessed by the ASAP.

The analyses of the data found that there were no statistically significant changes for any of the outcome variables in the study (Hill & Wallace-DiGarbo , 2006). However, on the ASAP there were predicted direction of improvement for deviancy, peer influence, school adjustment, and family adjustment. The probability that these changes were a result of the program and not simply by chance was 70%-80%. In measures of psychological adjustment and attitude, the statistical trend was in the predicted direction of improved psychological adjustment, with over a 92% chance that the participants' improved functioning was not a result of chance. The most atrisk participants improved the greatest in the study. The limitations of this study are the relatively small sample size, and that not all participants attended all 10 session, with the most attended being seven and the least attended being three (Hill & Wallace-DiGarbo, 2006).

Armistead, Benedett, and Brown (2010) headed two studies at Kaleidoscope Preschool, an arts integrated preschool founded in 1990 which promotes school readiness via arts enrichment for low-income children. Kaleidoscope Preschool includes music, creative movement, and visual arts. The researchers hypothesized that arts integrated programs provide children who are at-risk and in situations where they are commonly faced with poverty-related stressors the skills to regulate their emotions and behavior and fostered school readiness. In addition, the researchers proposed that engagement with the arts may increase cultural relevancy in education for racially or ethnically minority backgrounds. The researchers examined and compared school readiness, attendance, achievement, and receptive vocabulary of preschool children from diverse backgrounds with diverse needs at Kaleidoscope, with a nearby preschool.

The first study included 194 children, their parents/guardians, and teachers (Armistead et al., 2010). Ninety-nine percent of families in the study were at or below the federal poverty line, and qualified for the Head Start program, all families were considered low-income. The

researchers used parent interviews and the Brigance Preschool Screen-II to assess student development level. The Brigance Preschool Screen-II assessed children's language, motor, selfhelp, and socio-emotional skill areas of development.

The results from this first study indicate that art integration programs provide unique opportunities for development (Armistead et al., 2010). The researchers noted that the arts may enhance the cultural relevance of education to racial/ethnic minorities, in that the culturally specific traditions of many racial/ethnic minority groups embrace expression through the arts. The importance of providing students with multiple means to express themselves and demonstrate their understanding and acquisition of knowledge was demonstrated in this study, in particular at these early stages of schooling.

The second study sample was 165 children and their parent/guardians (Armistead et al., 2010). All participating families were considered low-income and poverty status according to the federal government. This study focused around the hypothesis that arts integrated pre-school programs would influence children's' development and readiness for school. The Peabody Picture Vocabulary Test-III was used to measure the receptive vocabulary of students in the arts integrated preschool and control group. Receptive vocabulary was chosen as it is a strong early indicator of school success. As predicted, students in the arts integrated preschool had significant greater end-of-year receptive vocabulary than the control group. Nearly all of the student in the study were at-risk associated with economic disadvantage, which includes social and emotional development stressors, and engagement with the arts was found to be a mechanism for fostering healthy interpersonal and intrapersonal development.

Because there was only one control group, a traditional non-arts integrated preschool, it is unsure if the arts-integrated preschool would have advantage over other early-childhood

programs. The studies also lacked a measure for socio-emotional functioning. In addition, the studies focused on low-income students, so the effects and implications for children of more advantaged backgrounds is not addressed. Future studies should include heterogeneous economic groupings, and follow students through kindergarten to see if the results carry on.

Additional Implications of Arts Engagement

The process of thinking creatively spans all disciplines and the capacity to think creatively is critical outside of academia as well. Creative thinking encompasses thinking outside the box, problem solving, and considering multiple perspectives, among other attributes (Eisner, 2002). In this next section I will review three studies which seek to explore the relationship between engagement in the arts and the development of creative thinking skills.

Creative thinking. Burton, Horowitz, and Abeles (1999) undertook a two year study with the Center for Arts Education Research at Teachers College Columbia University to investigate whether cognitive skills developed through the arts transfer and effect learning and thinking in general. The sample population included 2,000 pupils attending 12 public elementary and middle schools, grades 4-8. The schools were located in New York, Connecticut, Virginia, and South Carolina. The schools were rated on three seven-point scales to identify the extent to which they were arts integrated, arts-rich, and external providers of arts. The study examined a broad spectrum of arts learning. Several standardized measures were combined using paper and pencil inventories including the Torrance Test of Creative Thinking. There was also a Self-Description Questionnaire which measured self-concept. Lastly, the researchers gathered quantitative data using the School-Level Environmental Questionnaire which evaluated aspects of the school climate that included the ways in which teachers and

students interact, the Classroom Teacher Arts Inventory, and the Teacher Perception Scale to measure the creativity and other qualities of students.

Burton et al. (1999) found that students in high-arts groups consistently outscored the low-arts group on measures of creative thinking and teachers' perception of artistic capacities. High-arts groups were stronger than low-arts in their ability to express their thoughts and ideas, exercise their imaginations, and take risks in their learning. The high-arts group was also more likely than low-arts groups to think of themselves as competent in academics, which is an indicator of self-efficacy beliefs. The researchers gathered qualitative data through observation which indicated that high-arts groups were more cooperative and showed greater willingness to display their learning before a community of peers/parents, than their low-arts counterparts. Further interviews revealed that teachers emphasized that students involved with arts were able to unify divergent thoughts and express their ideas in many ways, and high-arts schools students more likely to have good rapport with teachers. These findings suggest that engagement in the arts positively influenced student creativity, academic self-confidence, and creative thinking.

Concerns with the validity of the Burton et al. (1999) stem from a non-random selection of the sample and a lack of information about the sample: no information was provided concerning student were in each grade level, city, school, and gender, SES, or culture. In addition, the researchers themselves conducted the interviews, rather than employing an unbiased firm.

Luftig (2000) conducted a yearlong quantitative study of 615 students in grades 2, 4, and 5 from two schools in two mid-sized school districts in Hamilton and Fairfield, Ohio. The study focused on the effects of the School, Parents, Educators, Children, Teachers Rediscover the Arts (SPECTRA+) program on student: (a) academic achievement, (b) creative thinking, (c) self

esteem, (d) locus of control, and (e) art appreciation. SPECTRA+ is a school wide, multidisciplinary, arts integrated education program. The researchers used the Culture-Free Self-Esteem Inventory, Bialer-Cromwell Locus of Control Scale, Torrance Tests of Creative Thinking, Arts Appreciation Scale, and the Iowa Tests of Basic Skills and Stanford Achievement Tests.

There were no significant findings regarding academic achievement for students participating in the SPECTA+ program. There were however significant findings in the area of creative thinking. The researchers found that students in the SPECTRA + program scored higher than the control groups on total creativity. SPECTRA+ students did not score better on general self-esteem, though parental self-esteem, which looks at how students think their parents/guardians feel about them, was shown to be influenced positively and significantly (Luftig, 2000).

This study (Luftig, 2000) was conducted over a period of one academic year, and as a result some indicators found through this study may not have long term implications or sustained success. Therefore the relatively short length of this study is a weakness.

Lampert (2006) conducted a study of 141 undergraduates at a large East Coast university with the intent of exploring the relationship between critical thinking and the arts. Using the California Critical Thinking Disposition Inventory (CCTDI) data was collected to compare the critical thinking dispositions of two discipline groups: arts and non-arts, and two class groups, freshman and seniors. The most significant finding was between the arts and non-arts groups where arts groups scored significantly higher on three CCTDI subscales: truth-seeking, open-mindedness, and critical thinking maturity. Non-arts students scored significantly higher on one scale, *systematicity*, meaning the tendency towards organized, orderly, and diligent inquiry.

Lampert's (2006) findings indicate that environments which support critical thinking, also condition the mind to approach other experiences or courses with those thinking skills. In other words, the thinking skills that are learned and practiced through the arts do not stop there; rather they become part of how an individual interacts with the world, and are therefore transferrable.

One possible limitation in applying Lampert's (2006) results is that the sample population was undergraduates, and therefore findings from this study may not necessarily be applied to students in grades K-12. In addition, the researchers employed just one method of testing for creativity, where multiple methods for quantitative evaluation and the addition of a qualitative method would have strengthened the validity of the study.

Studies and literature have demonstrated the importance of engaging in creative experience, which influences creative thinking, on school achievement, mental health, constructing meaning from the world, and affective functioning (Catterall, 1998; Collins et al., 2010; Day & Hurwitz, 2012; Eisner, 2002; Heath et al., 1998; Israel, 2008; Luftig, 2000; Spier, 2010; Wallace-DiGarbo & Hill, 2006). The findings from the studies reviewed in this section indicate that the arts influence creative expression.

Conclusion

Research provides strong evidence that arts engagement is particularly beneficial for students who are at-risk. Youth who are at-risk and involved in the arts have been found to have reduced truancy, lower recidivism rates, reduced delinquency, greater involvement in community service activities, higher retention rates, and greater motivation (Heath, 1998; Overly & Anderson, 2010; Catterall, 1998; Israel, 2008; Clawson & Coolbaugh, 2001; NGA, 2002). Heath, Soep, and Roach (1998) observed students transfer the critical and communication skills developed through the arts into other areas of their lives. In addition, students were more likely

than their peers to have school success which included achievement, participation, and attendance. Israel (2009) found that schools which offered students the most arts had higher retention and graduation rates. Israel (2009) discussed different reasons why engagement in the arts may have this positive influence. Students shared in interviews that they liked the arts, and that their enjoyment was a reason that they were coming to school day in and day out. Higher graduation rates were also found for at-risk students engaged in arts therapy programs (Collins, Sutherland, &Waldman, 2010). Catterall (1998) analyzed a national longitudinal study of youth and found that the most significant difference was between arts engaged and non-arts engaged low-income students. Arts-engaged students were much more likely to have attended and done well in college. Additional research on the arts impact on at-risk youth found that arts education has a significant impact on deterring delinquency and truancy problems (Clawson & Coolbaugh, 2001).

In addition to school successes, research demonstrated that engagement in the arts has a positive influence on motivation for students who are at-risk. Motivation is critical for student schooling success. Students who are disengaged and unmotivated are less likely to attend class, complete assignments, and graduate. Anderson and Overly (2010) found that incarcerated youth who were enrolled and participating in arts classes were motivated to enroll in other courses, significantly more than their peers who were enrolled in non-arts courses. In interviews the participants said that they felt engaged and motivated in the arts classes. Catterall et al. (2007) found that students were much more engaged in arts classes than most classes, and in addition that students who worked with arts programs had higher overall originality. This research suggests that art can be used as a means to engage and motivate students in school. Because

disengagement is a precursor for students to drop out of school, fostering engagement and motivation is important for students who are at-risk.

The influence of arts engagement on social and emotional development for students who are at-risk was found to be significant. Collins, Sutherland, and Waldman (2010) found that students involved in arts therapy programs had increased cooperation, trust, attachment, and participation. Spier (2010) studied an in-school arts therapy program working with at-risk students who were transitioning to high school. The research indicates that students who were involved in the program had overall positive effects on their social and emotional development which included attitude, behavior, and readiness for the impending transition. Hill and Wallace-DiGarbo (2006) worked with 12 at-risk students on a culminating mural project. Though the findings were not statistically significant they did show improvement regarding deviancy, peer influence, school adjustment, and family adjustment. Regardless of the level of significance, the research indicates that overall, engagement in the arts does have positive influence on students who are at-risk social and emotional development. This also suggests that the arts may be used to facilitate the social and emotional development and that providing students with arts outlets may positively affect them.

Critical and creative thinking is enhanced with the opportunity to practice independent investigation, analysis, classroom discussion, and problem solving (Astin, 1993; Ewell, 1994; King, 1994; Tsui, 2002, as cited in Lampert, 2006). The arts inherently use these pedagogical techniques, and offer student space and training to think creatively and critically. Students who have the capacity to think creativity are more likely to succeed in school. With the ability to think creatively comes the capacity to access information and experiences in a different way. A recent IBM poll of 1,500 CEOs found that the capacity to think creatively was the most

important *leadership competency* of the future (Bronson and Merryman, 2010). Supporting the development of creative thinking is important for students' experiences outside and within school.

The connection between engagement in the arts and the development of creative thinking is positive. Burton et al. (1999) found that students in high-arts groups developed greater creative thinking skills which included their ability to express their thoughts and ideas, exercise their imaginations, and take risks in their learning. High-arts groups were also more likely than low-arts groups to think of themselves as competent in academics and were observed as being more cooperative and to have a greater willingness to display their learning before a community of peers/parents. Additional studies (Lampert, 2006; Luftig, 2000) found that the arts support the development of creative thinking.

More research is needed to examine the influence that the arts have on student success in school, and social and emotional development. There is very little research to explain why the arts have positive influence on student success in school. Suggestions for future research include longitudinal studies which would follow students after engagement with the arts to examine how the skills and experiences gained through the arts persist and transfer. In addition, research that compares arts engaged students to non-arts engaged student longitudinally would strengthen the current understanding of the long term implications of arts engagement. Lastly, research recommended includes studies that examine a variety of strategies for educators to bring the arts into their classrooms to *intentionally* facilitate student social and emotional development.

Research has demonstrated that the arts can reach students on the margins of the educational system (NGA, 2002). However, at-risk youth are less likely to be introduced to the arts, and lose out on the benefits and richness that engagement with the arts provides.

Implications of this research for educators include the benefit of integrating the arts into the classroom to support students. The arts have the potential to be an effective classroom tool to motivate and engage students, and should be utilized. Creating art clubs where students have a place to engage with the arts is another suggestion for educators. Offering students a place like art club to express themselves, form bonds with peers, and be creative has strong possibility of promoting positive social and emotional development, engagement, and motivation. Educators are encouraged to draw upon the arts resources within their communities, and build partnerships between arts organizations and artists. The benefits of the arts on students who are at-risk are profound, and educators should make use of the arts as a resource for their students.

The findings in this literature review are highly relevant for policies and practices of schools, administrators, and government. The current education climate is not supporting creativity, or the arts. Though creativity is valued, the arts, which inherently support creative development, are losing their place in schools (PCAH, 2011). Access to arts in public schools has dropped significantly since the implementation NCLB in 2002. The National Governors Association (2002) calls for the enforcement of the legislation that requires arts in schools, and to monitor its outcomes. Districts and schools should expand successful arts organization partnerships and launch new ones. An inventory of the present state of arts education including spaces dedicated for the arts, course offerings, and compliance with education legislation should be conducted. Educational leaders must work to keep the arts in schools by encouraging and facilitating arts integration and the inclusion of the arts through professional development. Art course offerings should be expanded to provide students with more outlets to the arts, as well as reach the varying interests of students. With research strongly indicating that arts have a positive

impact on students' success in school, including at-risk youth, there is a necessity for arts to reclaim their place in today's schools.

Because art is a universal experience, and inseparable from culture, it is a prominent faction of arguably every one's life in some capacity or another. Whether we recognize it or not, we are exposed to and influenced by the arts every day. The value of the creative experience and creative thinking is irreplaceable, but there is a steady decline in creativity in the United States, today. A longitudinal study using the Torrance Test of Creativity looked at the creativity trends from almost 300,000 people between 1958 and present day. Total creativity had gone up steadily, an effect known as the Flynn effect where each generation goes up 10 points, until 1990. After 1990, the Torrance scores for children ranging from Kindergarten to grade 8 have consistently and significantly lowered (Bronson & Merryman, 2010). Creativity, as discussed earlier, is a valuable necessary human experience. The arts are a vehicle to meet the high demand for developing innovation and creative thinking, and to foster the ability to relate our human experiences on emotional, social, and cognitive levels to the complex contexts experienced today. The arts refine our senses and cultivate our imaginative abilities. The process of creation and experience in the arts includes inherently social and community focused aspects. This is because the arts can be a shared experience, but also individual. The United States Bureau of Labor Statistics (2010) reports that there are nearly two million full-time workers in artists occupations, with significantly more occupations using skills fostered by the arts like creative thinking and problem solving. The arts are needed to prepare students for post-secondary schooling, life outside academia, and the every changing job market and challenges of the 21st century workforce (Day & Horowitz, 2012; Eisner, 2002).

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Developing Social and Communication Skills for Cooperative Learning

Leah B. Baugh

Abstract

Cooperative learning is a socially and academically beneficial learning tool for middle school students. These benefits are contingent on students' ability to interact positively and equitably within groups (Battisch, 1993; Cohen, 1997). Numerous researchers have stressed the importance of teaching social skills in an effort to promote these positive interactions between students working in small groups. Many teachers, however, are apprehensive to implement cooperative learning because a frustration with the complex social dynamics at play within the classroom. This literature review aimed to address this problem by investigating the following question: How can teachers effectively develop social skills for cooperative learning?

Studies were drawn from a variety of fields, including general education, special education, experiential education, and social-emotional curriculum research. Four main components of social skill development were uncovered through the literature, including: developing classroom norms; direct instruction of social skills; teacher interventions; and group processing. The results of the studies indicate that each component fulfills a specific role within the learning process. Specific strategies within each component are explored, as well as implications for general classroom teachers.

Developing Social and Communication Skills for Cooperative Learning

A frequent refrain heard among educators is that no one can quite "figure out" middle school. The underlying message behind this seems to be that middle school students have vastly different, often difficult needs, and that the structure of middle schools and classrooms are not yet adept at meeting these needs. Indeed, research has shown middle school to be an important transition for adolescents – so important, that many students who do not cope well with the transition may follow a trajectory of declining academic achievement and disengagement with school (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Research has also shown that a student's ability to cope with this transition is often mediated by emotional and social factors (Durlak, et al., 2011). In short, students who are equipped with social and emotional "coping" skills are better able to meet the challenge of transitioning into middle school, and more likely to continue on the path toward academic success. Middle schools, then, are not only charged with teaching students the academic tools they will need for high school and college, but with teaching students the social and emotional skills needed for lifelong learning and success.

Cooperative learning has been cited as important and developmentally-appropriate teaching strategy for middle school (National Council for the Social Studies [NCSS], 1991). Cooperative learning, when implemented effectively, can increase student academic achievement, promote positive peer relationships, and increase positive attitudes toward school (Gillies, 2010; Johnson & Johnson, 2008). While research has shown cooperative learning – along with heterogeneous grouping – to be a developmentally appropriate and positive teaching strategy for middle school students, many teachers are hesitant to implement it (Gillies, 2010). Reasons that teachers give as to why they are apprehensive about implementing cooperative

learning include off-task socialization, the complexity of composing groups, and a lack of time for planning.

My own experience in schools has led me to believe that teachers are also hesitant to implement group work because of frustration with the more complex social dynamics and peer status at work within the classroom – namely, groups that are unhappy to be working together, students who dominate groups, students who are ignored or participate minimally within a group, and groups that cannot seem to communicate effectively or manage conflict. Though designing group worthy tasks, assigning meaningful student roles, and composing appropriate heterogeneous groups may help with many of these issues, researchers note that in order for groups to be successful, students must have a basic level of social skills (Roseth, C., Johnson, D. & Johnson, R., 2008), including the ability to give and receive feedback, ask others for help, manage conflict, and actively listen to group members. Groups that are not able to cooperate effectively using these skills do not receive the same learning benefits as groups that do (Battisch, 1993; Cohen, 1997; Johnson & Johnson, 1994). In other words, though research points to cooperative learning as benefitting middle school students socially, emotionally, and academically - students may need to be taught specific social skills in order to receive these benefits.

A few weeks prior to beginning student teaching, I was able to participate for two days in an outdoor education experience targeted towards developing leadership skills in middle school boys. I joined one group at the end of a two-week hiking trip. Though I had not been present since the beginning, it was clear that the participants had been taught specific communication, social, and problem-solving skills. I saw a socioeconomically and racially diverse group of middle school young men who were able to give and receive constructive criticism,
communicate their concerns to the group and request help, manage and resolve their own conflicts, collectively problem-solve, and publicly take ownership of their mistakes. Even more, the group had clearly formed a tight-knit bond. This group was not formed through the magical coincidence of ten mature middle school boys joining the same trip – it happened through a diligently implemented, skillfully facilitated, and highly-structured social skills curriculum.

When I began student teaching, I noticed that while academic skills were built into a highly-structured curriculum, social skills were not. Teachers were expected to know how to prepare and facilitate students for group work. What little social skills curriculum was implemented seemed based on a philosophy of encouraging students to follow the rules and accept consequences for breaking the rules, rather than concrete skills that would help students form bonds and work together successfully with their peers. It is with this problem in mind that I began my research. This literature review intends to answer the following questions: What social and communication skills are necessary for successful group work? How might teachers effectively develop these skills? And finally, what kind of insights might a non-traditional, social-skills focused model of education offer the mainstream classroom, such as experiential or special education?

Throughout this review, I will interchangeably use the terms social skills, communication skills, and social-emotional skills. Though individual skills may be able to be clearly grouped one category or another, as a whole they work together to supports students' success while working in groups.

Throughout this paper I will also refer interchangeably between group work and cooperative learning. Though several different models exist under the title of "cooperative learning", I will primarily refer those models that draw from *social interdependence theory*,

including Complex Instruction and Problem-Based Learning. These models assume that, in order for maximum cooperation and learning to occur, groups must be given a problem that individual group members cannot solve by themselves.

This review will not focus on how teachers can promote cooperative behavior through preventative design measures, such as group composition or constructing groupworthy tasks. Instead, this study aims to investigate the myriad of ways teacher can teach social and communication skills to their students, and the classroom-wide values or strategies that reinforce and support these skills. To this end, this review will focus on four main categories – *classroom norms, direct instruction of social skills, teacher interventions,* and *group process and reflection.*

Literature Review

What Social Skills Are Needed for Cooperative Learning?

Cooperative learning not only presents an opportunity for students to form relationships with their peers, it presents an opportunity for students to practice social skills that will serve them outside of the classroom. A successful group is thought of as a group that draws on all of its member's skills and abilities – intellectual, technical, and social - in order to achieve a goal. Effective groups communicate in such a way that multiple ideas are generated, explained, and analyzed; disagreement and conflict is encouraged and managed; and all that members participate and feel valued for their contributions. In order to achieve these norms, however, individuals within the group must have skills grounded in effective two-way communication – in giving and receiving information (Johnson & Johnson, 1997).

The individual social, emotional, and communication skills necessary for group work are varied. These may include giving and receiving feedback, self-regulating frustration and anger, conflict resolution, asking questions to promote thinking and conversation, assisting others, and

asking for help (Gillies, 2007; Johnson & Johnson, 1997). Which skills need to be taught depends on both student needs, as well as the particular skills demanded by an activity (Cohen, 1994). An activity that requires students to build a model roller-coaster, for example, may require a focus on equitably dividing work and resources; while an activity focused on creating a scripted play may require a focus on reaching consensus and giving and receiving feedback.

Developing Classroom Norms for Cooperative Learning

Preparing students for group work from the beginning of the school year is essential. How and what teachers can do to orient students to group work, however, can be a complex process. In the following sections, I will describe various strategies used by researchers and teachers in orienting students for group work and developing classroom norms. These strategies include experiential activities, whole-class discussion, and implicit orientation.

Experiential activities (skillbuilders). Experiential learning, as first described by Kolb (1984), is a theory of learning that contends that humans learn through experience. Experience consists of outside, environmental stimuli which is taken in by the learner as information. This information is interpreted by the learner, reformed into a hypothesis, and then tested in the real world. The information gained through testing in the real world is then re-interpreted, and then incorporated into the learner's schema, beginning the learning cycle over again.

Skillbuilder activities are, essentially, experiential learning activities designed to help students actively investigate, test, and form conceptions around cooperative learning norms. In the skill-builder activity *Broken Circles*, for example, students must share resources within their small groups in order for all to succeed. While the activity is happening, the teacher does not interfere with group decisions or communication breakdowns, unless major conflicts begin to occur. At the end of the allotted time period, the teacher leads the class in processing what

happened in their groups. Through asking questions, the teacher helps students draw their own conclusions as to what will encourage or impede their group's interactions. In effect, the teacher acts as a facilitator – not telling students the group norms that will help them cooperate, but instead guiding students in constructing those norms themselves (Cohen, 1994).

In one elementary school that implemented Complex Instruction, students were prepared for group work through "skill building" activities that targeted specific social behaviors deemed important for group work (Cohen & Lotan, 1995). These activities ended with a debrief session, with the teacher eliciting ideas from students as to what behaviors helped or hindered the group's success. Students were encouraged to draw their own conclusions at the end of the activity, and connect these conclusions to future group norms for cooperative learning.

Whole-class discussion. In contrast to skill-builder exercises, which use targeted, experiential activities to encourage students to construct norms, teachers may also use a combination of whole-class discussion and active practice, drawing on students' prior knowledge of working in groups in order to develop class norms.

Gillies and Ashman (1996) showed that sixth grade students who participated in discussion-based, cooperative learning training sessions prior to participation in group work displayed multiple benefits over similar groups who received no training, but simply were told to "help one another".

Training consisted of two, 45-minute sessions. In the initial session, students were introduced to small-group procedures, and through discussion, were encouraged to identify behaviors beneficial to the groups' participation and success. Behaviors discussed included: a) breaking each group activity into smaller components with each group member accepting responsibility for completing that component, b) encouraging equal participation by everyone,

and c) sharing resources among group members. The teacher then recorded the desired behaviors on a class chart.

The second session consisted of practicing those interpersonal skills deemed essential to collaboration. These skills included: a) listening to one another, b) providing constructive feedback on ideas, c) sharing tasks fairly, d) clarifying differences of opinion; e) trying to understand the other person's perspective; and, f) monitoring and evaluating the group's progress. Classes practiced, charted, and discussed these behaviors. Students were then encouraged to formulate their own group rules for working together.

The results of the study showed that students who participated in the trainings were consistently more helpful with one another, used language that was more inclusive, and gave more explanations to help one another as they worked. Students in the trained group also displayed more independence in their learning, and obtained higher learning outcomes than the untrained groups.

It is important to note that while this study implemented a specific type of preparation for students, it did not compare one preparation method with another. Furthermore, the study did not go into detail as to *exactly* how the teacher implemented the preparation. It is unclear how the discussion was guided, and for how long; how the teacher elicited students' prior knowledge; and how the teacher introduced the concept of group work and explained procedures. Because of this, it is still unclear as to how a teacher might replicate this procedure in the classroom.

Implicit orientation. In previous sections, relatively explicit methods of introducing students to group work were reviewed. Group work was introduced to students as special - with norms and expectations that were different from regular, whole-class interactions. Implicit orientation, on the other hand, is characterized by teachers minimally introducing group work

and expectations for behavior.

In a recent study (Gillies, 2010), researchers surveyed 10 elementary classroom teachers who were trained in and then implemented cooperative learning methods. The researchers interviewed the teachers at two different points during a semester-long cooperative learning experience. Teachers were interviewed in a semi-structure format, and researchers focused on investigating what challenges teachers faced, and how they dealt with those challenges. While most teachers spent some focused time introducing students to group work, and eliciting student input for norms and expectations, one teacher only minimally prepared students. This teacher explained that, instead of role-playing or discussing specific behaviors, she simply led a brief discussion comparing how group work behaviors matched with regular classroom expectations. The teacher then reinforced appropriate behaviors through small-group interventions.

It is important to note that this study reviewed a wide range of teacher experiences with group work, and that this particular case was not described in great detail. Additionally, this information was garnered from teacher interview, *not* researcher observation. Because of this, it is difficult to confirm exactly how the teacher reinforced cooperative behaviors, and to what extent students had positive experiences with cooperative learning in that particular classroom.

Direct Instruction of Social Skills and Behaviors

Even after introducing students to group work and creating classroom norms, teachers may find that students need more guidance in learning specific cooperative behaviors. The following section will review studies detailing how direct instruction practices might help the classroom teacher in developing social skills

SAFE practices. Teaching students appropriate skills for cooperation requires structure, focus, and intentionality. In a study conducted by Durlak, Weissberg, and Pachan (2010),

researchers investigated the effects of various after-school social-emotional learning programs for their effectiveness, and the extent to which the program enacted well-regarded principles of social-emotional learning curricula. These principles – represented by the acronym SAFE (Sequenced, Active, Focused, Explicit) – recommend that programs use a sequenced step-by-step training approach to teach social skills. These features were drawn from previous literature documenting in-school and clinical behavior interventions.

The first feature - Sequenced training - referred to the act of naming, breaking down, and mastering the individual components of a skill or behavior over a series of activities or lessons.

The second feature - Active – referred to the fact that active forms of learning must be used. Active forms of learning require students to practice and receive feedback on particular social skills or behaviors. This may be done after the student has the target skill briefly explained and modeled. Then, the student acts out the skill through role-playing or behavior rehearsal, and receives feedback from peers or adults. The student then has the opportunity to practice and receive feedback until they have mastered the skill.

The third feature – Focused – referred to what extent programs set aside focused, intentional time for teaching social skills. Those programs that identified part of their mission as developing students' social skills, but did not identify focused time that was spent teaching skills, were deemed less focused in their programming.

Finally, the fourth component - Explicit training - referred to extent that a program had clear, focused learning objectives for skills. In order to be explicit, students must know what they are expected to learn, and teachers should be able to clearly identify what the targeted skill is.

Researchers evaluated 75 reports of 69 after-school programs based on these four criteria. Program reports and evaluations were selected based on whether the program occurred during at

least part of the school year; happened outside of normal school hours; was supervised by adults; and focused on improving students' social skills. Researchers hypothesized that programs that contained all four SAFE components would have far more positive outcomes than programs that were missing one or more components.

The results of the study indicated that, indeed, programs that followed SAFE principles were more effective, and led to better outcomes than after school programs that did not incorporate all four components. In fact, *only* the programs that followed SAFE principles led to any significant effects in outcomes. These programs yielded many benefits, including improvements in youths' self-perceptions, bonding to school, positive social behaviors, school grades, and achievement test scores. A later study conducted by the same researcher (Durlak et al., 2011) indicated that SAFE-correlated social-emotional learning curriculum, taught by regular classroom teacher during school hours, led to similar positive outcomes for students.

The major limitations of the both studies include the fact that the programs used were not necessarily used in conjunction with cooperative learning, therefore, cooperative behaviors were not specifically examined or analyzed. Nonetheless, the desired goals of the programs were the development of those social skills deemed necessary for cooperative learning.

SAFE principles and cooperative learning. One study that implemented SAFEcorrelated principles alongside cooperative learning activities demonstrated a significant positive effect on trainees' cooperative behavior (Rutherford, 1998). This study examined the effects of direct, targeted instruction of social skills on the cooperative behaviors of 14 adolescent females in a Juvenile corrections facility.

Participants were assigned to heterogeneous groups, according to their level of social competence, as rated by correctional facility staff. The groups were trained over 12, thirty-

minute sessions designed to increase social-communication skills. These skills included conversational questions, positive comments to/about others, and positive self-references. Each skill was covered and practiced over four days. Direct instruction of the skill included the following steps: 1) skill identification and rationale, 2) skill modeling, 3) practice, 4) social reinforcement through cooperative learning, and 5) self-instruction. A rationale was included to explain the relevance of the skill, while skill identification consisted of asking students to verbally repeat the steps involved. After identifying the steps, teachers and peers modeled the skill correctly, and students practiced the skill and analyzed social situations that might require it. Teachers and peers provided constructive and positive feedback to one another while practicing.

After each direct instruction session, skills were reinforced through a cooperative problem-solving activity. Individuals within the group were accountable for acquiring information, and for the whole group's performance. Rewards were only given to those groups whose members used the target communication skills. As a result, students had to work together to ensure that everyone used the skills. This was accomplished through a cycle of practice and peer feedback. Finally, participants were given cue cards to use during the problem-solving activity. These cards acted as a reminder of the target skill they were supposed to practice while engaged in the problem-solving activity.

Participant's communication skills were evaluated at several different points during the experiment. First, baseline evaluations were made of participants' communication skills before direct instruction occurred. These were then measured again at the intervention stage (during instruction and group practice), and a follow-up stage (1 to 2 weeks after the training sessions). No rewards were given for cooperative behavior during the follow-up stage.

The results of the study indicated that the participants did improve and maintain the target communication skills over the 12-week period. Researchers attributed the effectiveness of the intervention to the combination of direct instruction with elements of cooperative learning, including interdependence, face-to-face interaction, individual and group accountability, and group processing. These factors, they concluded, led to increased opportunities for practice and feedback of pro-social behaviors.

Several factors limit the generalization of this study to the classroom. First of all, the study was conducted in a juvenile corrections facility, with all-female, multi-aged participants (12-18 year olds). Additionally, though the population itself would be considered more challenging than many regular classrooms – with several participants diagnosed as EBD and LD - the small size of the groups during training sessions provided a clear advantage that many regular classroom teachers do not have. In spite of these differences, however, the study does underline the effectiveness of a sequenced, active, focused, and explicit method of teaching of social skills for a population that is traditionally very difficult to manage.

According to some researchers, social and communication skills are best taught in a sequenced, active, focused, and explicit manner (Durlak, 2010; Rutherford, 1998; Sugai, 1996). This includes a cycle of skill identification, providing a rationale for the skill, modeling the skill, having students role-play, and then allowing students to sufficient time to practice and receive feedback until reaching mastery. Some instructors also provided visual reminders of targeted skills for student self-reinforcement (Rutherford, 1998; Jordan, 1997).

The previous section explored how direction instruction might be used to provide students with concrete, visible social behaviors that can be reinforced in cooperative learning

situations. In the following section, I will explore the role of the teacher in regulating interactions within these groups as they occur – both through modeling and reinforcing classroom norms.

Teacher Interventions in Small Groups

What is teacher intervention? Teacher intervention refers to the teacher's targeted use of language, discourse, and questioning to influence students' behavior in small groups. This is different from direct social skill instruction, where a teacher identifies and teaches a specific behavior that the whole class needs to learn. This kind of instruction takes place with the whole class - or at least a targeted portion of it - and uses time that is specifically set aside to teach and practice a behavior.

A small-group intervention, on the other hand, happens in the moment. A teacher sees a group that is off-task, or a group with one member that is not participating, and the teacher responds. With a small-group intervention, the teacher is not directly teaching a social skill, but is instead promoting and reinforcing classroom norms and on-task behavior through brief interactions with students. For students to fully internalize group norms – and become aware of how norms may have been violated – further group or individual reflection may need to occur. This topic – group processing - will be addressed in the last section of this paper.

Group autonomy. It is important to remember that with cooperative learning, the teacher's aim is to promote group autonomy. Group autonomy refers to a group's ability to problem-solve without outside intervention or assistance. With this in mind, teacher interventions are ideally very brief, and encourage students to use one another as resources rather than the teacher (Chiu, 2004; Cohen, 1994; Gillies, 2010).

In the following section, several case studies will be examined, showing how different teachers' interventions in small groups affected unequal status interactions, group autonomy, and cooperative discourse between students.

Status interventions. Perceptions of status among people in small groups will affect how group members cooperate. Extreme differences in status will lead to unequal interactions within a group – with some members dominating the decision-making, resources, and interactions. Even when cooperative norms have been put into place, students who are viewed as more competent or popular (high-status) will be more active than those who are seen as less competent or popular (low-status). This is pertinent to educators because students who interact less in small groups show smaller learning gains than students who interact more within a group (Cohen, 1997).

Equal-status interactions may be produced in the classroom through the combination of a multiple-ability curriculum and teacher interventions. With this strategy, the teacher introduces a group project by explicitly stating that the task requires multiple abilities; that no one person has all of these abilities; and that no one person can perform the task alone. The teacher then gives students a written list of all of the abilities required, and tells the students that they will need to work together. As students begin to work, teachers observe status interactions and progress within groups. When the teacher notices a low-status student displaying a valuable ability, the teacher points this out publicly to the group, and encourages the group to use that student as a resource. In doing so, the teacher simultaneously reinforces classroom norms of equality, and changes a group's expectations of its low-status members.

Researchers Cohen and Lotan (1995), examined the effects of this intervention on equalstatus interactions in both elementary and middle school classrooms. In the elementary-school setting, 13 classrooms (grades 2-6) within three different schools were observed for both status

interactions and frequency of teacher interventions for assigning competence. The results of the study indicated that, indeed, teacher interventions *did* increase low-status students' participation in small groups.

Results within the middle-school setting were uncertain. Observations of 19 classrooms showed that teacher interventions for status appeared to have no effect on the rate of participation of low-status students. Reports from individual teachers varied – a few noted that assigning competence *did* have a positive effect on student participation, while others said that students seemed uncomfortable with being singled out for praise.

The researchers determined several factors that may have mitigated research results. One factor may be that teachers were the ones who determined the perceived status of individual students. In an elementary school setting, this poses less of a problem, as teachers are often familiar with individual students and their classroom relationships. In a middle school setting, however, teachers may have less knowledge of peer relationships and status. Additionally, middle school students may simply not view some teachers as trustworthy, "high-status" sources for evaluations. Finally, peer status may have simply outranked academic status in importance among student.

Clearly, the complexity of peer status in the middle school classroom was not accounted for in the design of this study. While status treatments may prove effective at the elementary school level, more research will need to done in order to determine the effectiveness of teacher interventions for status at the middle school level.

Teacher interventions and group autonomy. Two studies by the same researcher (Chui, 2000; Chiu, 2004) examined the relationship between teacher interventions, group autonomy, and group motivation. In one study, 40 ninth-grade students from an urban high

school were videotaped while solving an algebra problem together. One teacher and several teaching assistants intermittently intervened in groups. Student behaviors were observed and coded for group autonomy and motivation, while teacher interventions were coded for teacher responsiveness and questioning strategies.

The study results indicated that: 1) high group motivation was an indicator of problemsolving success; 2) teacher interventions had both positive and negative effects on group motivation; and, 3) teacher interventions that promoted student autonomy increased group motivation. Interventions that promoted group autonomy included some of the following characteristics: a) they were initiated by the student, b) the teacher talked proportionately less than the students and, c) the teacher invited student participation through asking questions, particularly closed questions, rather than issuing commands.

In a later study, Chiu (2004) again investigated the effect of teacher interventions on group interactions and student problem-solving. This study involved 220 ninth-graders, placed into 55 small groups to work on an algebra problem. This time, the findings indicated that effective interventions – those that kept students on task – were also marked by whether or not the teacher evaluated students' work. Interestingly, on-task behavior increased both when the teacher agreed, and when the teacher disagreed, with the student's answer. In effect, teacher evaluations of student work allowed the teacher to better diagnose group needs, while still maintaining student autonomy by using their own ideas to move the group forward.

Limitations within these studies include the fact that both studies took place within a specific content area, age group, and problem-solving context. An intervention that increases student autonomy may appear slightly different in a language arts classroom, or in a problem-solving context that is more open-ended. Without further research in other classroom contexts, it

may be difficult to generalize the effectiveness of these teacher interventions for problem solving.

Teacher interventions and group discourse. Numerous studies have been conducted investigating the relationship between teacher interventions and group discourse. In a 2006 study, researchers Webb, Nemer, and Ing investigated the effects of teacher discourse – including discourse involved in small-group interventions - on small group interactions. Four middle school mathematics classrooms were observed over a semester. Each class was prepared extensively for cooperative group work through community-building activities, classroom identification of communication skills and group norms, and practice in help-giving and help-seeking behaviors. Student interactions were coded for help-giving and help-seeking behavior. Teacher discourse was coded for question and response patterns, in particular, the level of cognitive demand required of the student.

The results of the study found that student's helping behaviors within small groups closely mirrored the discourse modeled by the teacher. In the case highlighted by the researchers, the teacher took on the major responsibility for solving problems – both in whole-class discussions, and in small group interventions. The teacher would show the student how to solve a problem by setting up the steps, while the student's role was to listen and provide answers following those steps. In small group interventions, the teacher often simply confirmed correct or incorrect answers or directed students to work together, without questioning how students got their answers.

Student interactions in small groups were shown to mirror this low-level discourse, with help-giving students simply showing steps or answers with little explanation, and help-receiving students copying answers without asking clarifying questions in order to support their own

understanding. In this case, low-level discourse modeled by the teacher was reproduced within small groups.

Similarly, in a study conducted in a second grade language arts class, researchers found that a teacher's high-level discourse was reproduced within small-group discussions (Jadallah et al., 2011). Researchers observed, videotaped, and coded both teacher interventions and small group interactions. Teacher behaviors were coded for the following questioning strategies: 1) prompting and praising the use of evidence, 2) asking for clarification, and 3) challenging students' arguments. During discussion, the teacher attempted to remain as unobtrusive as possible, remaining seated off to the side, observing and only responding to students' volunteered contributions.

The researchers found that the teacher's use of questioning moves initiated chains of influence on children's thinking and talking. Over time, students began to use more detailed, reasoned arguments, and provided textual evidence. Even more, students began appropriating the teacher's questioning moves, increasingly asking other students for clarification and textual evidence. The findings of this study indicate that the teacher's use of questioning was a powerful method of both modeling communication skills, and reinforcing norms of critical thinking.

The limitations of this study most notably include the small sample size and differing small-group context. In this study, the teacher stayed with the small group throughout students' discussion. Though the teacher's participation was relatively low-key, it is important to note that many cooperative learning classrooms involve several student groups working and discussing simultaneously. In this environment, the teacher is much less omnipresent in conversation, and as a result, discussion interventions may be less consistent and targeted.

In this section, teacher interventions were explored as a means of reinforcing and modeling classroom norms of equal interaction, group autonomy, and critical discourse. In the following section, group processing will be explored as a method of reinforcing group norms through student metacognition.

Group Processing

What is group processing? Group processing, according to Johnson & Johnson (1990), is a reflection period that takes place after a group experience, where members describe what actions were helpful or unhelpful to the group, and decide what to continue or change. This process can be facilitated by the teacher or students in various ways, which will be reviewed in the following section.

Mediated learning experiences and group processing. In White and Dinos's study (2010), researchers wanted to investigate the use of Mediated Learning Experiences (MLEs) on a group's problem-solving and communication skills. MLEs are described as learning exercises in which a facilitator helps participants extract meaning from an experience that may apply to other contexts in their lives. Meaning-making and generalizations are gained, primarily, through group processing. In this case, the MLEs occurred within an adventure education context, with a focus on building group trust and communication skills through a series of games and group challenges.

Twenty-two middle school students – 11 boys and 11 girls - were randomly selected from a pool of volunteers from the same school and placed into two mixed-gender groups. To measure group trust and communication skills, groups' interactions were recorded and then coded for ontask and off-task interactions. Researchers took a baseline measurement of on and off-task communication for both groups with an initial group activity. After, the experimental group

participated in three one-hour mediated sessions involving trust activities, effective communication, and group-cohesion exercises. Then both groups participated in a non-mediated problem-solving exercise, and researchers recorded student interactions for on and off-task behavior.

Results of the study indicated that the experimental group's on-task interactions significantly increased after participating in MLEs with group processing. The control group's on-task interactions, on the other hand, decreased slightly. It is important to note that both groups started with similar rates of on task interaction. These findings indicate that MLEs can heighten cooperative skill development for small groups.

Several limitations were apparent with this study. For one, the group sizes used in the study were larger than the small groups generally formed for classroom activities. Also, group dynamics in classroom activities may become more complex, as academic status comes into play. Both of these factors make the study less generalizable to the classroom. Finally, and most importantly, this study did not go into detail as to how the facilitator ran group-processing sessions. Without a case study detailing facilitator-participant interactions, it is difficult to know how a teacher might implement MLE facilitation practices in the classroom.

The previous study explored how method of teaching that emphasized group processing enhanced group communication and trust. In the following study, the effects of different methods of group processing are explored, but within a more academic context.

Small-group vs. large-group reflection. Johnson and Johnson (1990) explored the effects of different methods of group processing on both group functioning and individual achievement. In this study, forty-eight high-ability Black American high school seniors and college freshmen were given a complex, computer-assisted problem-solving assignment.

Students were placed into groups covering four different conditions: 1) individual learning; 2) cooperative learning with no group processing; 3) cooperative learning with large-group processing only; and, 4) cooperative learning with small-group and large-group processing. Large-group processing was run by having the teacher observe groups for cooperative skills during the activity, then give feedback to the whole class. Small and large-group processing was run by having the students observe their groups for skills, then report their observations to group after the work session. The teacher also shared their own feedback with the whole class. Individual achievement was measured through success using the computer problem-solving task; group functioning was measured through both student surveys and group interaction observations.

The results of the study indicated that the cooperative learning conditions led to higher achievement than individual conditions. Groups that participated in small and large-group processing made the highest gains in both individual achievement and group functioning. There were no significant differences in achievement or functioning for groups in the large-processing and no-processing conditions.

Limitations of this student include the fact that the participants were composed of relatively homogenous groups - all students were identified as Black and high-ability. Younger, heterogeneous groups may need additional support to be able to successfully process within their own groups, without adult facilitation.

Student roles and group processing. Several studies emphasized the use of roles and group observation to increase involvement with group processing (Belland, et al., 2009; Johnson & Johnson, 1990; Jordan, 1997). Students could be assigned the role of "social skills coach", who would then observe and encourage their groups' use of a particular skill, and then share

their observations with the group at the end of the class. Or, as in Johnson & Johnson's study (1990), all group members could have the responsibility of observing one another for particular skills, and then report back to the group at the end of the activity. Finally, students could also reflect on how they fulfilled their group role, and how this affected the success of group as a whole.

Conclusion

Cooperative learning is a socially beneficial and academically challenging learning tool for middle school students. These benefits, however, are only available to students when group interactions are positive and equitable (Battisch, 1993; Cohen, 1997). Numerous researchers have stressed the importance of teaching social skills in an effort to promote these positive interactions between students in small groups (Cohen, 1994; Gillies, 1996; Johnson & Johnson, 1997). In this paper, I sought to answer the following question: how can teachers effectively develop social and communication skills for cooperative learning?

Four main components of social skill development were examined, including: developing classroom norms; direct instruction of social skills; teacher interventions; and group processing.

Developing Classroom Norms

Numerous studies explicitly pointed out the importance of orienting students before beginning group work (Cohen, 1995; Gillies, 1996; Johnson & Johnson, 1994). Orienting students to group work is important for constructing shared norms and expectations around cooperation. Research findings indicated that time set aside to develop shared norms and expectations led to increased group autonomy and positive social behaviors (Johnson & Johnson, 1990; Gillies, 1996; White, 2010). Three methods of developing norms were revealed through a

review of the literature, including: a) experiential activities (skillbuilders) b) whole-class discussion and behavior practice, and c) implicit orientation.

The limitations of these studies were numerous. Only one method - whole-class discussion - directly linked their method to increased cooperative behavior. The other two methods were drawn from case studies where teachers were described as employing a particular method, but the aims of these studies were to investigate teacher perceptions or academic achievement, not social skill outcomes. Additionally, only one method – experiential – provided sufficient description and rationale so that a teacher could effectively replicate it. Finally, no studies were found that compared one method with another. Without a comparative study, it is difficult to draw conclusions about the benefits and drawbacks of one method over another. Further research comparing these methods and their cooperative skill outcomes would be extremely useful for the classroom teacher.

Direct Instruction of Social Skills

Direct instruction of social behavior may be another effective strategy in developing cooperative skills. Several studies linked the effects of direct social skill training (SST) to positive behavior outcomes (Durlak et al., 2010; Rutherford, 1998; Sugai, 1996).

Interestingly, most of these studies found using direct instruction to increase prosocial behaviors were focused on targeted populations with social skill deficits. These populations included delinquent youth, students with Emotional-Behavioral disorders, and students on the autism spectrum. Other studies that *did* involve the general education classroom investigated social-emotional curriculum, but did not incorporate cooperative learning as a factor in their research.

So what does this mean for the teacher of a cooperative learning classroom? In effect, direct instruction may be an appropriate scaffold for teachers who notice specific social skill deficits as students work together in groups. Teachers can use the direct instruction cycle as a means of targeting problem behaviors, and replacing them with more cooperative ones.

Teacher Interventions

One theme that appeared frequently in the research on teacher interventions was that of promoting cooperative discourse and helping behaviors. Research suggested that the way in which teachers intervene in small groups - the praise they give, the questions they ask, and how they ask them - can effectively model and reinforce appropriate questioning, helping behaviors, and critical thinking skills (Gillies, 2007; Jadallah, et al., 2011; Webb, 2006). Teachers may also be able to intervene to affect equal-status participation in groups through assigning competence to low-status students (Cohen & Lotan, 1995).

Other teacher interventions studies focused on group autonomy and motivation, rather than cooperative discourse and helping behaviors (Chiu, 2000, 2004). Research findings suggested that interventions were particularly effective if the teacher evaluated a group's work, provided lower levels of help content, and issued fewer commands. Teacher commands were only effective if they were short, specific, and if a group did not have problem-solving strategy that they were already working with.

While the first set of studies focused on reinforcing norms and cooperative discourse, the studies mentioned previously focused on maintaining a group's motivation and autonomy in solving a problem. It is important to remember that, at any one time, a teacher may have a multitude of academic and social goals in mind when managing small groups. These goals may include normalizing disagreement, encouraging task persistence, or equalizing status, among

many others. Each goal requires adjusting to a group's specific needs, which in turn may change an intervention's style and length. For example, a teacher encouraging task persistence on an algebra problem may intervene using targeted, closed questions to diagnose student needs, and leave shortly after to keep students working together. A language arts teacher intervening in a discussion around a text, however, may ask several open-ended questions that model critical thinking skills. In other words, the *style* of an intervention will depend on the context of the activity, the local context of the group, and the goal of the teacher. The *effectiveness* of an intervention may be contingent on the teacher's ability to accurately assess a group's needs in relation to the learning goal.

Group Processing

Group processing was recognized as an important component of developing cooperative behaviors among several researchers (Cohen, 1994; Gillies, 2007; Johnson & Johnson, 1990; Rutherford, 1998; White, 2010). Cooperative learning environments that emphasized group processing showed positive indicators of group autonomy, cohesiveness, and problem-solving ability (Cohen, 1994; Glass, 2002; Rutherford, 1998; White, 2010). Several studies emphasized the use of roles and group observation to increase involvement with group processing (Belland, et al., 2009; Jordan, 1997; Johnson & Johnson, 1990). Studies that took place in experiential education environments additionally had students reflect on how the cooperative experience related to their life outside of the group (Glass, 2002; White, 2010). This particular method showed the potential benefit of allowing students to build group trust and cohesion.

Though numerous researchers emphasized the importance of group processing, only one study was found that directly investigated and compared the effectiveness of different processing methods (Johnson & Johnson, 2001). This study found that group processing increased both

group functioning and individual achievement. Even more, groups that participated in both largegroup (teacher-led), and small-group (student-led) processing made the highest gains in group functioning and achievement.

What does this mean for the teacher of the cooperative learning classroom? Teachers might use group processing to help students reflect on how their behavior impacts their group, and the class as a whole. Methods for group processing could include having individual students observe and reflect on their own group's use of targeted skills, having students reflect on group roles, and having students process within their small groups, and among the whole class. Encouraging students to make generalizations about their group experience to situations outside of the classroom may help build trust and a sense of community.

Further Research

Many of the studies found during research were quantitative, and focused on showing the effects of a particular method of cooperative learning on achievement or peer relationships. Studies on teacher interventions have given the most detailed view of the teaching process – however, more research is needed to understand how teachers can effectively introduce cooperative learning norms and facilitate group processing. Comparative studies, and in-depth qualitative studies would help fill this research gap, and help teachers create learning environments that support the development of students' social and communication skills.

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Too Stressed for School: Strategies for Improved Student Engagement, Learning, and Memory

Trygve C. Berg

Abstract

Based upon current research, it is evident that stress interferes with student academic success by inhibiting engagement, learning, and memory. Of interest to educators and administrators, this literature review addresses the question: what strategies can a teacher employ to mitigate the negative effects of student stress? It is organized into two sections. The first section of the review examines research correlating the relationship between stress and engagement. It also examines the association between stress and the ability to learn and remember. The second section of the review examines available teaching strategies that may mitigate these effects. The findings indicate that students benefit from: opportunities to be creative and expressive, student-centered options, connecting their studies to nature, specific patterns of inquiry questioning, and sorting through cognitively demanding tasks in small groups. In addition, teachers can incorporate technology into their lessons when it provides context to a lesson or includes a concrete example. The review will end with a discussion of ways in which to apply these strategies and with recommendations for future research.

Too Stressed for School:

Strategies for Improved Student Engagement, Learning, and Memory

Most people can relate to a time when it was difficult to learn or remember something because they were experiencing anxiety, worry, depression, fear, or other feelings of distress. Students also experience this difficulty in the classroom. Moreover, a growing number of students are experiencing high levels of stress in their lives, when compared to the experiences of students from over a decade ago (The White House, 2011; U.S. Census, 2010). Subsequently, these students can become too stressed for school and their ability to effectively learn may be at stake. For educators who are dedicated to improving academic achievement, this leads to the question: what strategies can a teacher utilize to mitigate the negative effects of student stress?

During my student teaching experience, I instructed a student who suffered stressful past life experiences so severe that the student was afflicted with constant migraine headaches, thus hindering this student's ability to concentrate and learn. Although this is an extreme example, this student was not alone. Some factors for stress in the lives of students are easier for educators to identify, such as physical and/or mental disability, recent relocation, cultural acclimation, or teen parenthood. Other factors may or may not be as visible to teachers, such as parental divorce, bullying, poverty, foster care, homelessness, military deployment of parent(s), identity crisis, pressures of parental expectations, dysfunctional family life, drug/alcohol/gambling abuse, emotional/physical/sexual abuse, chronic illness, or death of a family member. Even though it was clear that several of the students I taught struggled with one or more of these factors, I also recognize that many others struggled silently. In order to help stressed students, it is important to first have a clear definition of stress.

Stress is multifaceted and can be described in many different ways. For example, it can be experienced as either positive (eustress) or negative (distress). In relation to negative stress, researchers have found that feelings of distress are the body's response to a perception that it cannot cope during a given stressful situation (Bracha, 2004; Cannon, 1915). Moreover, feelings of distress can occur as a result of thinking about overwhelming situations from the past, in the present, or imagined about the future (Lazarus & Folkman, 1984). In terms of biology, the hormonal release of cortisol, which triggers these emotions, is the body's way of coping with short-term stress (McCormick & Mathews, 2009). To synthesize these ideas and to more specifically define stress within the context of this paper: stress is more than the presence of a potentially stressful situation, for it occurs when the body has a biological response to a stressor which results in feelings of distress, such as anxiety, worry, depression, and fear. While I acknowledge the perspective that students who have moderate amounts of pressure in their lives may actually be motivated by the stressor, in order to explore my research question this review will only focus on how stress may negatively impact academic achievement.

To answer this question, this review examines current, peer-reviewed research on how stress effects students. Based on the findings of the literature, it is apparent that there is a correlation between stress and student engagement. It is also evident that there is a relationship between stress and decreased learning and memory. Second, this review looks at studies of teaching strategies that mitigate the effects of stress on student engagement and learning.

This literature review is first limited in how stress is defined. As such, the review does not explore either positive stress, or negative stress that can have limited positive effects on learning or memory. Next, there are no studies that examine any type of direct correlation between existing teaching methods and stress. As a result, this review focuses instead on

research that indirectly answers the research question. It first looks to identify the effects of stress on academic success and then identifies the contributing factors that influence those effects. Although a multitude of factors have been explored in relation to academic success, only the factors of engagement, learning, and memory will be addressed. Finally, the review of the literature does not look at ways to improve student memory. Based upon the research of Bangasser and Shors (2010), the conditions for improving memory and learning appear to be the same. If the proposed conditions are optimal for improved learning then they will be optimal for memory as well.

Literature Review

The Negative Effects of Stress on Student Academics

Researchers have both directly and indirectly studied several factors relating to stress that negatively influence academic achievement (Bangasser & Shors, 2010; McCormick & Mathews, 2009; Moore & Vandivere, 2000). The findings demonstrated that three of the important factors that led to academic success were: a student's ability to engage with the class lessons, learn the material, and remember the information. From the studies surveyed, two stand out as explicitly linking the negative effects of stress to difficulties with student engagement, learning, and memory. The first is a quantitative national government survey that indicated a correlation between living in stressful family households and reduced student engagement in school. The second is a peer reviewed scientific study that identified the biological reasons for why stress disrupts learning and memory.

The National Survey of America's Families (NSAF)(1997) both indicated the effects of stress on student engagement and established a baseline for stress levels from just over a decade ago. The NSAF was primarily intended to assess the effectiveness of federal policy changes

regarding education and welfare reform (Moore & Vandivere, 2000). Indirectly, it also determined the amount of family stress children experienced in the United States. To determine this, Moore and Vandivere combined several questions to create a "stress index." This rating was influenced by factors such as: ability to pay the mortgage, number of occupants per household bedroom, availability of food at the end of the month, access to healthcare, and any parent or child's poor physical and/or mental health. Most of these qualifiers are related to the financial means of the child's family. The survey polled 44,461 family households with children.

The data collected indicated that over 20% of all children under age 18 had stressful family lives (Moore & Vandivere, 2000). Even more noteworthy, it also indicated that 31% of children ages 6 to 17 were academically disengaged due to having stressful family lives, in comparison to the 17% of the other children who were disengaged but not measurably stressed (Moore & Vandivere, 2000). According to this research survey, over one in five students experienced stress primarily due to economic reasons. Also, students with stress are academically disengaged at nearly twice the rate of their peers without stress.

The NSAF had limits. Because it only polled families with homes, it failed to capture the stress experienced by numerous homeless youth. Neither did it demonstrate the stress levels of today's students. Between the time of the survey and now, there have been two more recessions which would suggest that even more students are under stress now than before (U.S. Census, 2010). The 2010 census does not indicate the stress levels of today's youth, but some of the data can be used to speculate about the current rates of stress. A review of the 2010 data indicated that poverty among children under the age of 18 rose five percent, from 16.9% in 2001 to 21.9% in 2010 (U.S. Census, 2010). Further limitations of the 2000 survey were that it did not look at other factors that cause stress such as divorce, relocation, alcohol/drug abuse,

physical/mental/sexual abuse, teen parenthood, chronic illness, and/or the death of family members. Another such factor that was not included was the military deployment of parents. According to the Department of Defense (The White House, 2011), there are currently 220,000 children with one or more parents militarily deployed. Moreover, 700,000 children have experienced parental deployment in the last decade due to the wars in Iraq and Afghanistan (The White House, 2011). If all of these added factors for stress were accounted for, then the anticipated number of students struggling to cope with stress would be measurably higher. Lastly, while the NSAF indicated a correlation between stress and student engagement, it does not identify causation.

In contrast to the NSAF, the second study is a peer reviewed scientific journal article that identifies the biological reasons for why stress disrupts learning and memory. Bangasser and Shors (2010) conducted a study to demonstrate that there is a causal relationship between the release of the stress hormone cortisol and the processes that relate to learning and memory. The researchers proposed two models of how this actually occurs within the brain. The first model proposed that stress hormones act on areas of the brain that inhibit learning and memory. They tested this directly by injecting drugs that mimic or block stress hormones directly into the brain regions that are used during learning. These tests were performed on rodents as an alternative to testing on people. The researchers determined that, "stress hormones directly modify activity within the hippocampus to influence learning" (Bangasser & Shors, 2010). The second proposed model looked at the relationship between the amygdala, hippocampus, and the bed nucleus of the stria terminalis, which is an area of the brain associated with stress and anxiety. The researchers used eye-blink conditioning tests to check the functionality of the regional brain circuitry. As a result, they found that changes in activity within the studied brain regions indicated that stress

altered the process of learning. This demonstrated to them that the brain circuitry used in learning may be altered as well.

Critics might claim that Bangasser and Shors' study is limited in its direct application to teens because the studies were performed on rodents; however, it is not possible to perform certain neurological tests on human subjects. In these instances, researchers are reliant upon animal models to provide data that can relate to human physiology. As a part of their initial findings, researchers discovered an unexpected variance with the results of the eye-blink conditioning that was related to the gender of the test subjects. Although Bangasser and Shors are confident that stress hormones still altered the brain circuitry of both male and female rodents, due to the variance in their findings, they believed that female rodents utilize a different combination of brain regions in their learning processes.

An additional caveat for teachers is that most studies on student stress do not differentiate between short-term (acute) stress and long-term (chronic) stress. Chronic stress has an additional detrimental effect in addition to the general effects of both acute and chronic stress on engagement, learning, and memory. McCormick and Mathews (2009) found that chronic exposure to cortisol influenced the brain's ability to form new neural connections for the purpose of learning and memory. Consequently, adolescent students under chronic stress not only have difficulty with their immediate success in academics, but the changes that occur within their brains also alter their abilities to learn into adulthood (McCormick & Mathews, 2009).

To summarize, from these studies it is clear that stress negatively impacted student engagement, learning and memory. There is also the added implication that learning into adulthood is at risk. As a teacher working in a classroom, it is important to understand what teaching strategies can be used to mitigate the effects of stress. The next section is organized into

strategies that will improve engagement and learning. Again, I did not include strategies to improve memory because Bangasser and Shors (2010) already demonstrated that the conditions required to improve learning will also improve memory.

Teaching Strategies that Mitigate the Effects of Stress

Studies in this section include the following approaches to engage students: a study focusing on varied approaches, a study focusing on the effects of student choice, a study focusing on the influence of nature, a study focusing on the role of service learning, and a study focusing on the use of videos. The first study was particularly important because Intrator (2004) spent several days shadowing students while carefully observing their level of engagement. He also followed up with interviews to get the students' perspective about their own perceived level of engagement. From this study, several recommendations were made that match the results of the other listed studies. Although these journals collectively tended to lack substantive data, they contained teaching practices that are pedagogically relevant.

As part of his research on engagement, Intrator (2004) spent 130 days in a diverse California high school trying to discern what caused students to engage with learning. In order to get a better understanding of students' experiences in the classroom, Intrator followed and observed students during their daily routines. Later he interviewed them, investigating their cognitive and emotional experiences and the classroom factors that caused these students to engage or disengage in their work. Intrator found that students reported that they had experienced academic moments that were both inspiring and depleting. Unfortunately, on average, the students' experiences were reported to have been boring and wasteful.

Similar to my own observations while teaching, Intrator also made observations of students under distress in the classroom, which he referred to as "worry time." Students who felt

depressed or irritable had difficulties concentrating and some students devised strategies of faking interest. They did this by positioning their bodies and books in a way to feign interest. He stated, "High schoolers spend vast stretches of time worrying and strategizing about nonacademic matters. Students describe a host of distractions to their attention that drain their capacity to emotionally and intellectually connect with what happens in class" (p. 22). Although Intrator recognized that students worried, students explained in the interviews that the anxiety was either due to arguments with peers or in relation to performance activities (i.e. football or theatre). In class, these students were observed to be attentive but passive in their learning.

In contrast to the "worry time" observed, there were times when many students were deeply focused, animated, and immersed in learning. Students found those learning experiences to be fun, fascinating, engaging, and memorable. After watching several instances of engagement in the classroom, Intrator found the common link to be that engaging teachers were relentless about seizing and retaining their students' attention. They knew that students choose whether or not to participate in school. As such, these teachers choose to make participation more appealing than apathy. Intrator recommended that one invigorating way to do that was to provide students with opportunities to be creative, imaginative, and original. Students also became involved in class when they could express their ideas in a safe place and when their ideas were taken seriously. Intrator provided two more effective examples for breaking routines. He encouraged taking students outdoors for class and using video with rousing footage in class.

In addition to taking class outdoors and using captivating videos with a lesson, Intrator saw that it was important for teachers to also do the following: be energetic in the delivery of the lesson, share curiosity about the subject matter, and have a passion for lifelong learning in an authentic way. Additionally, engaging teachers manipulated the pace of the classroom, controlled
the tempo throughout the class period, and paid attention to the effectiveness of transitions between lesson activities. They also resonated in their connection to the class, taking time to understand and appreciate students for who they were as individuals. Moreover, they connected lesson plans to their students' interests, experiences, abilities, and styles of learning. These efforts were made as a way to win the hearts and minds of students and assist them in finding direction and significance in their educational experience.

Intrator's study was unique in its qualitative approach when compared to the research methods of the other studies. Its strength is based upon the personal acknowledgments of student engagement during the interview process, versus studies that may have had data that reflected engagement when students were actually only pretending to be interested. It strengthened the study when Intrator was explicit about the number of days he spent on his research, and when he explained that it was a "diverse" population of students.

Disappointingly, Intrator's study contained no measurement of the level of change in student engagement. Furthermore, he did not provide any data on the number of students interviewed, nor did he provide any demographic data on the participants. Subsequently, educators have few ways to evaluate the degree of effectiveness of these strategies, the diversity of the participants, or the applicability of the results to a larger population of students.

Intrator's study would have been stronger if multiple schools were selected from around the nation. However, selecting a convenient sampling of participants appears to be a similar trend among the available studies. After examining Intrator's work, it would be helpful to review studies that provide a further look at the effectiveness of his recommendations.

The next four studies look more closely at improving engagement in different ways. The first of which featured Gardner (2011), a teacher who fought for her students' attention by

providing opportunities to be original. Gardner also aided the development of student agency by offering students a variety of ways in which they could learn the class material and demonstrate their understanding of what they learned. Gardner offered the 20 to 25 students in her U.S. History class a selection of choices in the classroom by giving them all activity menus. These menus were based upon a developmental psychologist's theory of "Multiple Intelligences" (Gardner, 1983). The menu selections the researcher offered were grouped into the following categories: spatial-visual, kinesthetic-movement, linguistic-verbal, musical-song or instrumental composition, interpersonal-self's relation to others, intrapersonal-self reflective, mathematical-numbers, and naturalistic-self in relation to the environment.

Gardner's (2011) class had varied educational needs and this approach supported her students' need for multiple modes of comprehensible input. Assignments based upon activity menus provided students not only an opportunity to be original, but also an opportunity to be imaginative and demonstrate expertise with a skill or area of knowledge. It also allowed students time to practice and develop their listening and speaking skills, which is particularly important for students who lack proficiency in these areas. Additionally, students who struggled with English or literacy could participate more in class by having choices available to them. It was not explicitly stated, but I assume that this was because they got to practice their skills by working on projects that were more aligned with their current level of skill. Gardner appreciated that this teaching strategy allowed students to work in different media and to engage in new activities that she would not have otherwise used in her class. She saw that this provided an enriched exploration of the course material in a way that benefited her students. Gardner also found that she had more free time to assist students individually, after students became familiar with activity menus and group work. In addition to improving engagement in the classroom, Gardner

found that more of her students did their homework when it was assigned as an activity menu project.

Gardner also introduced this teaching strategy to teachers within The City University of New York's Adult Literacy/ESL/GED Program, and she collected teacher responses regarding the effectiveness of the activity menus. Gardner found the feedback to be positive, as the strategies helped to promote differentiation based upon interest, readiness, and learning profile. They also promoted a student-centered classroom that valued active learning, student responsibility, community building, and self-efficacy. Another teacher that Gardner interviewed substantiated many of the researcher's earlier observations and noted that she saw both students' abilities and confidence grow. Quieter students became more outwardly involved in class participation and self-expression. Many of the students took more risks, valued their own agency, and appreciated the opportunity to have their voices heard and respected.

In addition to Gardner's observations of students in her classroom and of the interviews she did of teachers in New York; Gardner reflected upon her own workshop experiences prior to implementing this technique in her classroom. As a result of her reflections, she realized that this approach lowered the level of anxiety she felt toward math. This was because she was able to explore geometric angles through poetry, which she later shared with peers. Not only did Gardner comment that her own learning was more interesting, but also the multi-faceted group presentations by her peers were more engaging as well. She also thought that it was easier to take risks when the purpose for the risk was her own growth.

Gardner's study did a better job than Intrator's at casting a broader net for its selection of participants, as the strategy of group work was implemented in multiple classrooms. However, there was still no demographic data, quantity of participants, or measurement of change in

engagement. Furthermore, this researcher's recommendations could be challenging in their implementation. For example, the students' end product was not predetermined which would make assessment challenging. Gardner also addressed the challenges involved in planning and preparation of the materials necessary for students to have access to all of the learning choices. In addition, she recommended against letting group projects have more than three to four members due to the limit in opportunities for all members to participate.

Also aligned with Intrator's recommendations, the next study explored the importance of nature in engaging students. Alexander and Russo (2010) researched the benefits of taking students outdoors for class. Students participated in citizen science as a way to foster curiosity about the natural world. Citizen science is a practice whereby all people can contribute to data collection in order to supplement scientific data about various species of wildlife under study. The participants of this hybrid study were 22 children, six to seven years old; 8 were girls and 14 were boys. The children were selected from a middle-class, suburban primary school in southern Australia. The students observed local bird populations at and around their schoolyard. The students then drew magpies and other familiar birds from memory, labeling the main parts of the anatomy. Lastly, the students extended their learning about these birds by researching and adding factual information to their drawings, studying various forms of literature, studying indigenous perspectives, or developing abstract drawings. This was another example of student choice.

In the end, Alexander and Russo found that involving students in active exploration of the outdoor environment and including indoor extensions built upon that initial work, definitely demonstrated a steady level of student engagement. Five female teachers were also interviewed regarding their perceptions of the student achievements. The instructors felt positive about the student experiences as well as the academic results. Based upon the student data, most of the

children scored either "good" or "excellent" for their participation, work samples, and sustained interest. Nearly half of the class had little interest in extending their studies beyond the classroom setting, yet over half of the class did continue additional work on the assignment. In general, all of the students responded favorably in their interviews to the process of teaching and about their experiences. In contrast, the study did not demonstrate an improvement in their understanding of the scientific concepts. Unfortunately, the researchers did not speculate on this disparity.

Even though Alexander and Russo's study provided information regarding the number of participants and their sex, educators still were not given any further information to determine how likely the results from this study may apply to another population of students. The fact that the students live in Australia may in itself limit the applicability of the study to students in the United States. Regardless I selected two studies from Australia, as there has been more recent research done there that relates directly to student engagement and learning. Even more useful to me is that this research is often focused on middle-school science classrooms, aligning with my next student teaching placement. Nonetheless, these strategies are more broadly applicable than just that. For example, outdoor lessons could be incorporated into writing and art classes to name just two applications.

The fourth study examined the benefit of using service learning to promote student engagement. Likewise this strategy also had an outdoor component. Struck by staggeringly high national drop out rates among high school students, Payne and Edwards (2010) focused on engaging students through service learning. In the survey *The Silent Epidemic* (Bridgeland, 2006), Payne and Edwards read that nearly a third of the nation's students were not graduating high school, and nearly half of those adolescents noted that they lost interest in school as did their peers. With an interest in engaging students, Payne and Edwards used The National Middle

School Association's (NMSA) (2010) keys to engagement as guiding principles for their research. A few of the principles that the researchers listed were: students preferred active learning in peer groupings, they were curious about the world and wished to make it better, they were quick to connect what they have learned to real-world situations, and they wanted to contribute to a cause larger than themselves (NMSA, 2010). Service learning seemed like an obvious approach to connecting student experiences in the classroom with their intrinsic interests.

Payne and Edwards were not clear on how comprehensive the study was, but they did mention two of the schools that participated. They followed the results of a middle school in Belfast, Maine, and a K-8 charter school in Minneapolis. In Maine, students secured land intended for paving to grow niche crops. In the process, they learned about soil composition and seed germination as well as business, physics, chemistry, english, math, economics, and history. In comparison, students from Minneapolis studied global issues of social justice at a local level in cooperation with an organization focused on improving working conditions for migrant workers. These students spread the lessons they learned to the community at large by lobbying, mentoring, and through public speaking engagements. One eighth grader spoke to a classroom of college students, teaching them about the curriculum and about the organizations the charter school helped. He expressed that, after teaching the college students about what he participated in, he could envision himself going to college himself. Another student chose to not give up on school when he saw that he could make a difference as a mentor.

The fifth study on engagement explored the use of powerful videos. Trier (2007, February; 2007, April) published a two-part study focused on engagement through the use of technology which supports: a wide range of interesting materials; mutual construction and

sharing; and flexibility and comfort. In the first part of his study, Trier (2007, February) discussed that his research was based upon a graduate course he taught titled "Cultural Studies and Education." Students actively sought out and shared with classmates video clips that extended or supported their understanding of the assigned weekly readings. Trier felt that the large quantity of resources available on *YouTube* allowed students access to interesting and otherwise difficult to obtain information on a tremendous variety of subjects. Another benefit of *YouTube* is that the mutually constructed collection of videos could be viewed or shared in a manner that allowed students the flexibility and comfort of viewing the information at a time and place that best met the needs of students.

In the second part of his study, Trier (2007, April) walked teachers through *YouTube* usage. As he was doing so, Trier expressed that he also used videos that provided historical context and examples as a part of his direct instruction. These videos helped students to relate to historical events that they had little or no prior knowledge about. Trier modeled examples of searches he would perform. The videos he selected gave him access to information that was both popular and elicited student participation. Trier also pointed out ways in which educators can expand their searches to collect more information about their topic. In his own searches, he often found information on novelists, poets, playwrights, musicians, actors, and pop culture. Another advantage of this format was that students watched and listened to how artists performed or read aloud their work. As such, students experienced the work in a manner closer to the way the artist originally intended. In the end, Trier was clear that his focus was not on recommending specific videos to educators, but rather to inform educators of the possibilities that this medium offered.

Trier's study was limited in that the participants were graduate students, and as adults they had more autonomy to browse the web for video content. Older students would likely have been more responsible and critical of the video content before posting and sharing among classmates and faculty. Moreover, if younger students selected their own video materials, they would need to be taught to be critical of a video's source, particularly as it relates to the accuracy and authority of the video's content. They may also need to be given guidelines in relation making judgments about what is appropriate for the classroom.

Trier also does not provide data on the participants in the classroom, nor does he provide any indication that he measured student engagement. Educators are left to assume that the author observed some type of improvement in student engagement in order to substantiate his impetus to publish two studies on the subject.

In summary, in order to improve engagement Intrator, Gardner, Alexander, and Russo all expressed that stressed students can benefit from opportunities that allow them to be creative and expressive. Intrator and Gardner suggested that educators connect lesson plans to their students' interests, experiences, abilities, and styles of learning. Intrator, Alexander, Russo, Payne, and Edwards all recommended taking students outside in order to break classroom routines. Intrator and Trier also advocated for breaking routines by using engaging video footage to elicit participation. Even though the primary focus of these strategies was on improving student engagement, all of the authors noted that they would also improve learning as well. In the next section are studies that propose further strategies to improve learning.

Studies in this next section include a study focusing on the collaborative effects of group work and a study focusing on the importance of a sequence of effective discourse styles. Even though the next study focused on engagement, its main value remained in the improvement of

student learning. In particular, Williams (2011) wanted to know if group work would reduce the cognitive load experienced by students when material was presented via a class lecture. To determine whether group work was effective in this regard, Williams used opportunistic sampling to select 14 of 17 students enrolled in his class. Each group consisted of three to five individuals that collaborated on a task, who then presented their findings informally. For students, this meant a shift in responsibility. Failure to understand on an individual basis meant that students only failed themselves. In this new environment, failure to understand meant that a student may contribute to the failure of the other group members as well.

Afterward, students reflected on their experiences and the impact that group work had on their engagement and learning. Students expressed that learning experiences that involved group work were more interesting than previous lectured experiences.

In addition to using qualitative student interviews the researcher also used quantitative questionnaires and statistical results from three multiple-choice quizzes. Each quiz consisted of 26 questions which were intended to be crafted with less bias. Yet, the researcher acknowledged the possibility that question formats could still be biased. Based upon the datasets from the questionnaires, the important factors contributing to successful group work were: participation, responsibility, communication, trust, and friendship. As such, Williams found that group work provided better understanding of topic material in comparison to individual understandings of lecture material. He also found that groups that collaborated better also obtained deeper understandings of the content. Williams surmised that the benefit of group work is that students can pool together information and resources.

Williams' study was limited in the following ways: the sample of participants was selected based upon the convenience of utilizing the students from the practitioner's classroom,

the sample size was small, and the participants were primarily male. All of these factors indicate that the sample may not be representative of a larger population. Also the quiz results were dependent upon students' foundational prior knowledge in the subject matter, their prior abilities to work within groups successfully, and collective intrinsic motivation to succeed. Even more critical is that this study on group work was researched in a university setting. In regard to my upcoming teaching, middle school students would require scaffolded practice to develop strong habits in group work.

The second study examined communication's role in assisting learning. Hackling, Smith, and Murcia (2010) looked at four specific combinations of discourse in relation to the different phases of the "5E" model of teaching, and observed the results. The "5E" model contained the following phases: engagement, exploration, explanation, elaboration, and evaluation. The researchers compared this first model of discourse to another model that followed a pattern of Initiation-Response-Evaluation (IRE), and a third model that used questions to promote reasoning and wait time to encourage deeper thinking. For students to achieve optimal learning, this study recommended a different approach during each of the five stages of discourse.

In the first phase, Hackling, Smith, and Murcia's study says to incorporate "interactive discourse" that used many voices and "dialogic discourse" that used many ideas during the early stages of engagement and exploration. The study determined that the use of wait time benefited both students and teachers by providing time after questioning for students to formulate better responses and by providing teachers more time to improve probing questions. This study found that teacher questioning was best when it focused on the clarification of ideas or on seeking alternative explanations, rather than on evaluating the responses. Throughout all five stages, discourse was best when teachers and students listened to one another in a supportive way.

Teaching Toward a Better World

During the explanation stage of the "5E" process, the study found that the best style of discourse was one that transitioned between being "interactive" and being "authoritative." In this way, both the students' voices and the teacher's were used to review ideas and connect them to scientific principles. During this process many ideas were eliminated as students reasoned through why certain ideas may not be appropriate while focused questioning lead the discussion toward a justifiable outcome. If necessary, the instructor corrected misconceptions. Shorter wait time was generally used at this stage, but longer wait time could be used depending upon the questions' difficulty. The study suggested that the teacher may summarize students' collective ideas to keep things clear for the class. Summarizing was designed to draw together class ideas in a coherent, purposeful combination that aligned with lesson goals.

During the elaboration and evaluation phases, students internalized what they learned and tested their assumptions through scientific investigation. The study found that interactive and dialogic discourse was best suited for the investigation process, particularly as students interpreted and evaluated an experiment's data. Hackling, Smith, and Murcia suggested that interactive and authoritative discourse may also be used.

Although Hackling, Smith, and Murcia did not value the IRE style of discourse found within the first model of discourse the researchers examined; they valued the use of wait time during the early phases of discourse, present within the second model. This was evident as researchers incorporated wait time into many of their recommendations, specifically during the times when students were engaging, exploring, and explaining. Hackling, Smith, and Murcia suggested the use of a wait time of three to five seconds after a question was asked before taking answers. In *Teaching Like a Champion*, Lemov (2010) also used this approach to improve the number of students offering an answer. As a result, he found that discourse improved in the

length and correctness of answers, and increased the use of evidence that students utilized to support of their claims. In addition to using wait time, Hackling, Smith, and Murcia (2010) also expressed the importance of establishing initial ground rules for group work.

In summary, in order to improve learning Williams recommended small group work which was also recommended by Gardner in the section on engagement. In addition to that, Hackling, Smith, and Murcia encouraged a specific approach of using discourse to aid the process of inquiry-based learning.

Discussion of the Findings

In the book *Discipline with Dignity*, authors Curwin, Mendler, and Mendler (2008) remind educators that, "It is important for teachers to remember a time when learning something was hard for them. This will help teachers treat struggling students humanely and with dignity" (p. 167). Similarly, teachers should be mindful that many students in their classrooms are faced with stress, whether teachers are aware of it or not. Today's students struggle to focus on school demands while distracted by life's stresses.

Although research is lacking when it comes to studies that look directly at teaching strategies that lower student stress, research shows an association between stress and student disengagement. A causal relationship indicated that stress inhibits learning and memory on a biological level. Moreover, teenage brains are still forming and stress has the potential of permanently altering the way an adolescent learns as an adult. According to the research, educators have the power to effect change in the lives of stressed students. The studies indicated that teachers may improve student engagement and learning by providing opportunities for expressions of creativity, student agency, connections with nature, group work, discourse, and the use of technology.

As a teacher, I recognize the need to align my teachings with research findings. One way may be to provide students with opportunities to expressively address social or environmental problems. Most children can easily identify one or more animals that they feel connected to or are fascinated by. Connecting student interests to a problem like animal extinction may provide an opportunity for students to actively deconstruct the problem.

Creating a safe place of discourse, where ideas are encouraged and respected rather than ignored or dismissed, provides a forum where collective ideas can be shared. Intrator (2004) tied this concept to student engagement when he said, "I can't emphasize enough how invigorating it was for them to be part of a discussion or project that allowed them to express their originality. Students tuned in when they felt they were in a safe place to share their ideas" (p. 22-23). After addressing the problems and proposed solutions, students could choose, as individuals or in small groups, ways to communicate their findings to one other. The product may be a visual arts project such as a poster or video, writings, performance art, or an outdoor demonstration. Regardless of their chosen mode of output, students would be asked to explain the reasons for selecting and sharing the project they chose. This use of student voice may act as a form of formative assessment to determine what students understood, analyzed, synthesized, and evaluated in relation to the lesson's goals.

It is my hope that an engaging class will be a sanctuary and provide a brief reprieve from life's stresses. In addition to looking at ways to push back against stresses from outside of the classroom, strategies like providing differentiated instruction, flexibility with assignments, and opportunities for group work may help to make class work itself a less stressful experience.

As mentioned previously, the recommendations of the studies only offered indirect ways in which to lessen stress. By that, I mean the teaching strategies were intended to reduce the effects of stress, not the stress itself.

Ideas for Future Research

It might prove insightful if further research examined the direct influence of these teaching strategies on stress. To determine the scope of the problem, it would be helpful to survey students to determine how many of them are impacted by stress in their lives. I anticipate that if a study was conducted that accounted for the aforementioned factors of student stress, then the number of students considered to be living under stressful conditions would be much higher than previously reported. To create a stress indicator benchmark, students could indicate via a questionnaire what level of stress they are experiencing prior to the introduction of the teaching strategies. Researchers could then use follow up interviews or questionnaires to measure the change in stress levels in relation to each teaching strategy. Although I found Intrator's use of student voice to be powerful, it would have been more powerful to incorporate quantitative metrics into the study as well.

One example of studying the direct effect of teaching strategies on stress would be to examine the effect of developing classroom community. Researchers could explore whether developing a classroom community through either group work or service learning would better mitigate stress. One might speculate that a classroom community could act as a support system for stressed students. In order to test this, a researcher might measure outcomes from improved peer relationships and a developed sense of friendship.

A second example of this would be to examine if the effect of developing students' selfefficacy through group work and student-centered activity menus would mitigate stress. Perhaps

self-efficacy might act as a tool that would make students more resilient against negative stress. Researchers might measure the effectiveness of students' abilities to better understand complex concepts, while working together in groups. Individual students may then see that they can also overcome similar obstacles on their own. This would provide them a greater sense of confidence in their ability to cope with future challenges. Also, helping others by serving the community may provide a sense of purpose, achievement, and elation that may act as counterweights to the negative emotions associated with stress. However, group work requires scaffolded instruction so that it functions well, otherwise working within a group may then become stressful. Other teaching strategies for research could include an examination of how individuals create imaginative art, or connect with nature as a way to relieve stress.

In conclusion, teachers have no direct control over the stressors that students experience. Yet, we are faced with the task of helping students learn and develop into adulthood in a holistic manner. To do so, teachers must overcome the disruptive influence of stress on engagement, learning, and memory. The teaching strategies recommended in these studies have demonstrated powerful influences over mitigating student stress. Certainly these strategies, when applied in the classroom, would improve the engagement, learning and memory of stressed out students, with the potential to also improve their academic achievements.

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Thinking about Groupwork: The Effects of Low Press Metacognitive Academic Journaling on Groupwork Skills, Processes, and Affect

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Abstract

This live action research examines the effects of low-press metacognitive journaling on groupwork affect, processes, and skills as a means of partially addressing the deficit in groupwork competency routinely cited by industry leaders and policy-makers. Low-press metacognitive tasks utilized in the study positively impacted groupwork affect (particularly amongst male students), helped facilitate complex instructions for students with limited academic proficiency, acted as an initial priming component, and scaffolded higher-order reflective thinking. This study provides workable examples of low-press artifacts and helps promote the need for additional research to be carried out concerning the impact of metacognitive journaling on groupwork competencies.

Keywords: metacognition, groupwork, low-press journaling, affect, priming component, reflective thinking

CHAPTER 1: INTRODUCTION

It is a matter of gross over-simplification to cite current unemployment levels as a result of merely inadequate labor demands. Industry leaders, like-minded think tanks, and advocacy groups have routinely mentioned a mismatch between current labor-held skills and the skills and knowledge required by an increasingly globalized and interconnected market economy. Even during a period of near-record unemployment in the United States, employers are finding it difficult to hire workers who possess the skillset and attributes industry leaders cite as crucial for this '21st century economy' (McNerny, 2008). This dichotomy has far-reaching implications, both for current educational practices and for future education policies in the United States, as invested parties attempt to find effective solutions for this 'skill-deficiency' problem.

Chief amongst deficient skills noted in industry and economic policy literature is the ability for potential employees to work collaboratively in diverse groups toward multiple, often complex objectives. In laymen's terms, the executives of companies such as Boeing, Royal Phillips, Xerox, and Infosys seek to hire candidates capable of productive groupwork and find it difficult to do so. A prospective employee's lack of experience and skills regarding groupwork, sometimes referred to by other industry monikers like "teamwork" or "autonomous unit work," is routinely referred to as one of the biggest obstacles facing potential employers, according to industry think-tanks such as the Business Roundtable (2009) and the National Alliance of Business (2000). The majority of labor-market commentators have identified globalization as the most important factor for the increased need for groupwork skills across a wide-range of industrial and commercial sectors.

The push for groupwork skills as a result of competition within an increasingly globalized world labor market was first identified by former Carnegie-Mellon provost Arnold Weber in 1979. In his predictory article "Conflict and Compression: The Labor-Market Environment in the 1980s," Weber posited that the presence of employees with strong groupwork skills was adequate to meet demand. From the late-1980s, however, such industry-held positions had swung far in the opposite direction. Based on a longitudinal survey of 476 Fortune 1000 firms, Appelbaum and Batt (1994) uncovered a three-fold

increase in the number of companies that required at least 60% of their mid- and high-level workers to demonstrate competency in groupwork skills between 1987 and 1993. The shift has only increased in the new millennium and has also spread to include traditionally lower-skill fields of work, such as construction and manufacturing (Fong & Lung, 2007).

The availability of potential employees with adequate groupwork skills, however, has routinely been highlighted as low—American workers are cited repeatedly in industry literature as lacking groupwork skills (McNerny, 2008). According to the Workforce Training and Education Coordinating Board (WTECB, 2009), a third of all private employers in Washington State have difficulty hiring workers with the prerequisite level of groupwork skills necessary for adequate job performance. This lack of adequate groupwork skills is often linked to inadequate preparation and instruction at the secondary academic level by industry groups (Kleisterlee, 2008).

As a direct result of these concerns, industry expects public education in the United States to provide a structural response to eliminate such deficiencies. Industry leaders have called for a fundamental "change [in] the ecosystem of education," (McNerny, 2008) that asks public education to develop student abilities to work dynamically in a group setting, across diverse opinions and cultures, and be able to produce and refine high-quality collaborative projects. Put more simply, industry expects public education to teach students groupwork skills.

If educators are to be tasked with teaching groupwork skills and strategies, then naturally the question becomes: how does one teach students groupwork? Any attempt requires concrete experiences in order to scaffold competency and eventual content mastery; however, 'groupwork' as a content domain is somewhat abstract in both its conceptualization and application and deserves closer examination. Collaborative interaction and production, such as that carried out in meaningful groupwork, requires the "individual management of complexity—in terms of the content demands...and in terms of the development of more complex prosocial behaviors" (Cantwell & Andrews, 2002, p. 6). This concept of 'individual management' consists of two distinct and important capacities: self-assessment and self-management, both of which are positively associated with productive groupwork and positive groupwork

affect (Georghiades, 2004; Liuolienė & Metiūnienė, 2009). Individuals involved in meaningful groupwork, whether consciously or subconsciously, thereby utilize higher order thinking processes to analyze, synthesize, and evaluate their own work, their work in relation to others, and the content of the purposeful task(s) demanded of the group unit (Cantwell & Andrews, 2002; Cohen, 1994).

As a result, when teaching groupwork skills, educators must also necessarily consider how to scaffold and develop higher order thinking skills in their students. Explicit metacognitive instruction and engagement is viewed as an important process in promoting such thinking by an increasingly large body of psycho-cognitive and educational research (e.g. Garner & Alexander, 1989; Georghiades, 2004). Metacognitive engagement—that is, explicitly engaging students in thinking about their own thinking—in regards to either self-assessment ("where am I in reaching this goal?") or self-management ("what strategies do I possess that will most effectively and efficiently help me process/access/integrate this new information?")—is therefore a crucial component of the learning process for groupwork skills because of the inherent complexity (Efklides, 2009; Wilson & Clark, 2002). Students who are metacognitively engaged in their own learning experience less anxiety around specific tasks (Cantwell & Andrews, 2002), demonstrate higher levels of achievement than low-metacognitive students (Bangert-Drowns, Hurley, & Wikinson, 2004; Buehl, 1997; Coll, France & Taylor, 2005; Commander & Smith, 1996; Efklides, 2009; Kramarski, Mevarech, & Arami 2002; McCrindle & Christensen, 1995; Roberts & Tayeh, 2006/2007), and exhibit higher levels of concept and skill transfer (Brown, Bransfor, Ferrara, & Champione, 1983; Fogarty, 1992; Holton & Clark, 2006).

In light of this body of research, the question concerning teaching groupwork is now joined by another consideration: how can teachers promote metacognition regarding groupwork that will result in deeper and more integrated understandings and content transfer? One way of engaging students in this metacognitive discourse is through the regular use of a reflective academic learning journal. Reflective journaling as a means of metacognitive and cognitive engagement is hardly new academic territory—researchers and theorists have engaged with meta-journaling as an important aspect of the 'write-to-learn' movement for the better part of three decades (Audet, Hickman, & Dobrynina, 1996; Buehl, 1997;

Fritson, 2008; Hübner, Nückles, & Renkl, 2010; McCrindle & Christensen, 1995; Minott, 2009), while cognition-specific journaling has a considerably longer historical presence and accompanying body of literature (Fulwiler, 1987). Research examined the correlation between metacognitive journaling and applications in the workplace, for example in computer programming (Dunlap, 2006), nutrition (Iwaoka, & Crosetti, 2008), and nursing (Thorpe, 2004), but little extant literature has been produced concerning metacognition's role in developing groupwork competencies via journaling.

Statement of the Problem

The body of research as it relates to *learning* groupwork via metacognitive engagement also leaves ample room for exploration. Extant research has not dealt with groupwork *per se*, but rather has focused on the underlying cognitive and psychological factors that influence collaborative affect regarding groupwork tasks (Cantwell & Andrews, 2002; Fritson, 2008; McCrindle & Christensen, 1995; Vojnovich, 1997). This study seeks to rectify this partial oversight by exploring what the outcomes of targeted metacognitive journaling are on the acquisition of groupwork skills and groupwork affect as students work toward competency in a middle school social studies classes. Additionally, this study examines the effects of such journaling on the educator's instructional decisions.

Given the real limitations of this research project and the demands of concurrent student teaching tasks and certification requirements by the author, an additional aspect needs to also be considered when framing this problem. Given that there is scant research devoted to metacognitive journaling as a means of learning groupwork skills, this research can also help establish a baseline concerning the minimum level of engagement and cognitive demand required of metacognitive journaling—hereafter referred to as 'press.' So the issue becomes not one of impenetrable scope but rather one of more focused impact to allow for solid continuing scholarship regarding the topic. In essence then, this project looks at low-press metacognitive engagement to determine its effects—if any—on the acquisition of groupwork competencies by middle school students.

Review of the Literature

In order to examine and evaluate the effects of targeted low-press metacognitive journaling tasks on the acquisition of groupwork skills, one first needs to look at the empirical and theoretical contexts in which both metacognition and reflective journaling are presently embedded. This section first explores contemporary conceptualizations of metacognition as they relate to content/skill acquisition in general, and then discusses current scholarship concerning journaling and its role(s) in content/skill acquisition. Following this discussion, this section outlines the current scholarly context regarding metacognitive engagement as a means of acquiring groupwork competencies. Finally, this section presents four recurrent areas of contention and controversy within the larger metacognitive academic discourse that are salient to this study.

It is important in any discussion of metacognition to first engage this term semiotically—what exactly is meant by metacognition both within a non-specific locus and in a more specific academic locus primarily concerned with content/skill acquisition. Formulating a unifying definition of metacognition has proved elusive since its naming by developmental psychologist John Flavell in 1976. Derived from his earlier work on metamemory (1971), metacognition, Flavell wrote, is: "one's knowledge concerning one's own cognitive products or anything related to them" (1976, p. 232). Flavell, although he termed metacognition, was not the first person to conceptualize one's own understanding of the cognitive self— he worked within a theoretical framework informed by much earlier critical cognitive theorists such as Dewey, Piaget, and Rousseau (Cavanaugh & Perlmutter, 1982; Gavelek & Raphael, 1985) to formulate his own theories on metacognition. From this somewhat ambiguous and open definition, an ever-increasing body of philosophical, psychological, and educational research has, in turn, generated numerous derivatives of Flavell's initial definition. As a consequence, and remarked upon in regular intervals by various meta-analyses, there is still no standard definition or systematic reading of metacognition within the academic discourse (Cantwell & Andrews, 2002; Efklides, 2009; Garner & Alexander, 1989; Georghiades, 2004; Winch, 2008; Yussen, 1985).

There is much agreement, however, amongst scholars pertaining to the relational states of various agents and loci concerning actualized metacognition—in other words, the relational structures and agencies present when one metacongnates. It is this second-order relational attribute that inextricably intertwines metacognition with the learning process. Later, researchers and commentators often abbreviated Flavell's definition to simply 'thinking about thinking' or 'cognition of cognition,' but even such simple reductions encapsulate the second-order cognitive relationship integral to Flavell's original conceptualization.

The concept of metacognition requires a second-order physical process in which such a domain can have agency-in other words, how someone is supposed to 'metacognate.' The second-order relationship has been noted by several theoretical researchers as inherently reflective; that, to think about cognitive experiences and strategies in regard to one's own cognitive actions, one is prima facie engaged in reflective cognitive behavior (Gavelek & Raphael, 1985; Georghiades, 2004; Winch, 2008; Yussen, 1985). This reflection results in one of two metacognitive actions, according to Flavell and Wellman (1977): 'self-awareness' and/or 'self-control.' Subsequent literature termed these metacognitive products as 'self-assessment' and 'self-management' respectively, but little else differs from their originators' meaning (Georghiades, 2004; Gordon & Braun, 1985). Metacognitive self-assessment and selfmanagement have been shown to promote: improved reading comprehension (e.g. Gordon & Braun, 1985), complex problem-solving (e.g. Yussen, 1985; Swanson, 1990), increased memory recall (e.g. Flavell, 1985; Ornstein, Grammer & Coffman, 2010; Schnieder, 2010; Waters & Kunnmann, 2010), scientific and/or mathematical meaning-making (e.g. Carr, 2010; Coll, France, & Taylor, 2005; Kramarksi, Mevarech, & Arami, 2002), student engagement and motivation (e.g. Vojnovich, 1997), improved writing skills (e.g. Afflerbach & Cho, 2010; Harris, Santangelo & Graham, 2010), and selfefficacy (e.g. Cornoldi, De Beni & Fioritto, 2003; Cornoldi, 2010).

The extensive body of research concerning metacognition highlights some specific outcomes important in exploring metacognitive reflection's impact on (and contribution to) the learning process— chief amongst these being that the reflective processes required by metacognition aid in deeper and more

effective learning. Davidson, Deuser, and Sternberg (1994) concluded that, because metacognitive reflection naturally focused on the processes of learning—not the products of learning, learners became more aware of their own relational status to a desired objective. As a result of this awareness, students acquire greater agency and content engagement, a conclusion reached earlier in a different meta-analysis context by Garner & Alexander (1989). More recently, Efklides (2009) posited that such reflection was critical in the construction of a 'metacognitive database' that supported deeper integration of content through applied reflection upon: planning strategies, regulated cognitive processes, progress monitoring, task processing, recapitulation, and self-regulation. Holton & Clarke (2006) argued that such reflection is a necessary pre-cursor to deeper learning as "task [become] more challenging" (p. 132). Metacognitive reflection, then, can be seen as an agent of metacognition that can lead to deeper learning (Gunstone, 1991); however, such a conceptualization requires further clarity in order to become useful.

Metacognitive reflection, as a means of accessing higher order evaluative and analytical cognitive abilities, requires one to first define how such reflection enables learning before one can reach conclusions on its utility. Winch (2008) was correct in criticizing the popular expression of 'learning how to learn' as an *a fortiori* fallacy concerning one's capacity to learn. One must reconsider metacognitive reflection as it pertains to 'learning how to learn *better*,' or in Winch's (2008) words: "make sense of an ability to learn as opposed to a capacity to do so" (p. 651). As a result of viewing metacognitive reflection as engaging with one's ability to learn, one can move to more concrete domains of metacognitive reflection, such as self-strategy selection (Garner & Alexander, 1989) and self-scaffolding (Holton & Clarke, 2006). One can further restrict the domains of metacognitive reflection by focusing on declarative metacognitive knowledge effects on learning groupwork skills based on the parameters established within this study (discussed further in the following section). Under Flavell and Wellman's (1977) notion of declarative and procedural knowledge, formalized attempts at initiating metacognitive reflection (2010) concluded that such a determination is crucial because automatic and often unconsciously driven

procedural metacognitive knowledge that helps to drive reflection is fairly complete at a young age, but

research has repeatedly shown that this is not the case with declarative metacognitive knowledge, which is specifically elicited via outside agency or agents. It is this outside agency that can be produced from targeted metacognitive journaling; the agent being the specific tasks and/or prompts required by the journaling that intentionally elicit and promote metacognitive engagement and reflection. Before one considers the merits of journaling on metacognitive processes and engagement; however, one needs to establish what is meant by journaling within an educational context.

The use of journaling as an instructional method has a long tradition both in and outside of education, with increased research and attention given toward it with the advent of the "write-to-learn" movement in the 1960s. The theoretical basis for including journaling as a pedagogical device is derived not from the journal product itself, *per se*, but rather the cognitive processes which occur during the creation of journal artifacts, described by Mayher, Lester, & Pradl (1983) as "percolating, drafting, revising, editing, and publishing" (p. 5). In his foreword to the influential *The Journal Book*, Fulwiler (1987) opines that "[w]hen people write about something they learn it better" (p. 9) and empirical research has routinely validated his position (Freeman & Freeman, 2009; McKenna & Robinson, 2009).

Beyond the justification for the use of journaling as a pedagogical device for content acquisition, attention has turned toward the use of journaling as a medium for metacognitive engagement. Journaling, with its less rhetorically demanding structure and conversational tone, effectively reduces traditional barriers to writing and explicit metacognitive engagement (Hübner, Nükles, & Renkl, 2010). Additionally, the use of metacognitive journals provides a student-created "context which guides his or her learning" (McCrindle & Christensen, 1995, p. 169). Learning journals and learning logs, as these metacognitive journals have been termed, are composed of targeted prompts and/or graphic organizers that provide students with the opportunity to engage in two critical metacognitive activities noted by Flavell and Wellman (1977): self-assessment and self-management.

Self-assessment journal entries require students to reflect on where they are situated cognitively in relation to defined outcome targets and, in some instances, establish goals that allow for progress toward those target outcomes (Rivers, 2001). These acts of reflective evaluation and attendant goalsetting have been cited as having positive impacts of content acquisition, critical thinking, and problemsolving skills (McCrindle & Christensen, 1995; Audet, Hickman, & Dobrynina, 1996; Cantrell, Fusaro, & Dougherty, 2000; Fritson, 2008; Swanson, 1990; Thorpe, 2004). Self-management journal entries target student abilities to self-select productive strategies *in situ*, while also reflecting on why such strategies are effective or ineffective for the given situation (Liuolienė & Metiūnienė, 2009; Rivers, 2001). Reflective and responsive self-selection has been linked to higher academic achievement (Audet, Hickman, & Dobrynina, 1996; Bangert-Drowns, Hurley, & Wikinson, 2004; Cantrell, Fusaro, & Dougherty, 2000; Fritson, 2008; Hübner, Nükles, & Renkl, 2010; McCrindle & Christensen, 1995) and effective and efficient learning environments (McCrindle & Christensen, 1995; McTighe & Brown, 2005; Minott, 2009).

Metacognitive journaling, as it relates to groupwork, however, has been ill-served by extant literature. Little is made explicit concerning the possibilities of metacognitive journaling on complex instruction and groupwork. Rather, many connections are implied via the current discourse's conclusions that, in general, metacognitive engagement supports higher order critical thinking and problem-solving skills (e.g. Efklides, 2009; Kramarski, Mevarech, & Arami, 2002). Cohen (1994) notes that, because of the complexity and social requirements of groupwork, students naturally engage and strengthen their critical thinking and problem-solving skills through complex instruction. Later, Slavin (1996) noted wellestablished links between groupwork and increased cognitive advantages, particularly under a Vygotskian perspective that stressed the importance of interpersonal communication in developing new knowledge and competencies. Both Cohen and Slavin can be seen as laying the groundwork for incorporating groupwork skills and competency into a metacognitive activity as it becomes an increasingly important pedagogical tool to meet current educational standards. Cantwell & Andrews (2002), however, concluded that the bulk of scholarship dealt with products and processes of groupwork while avoiding the underlying metacognitive and psychological factors contributing to learning outcomes via complex instruction. Among their most salient findings was that metacognitive engagement correlated significantly with self-regulatory control and engagement. This study attempts by provide an authentic application of

metacognitive engagement concerning groupwork competencies, which, in turn, allow for potential increases in academic achievement and interpersonal growth via complex instruction. As one can see, there is ample space for scholarship to investigate the role of metacognition on groupwork competencies.

In addition to examining the current academic literature as it relates to this study, it is also equally important that one examines the typical constraints of contemporary metacognitive academic research. Within the existing scholarship, four key problems can be identified: the lack of a universal concept of metacognition, the inherent rhetorical abstraction of metacognition as a measurable entity, age clustering of participants in either early childhood or postsecondary ranges, and the relatively small number of participants.

As previously noted, there has yet to be established a universal or even discipline-wide common conceptualization of metacognition. No standard definition has been able to fully penetrate any of the salient academic fields (Garner & Alexander, 1989; Georghiades, 2004; Wellman, 1985). This range of definitions limits the potential for cross-disciplinary academic engagement without the individual establishment of shared common definitions. Existing definitions can range from exhaustive (e.g. McCrindle & Christensen, 1995) to the vacuous and overly-simplified (Rowland, 2007). There are also language and developmental barriers inherent to the abstract nature of recording/collecting data about other's thoughts related to their own thinking—chief amongst these being cognitive development and communicative fluency (Garner & Alexander, 1989; Georghiades, 2004; Schwartz & Metcalfe, 1994). Hübner, Nükles, & Renkl, (2010) found that despite the organic nature of metacognition, students required very high levels of instructional support and instructor involvement in producing—either verbally or in writing—metacognitive artifacts either of low- or high-press due to rhetorical difficulty and the level of cognitive abstraction required.

Beyond the limits imposed by the semiotic openness of metacognition and the rhetorical and developmental limits imposed on collecting metacognitive data, there are two recurrent criticisms to be made of typical metacognitive data sets. These two recurrent criticisms can be focused upon the participants' age breakdown and the relatively small number of participants in studies investigating

journaling. The limitations imposed by trying to measure metacognitive processes—either quantitatively or qualitatively—have resulted in a fairly polarized body of research. Researchers examining Flavellian metamemory and mnemonic memory typically use very young participants, usually between ages 3 and 10 (e.g. Brown, Bransford, Ferrara, & Champione, 1983). On the other hand, much of the research concerning targeted metacognitive engagement, as a means of promoting deeper learning, focus on accessible postsecondary student participants (e.g. Dunlap, 2006; McCrindle & Christensen, 1995). Despite the disparate age ranges, data obtained from either age group tends to be obtained via fairly similar methods: student questionnaires, observer reflection, or some combination of the two (e.g. Cantwell & Andrews, 2002; Fritson, 2008).

Literature concerning learning journals, however, does not suffer the shortcomings associated with the bulk of current theoretical and empirical research concerning broader metacognitive discourses. Learning journal research is, by its very nature, more narrowly focused and can rely on concrete artifacts and outcomes. Of concern however, is the reliability of learning journal research given the relatively small numbers of participants in each study—the largest included here being 91 (Connor-Greene, 2000) and the median number of participants much closer to 40. The low number of participants in learning journal studies (Dunlap, 2006), increases the chance that given similar results may not occur, thereby affecting the reliability of results and corresponding conclusions. This is not necessarily an absolute deficiency, as Schwartz and Metcalfe (1994) argued that the increase in responsiveness inherent in journal responses helps to introduce meaningful variance as opposed to random variance in more traditional forms of forced-choice collection methods (e.g. a Likert scale).

This study attempts to circumvent several of these criticisms and sources of contention. Although the issue of metacognition and its relationship to learning is ongoing, this study only seeks to explore the role of second-order reflection in learning, a cognitive relationship pivotal in almost all conceptualizations of 'cognition of cognition.' Additionally, this study references two sources of student-created data that used prompted written communication in an attempt to lessen the rhetorical demands of student-created metacognitive artifacts. The participants were 8th grade students from a small and fairly homogenous population, and will therefore avoid the 'babies and bachelors' tendencies of metacognitive theorists. The last criticism, leveled at learning journals, however, will not be addressed. The time constraints of coding and recording 52 learning journals precludes, as it does in most of the learning journal literature, a larger study sample out of necessity and practicality. This will be further addressed in the results section.

CHAPTER 2: CONTEXTUAL FACTORS

Quarry Middle School (QMS) is the only mid-level school serving the small rural community of Pembroke. Pembroke School District (PSD) serves the local township and the surrounding farming and logging-dominated hinterland, with a total K-12 student population of approximately 1,248 students enrolled in May 2010. The student population reflects an ethnically homogenous distribution, with 87.4% of students reported as White, 4.5 % as Hispanic, 1.2% as Asian/Pacific Islander, and 1.1% Native American (American Indian/Alaskan Native) and Black (Site Report Card, 2011). There are a total of four schools in the district: one high school, one middle school, and two elementary schools. Quarry Middle School is a Title I school receiving federal funds for school improvement. It is considered a 'povertycommunity' school with 40.1% of students receiving free or reduced lunch and only 69.1% of students graduating on-time (80.1% graduate after an extended period of time). The annualized drop-out rate is 5.2% and 14.9% of students are serviced under IDEIA or Section 504 federal programs (Site Report Card, 2011). Although official statistics place the unexcused absence rate for the 2009-2010 academic school year at 0.2%, administrative policies routinely under-report such absences—chronic absenteeism is described by most QMS staff as "endemic," "rampant," "a common occurrence," and of "great concern" (personal communication).

As a result of PSD's fairly homogenous student population, only a dozen students receive specialized ELL transitional bilingual support services (less than 1.0%) and currently no students are classified as migrant. Within the local community, limited visible diversity is also recognized and widely-held as a defining characteristic of the community. Pembroke has experienced protracted economic hardship and declined over the last three decades, with the per capita income of residents below \$19,000 and a four-fold increase in persons living below the poverty line since 1980 (City Census Report, 2010). PSD offers free lunch to persons under the age of 18 three days a week during the summer, and on weekends during the school year to help alleviate local hunger and hardship (District Website, 2011).

School Context

The schools compromising PSD are all old (pre-1980) outside access buildings. QMS is situated adjacent to one of PSD's elementary schools and was built in 1979 as a single-shell building with limited interior walls—however single-purpose classrooms were partitioned in 1982-83. There is limited interior heating and air-conditioning, and classrooms are generally aged-looking and distressed. QMS serves PSD's three hundred sixth to eighth grade students and has a faculty of 21 FTE staff members. At QMS, 95% of teachers during the 2009-2010 academic year met NCLB highly-qualified status, 62% held at least a Master's degree, and no teachers held either a conditional or emergency certificate (Site Report Card, 2011). The average years of teacher experience at QMS is 7.1, well below the district-wide average of 14.2 (Site Report Card, 2011). Official numbers are not necessarily reflective of current conditions, as each of the last three academic terms has resulted in substantial (10% or more) teacher turnover, including reductions-in-force.

QMS has done fairly poorly in the state's standardized tests, with scores across all test components decreasing slightly over the last three years. At 7th grade, 53.0 % of students scored proficient in reading, 49.0% in writing, 45.1% in science, and 34.0% in mathematics. Only the number of students scoring proficient in writing or reading improved significantly by high school graduation; the number of students scoring proficient in science and math actually decreased during the same period. Currently, QMS is in the second year of a three-year transition to standards-based grading for all coursework as a prescribed means of improving test-determined outcomes.

Participants

The students participating in this study were all enrolled in eighth grade Unites States/Pacific Northwest History at QMS during the 2011-2012 academic year. The teacher, Mrs. Stone, has taught in the district for four years, and all eight-grade students enrolled in history are taught by her over four class periods. There is no official ability grouping or tracking undertaken at QMS, however, due to the necessities of band, leadership, and math in a district as small as PSD, *de facto* ability grouping occurs. Mid- and high-level students are overrepresented in periods one and two, and low-level students are

clustered in later periods of the day. Mrs. Stone was joined during the time-period in which data collection was conducted by the author, a student-teacher with three years of experience teaching abroad in the private sector. Class periods are 50 minutes in length and classes meet Monday through Friday. Half-days, of which four occurred during the data collection period, require students to attend all classes, but for only 21-23 minutes. Class times were also truncated to accommodate two school assemblies, a safety drill, and a school-wide jamboree fundraiser.

Period 'A' had 26 students (2 students left the school district and are not included in any aspect of the study) with the following ethnic breakdown: 85% Caucasian (n=22), 4% Hispanic (n=1), 4% Asian/Pacific Islander (n=1), 0% Native American (n=0), and 7% African American (n=2). 38% of students were male (n=10), 62% female (n=16). Three students received special education support under IDEIA, one for a specific learning disorder, one for a communication disorder, and one for persistent developmental delay, while none received Section 504 accommodations. No students were identified as having limited academic proficiency (LAP) (n=12). Period 'B' had 25 students with the following ethnic breakdown: 80% Caucasian (n=20), 8% Hispanic (n=2), 0% Asian/Pacific Islander (n=0), 4% Native American (n=1), and 8% African American (n=2). 40% of students were male (n=10), 60% female (n=15). Two students received special education support under IDEIA, both for specific learning disorders, and one received Section 504 accommodations. One student was identified using district-side identification metrics as gifted and advanced two grades at the beginning of the year. No students received bilingual transitional services. Using the district-wide identification metrics, 68% of students in the class were identified as having Limited Academic Proficiency (LAP) (n=17).

Students in both these classes overwhelmingly viewed themselves as culturally similar, with broadly accepted interests in local sports, various aspects of animal husbandry, and interests in outdoor activities and recreation. Concomitant to this self-identified similarity is a sense of established loyalty and community—students often band together in tight ranks when faced with substitute teachers, discipline, or other stimuli.

Five students were chosen at random, one from each quintile group using the results of the *Feelings toward Groupwork Survey* (Appendix A) as a means to examine individual students more closely within the broader context of this study. A student was chosen from each quintile group to allow for student representation all along the affective continuum and to help with subject sample validity. All names given in this study are pseudonyms in order to protect confidentiality and to reflect best practices in educational research.

'Gus' was selected at random from the lowest quintile of students (those with the most negative affect towards groupwork), and attended social studies in the morning (period A). Gus is a cisgendered male, age 14, and comes from a very low socioeconomic class—both his parents are currently unemployed, however his father does do occasional part-time work at a local fabrication company doing metal work. Gus has a poor relationship with his father who was imprisoned during Gus' early childhood. Gus' father tends to be domineering and has displayed aggressive tendencies in interactions with his son and other members of staff. Gus' mother-in-law just recently gave birth and Gus seems to feel a little lost in the shuffle of new home dynamics, according to one of the paraeducators. Gus is no longer able to see his birth mother under court order because of past neglect and drug abuse. She is currently not allowed on school property due to an undisclosed incident a few years ago.

Gus is part Caucasian and part Pacific Islander and uses English as his primary mode of oral communication. Gus revealed to that he used to know some Hawai'ian when he was younger and lived with his birthmother, but has forgotten most of it now. He is interested in mechanics and technology and has demonstrated an aptitude for spatial reasoning/learning. Once Gus described "needing to see something in my head" before he could work on a project (personal communication). Although somewhat shy, Gus opens up readily to people he knows and is well-liked at school.

As a student, Gus is served by an individualized education plan (IEP). He qualifies for having a specific learning disability in writing because of a written production disorder. As a consequence of his disorder, Gus often has a hard time generating written artifacts without highly structured scaffolding and instructional aid. In addition, he receives specialized instruction in a special education language arts class

in the period directly following his social studies class. Gus is mainstreamed except for that particular language arts class and is proud of the fact that he only has to attend one special education class; he has only received services since the start of the 2009-2010 academic year.

'Monica' was selected at random from the lower middle quintile of students (those with the second most negative affect towards groupwork), and is a student in period B. Monica is a cisgendered Caucasian female, age 13, from a high socio-economic class and uses only English to communicate. Both her parents are employed in the healthcare industry and are active in her academic and social life.

Monica is a high-achieving student who is very involved in both academic and extracurricular activities. She currently is enrolled in a leadership elective, is the ASB vice president, and competes in both Knowledge Bowl and Cross Country. In addition, Monica plays in the band, attends church-related activities regularly, and maintains consistently high grades.

Monica is very interested in history as an academic subject. She reads non-fiction and historical fiction independently and for the Accelerated Reader program. Last year she suffered from some bullying, but once the offender was moved to a different class, the bullying stopped and no further complaints were officially made.

'Carl' was selected at random from the middle quintile of students (those with placed in the middle range of compiled affect towards groupwork), and attended social studies in period B. Carl is a cisgendered 14 year old Native American male diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). He is currently not taking a prescription drug for his ADHD, but is following a low-sugar diet. Carl reports that he is unsure of who his biological father is, and raised by his mother—a recovering alcoholic who did not graduate from QHS which she previously attended. Carl's living situation during the time period of the study was volatile; Carl's mother's significant other was released from prison and caused much tension in the household with the shift in family dynamics.

Carl is athletic and tends to use school primarily as a vehicle for his athletic talents and for socialization. He participates in sports year-round and is also very popular. Carl is often described by his teachers as "a class clown" or "a big goof ball" (personal communication). The faculty at QMS also
describe Carl in fairly negative terms, for example as "not a successful student," and "*really* annoying" (personal communication). Carl was identified using the district-wide metrics as having limited academic proficiency and currently is enrolled in a self-contained 50 minute reading strategies class.

'Margaret' was selected at random from the upper middle quintile of students (those with the second most positive affect towards groupwork), and is a cisgendered Caucasian female student in period A. Margaret is a social student and tends to be very popular with the eighth grade class in general. She was elected last spring to the student council as its secretary. Margaret is an average achieving student and enjoys being at school in order to be able to converse with her friends. Her favorite class is science.

Margaret bonded closely with her seventh grade social studies teacher, Mrs. Slate, and is very reluctant to establish a similar relationship with Mrs. Stone, whom she sees fairly negatively for undisclosed reasons. Margaret has been sent to the office or otherwise reprimanded before for excessively socializing in class, and is often late to class due to lengthy conversations with her friends during passing periods. Margaret signed up to play volleyball for QMS, and this is her first time ever participating in a team sport. Margaret is close to her parents, both employed in middle class occupations, and is an only child.

'Timothy' was selected at random from the highest quintile of students (those with the most positive affect towards groupwork), and is a student in period A. Timothy is a cisgendered Caucasian male, age 13, and is described by his peers as popular and involved in sports at QMS. Timothy's family is experiencing some financial hardship after his mother was laid off at the end of the last school year and has yet to have found a job. Timothy has two older sisters and a younger brother.

Timothy is currently enrolled in a leadership elective and receives additional academic support in a mathematics interventions class. Timothy has played basketball for the school and is planning to continue this year. He also plays in a private baseball league. Timothy is not necessarily interested in social studies purely as an academic subject, but is interested in specific aspects of the content, primarily those related to battles and sports. Last year, during a unit on medieval Europe, Timothy created an entire diorama depicting a jousting tournament and read voraciously about it for his project. Yet, other topics elicit minimal engagement from him, according to his previous social studies teacher (personal communication).

CHAPTER 3: METHODOLOGY

Two classes of eighth grade U.S. History were selected using random assortment to participate in this study. One class was selected from two classes offered before lunch, while the other was selected from the two classes held after lunch as a means of controlling for the *de facto* tracking that occurred at QMS. All students in both classes followed the same protocol for data collection. Consent was obtained after initial contact via parent/guardian letters were distributed the first day of the academic year (Appendix B).

Data was collected using three primary methods: pre and post student-answered attitudinal surveys, a series of student-answered low-press metacognitive reflection forms, and author observations.

Students were first given the *Feelings toward Groupwork Survey* on the third or fourth day of the academic school year. The Affect Survey is derived from a similar diagnostic tool published by Cohen (1994) and allows for the generation of a score that roughly places students along an affect continuum in relation to groupwork. Students with scores below 15 indicated students that would likely have a negative affect towards groupwork—scores above 15 generally reflect more positive groupwork affects. This survey was used to identify student quintiles for the selection of case study students previously detailed in Chapter Two and to establish a baseline.

Over the course of eight weeks, students were given *Groupwork Evaluation Forms* (GEFs), a low-press reflective piece drafted and designed by Cohen (1994, p. 183-187). The goal of these forms is to help students to focus on the processes of collaborative groupwork, not just the products (1994). Thus, one can view the GEFs as a tool to scaffold in higher-press metacognitive thinking and reflection over a short period of time. This tool consists of two demarcated sections: a section that focused on the individual evaluator, and a section that asked students to evaluate their respective group. For some examples of completed GEFs, see Appendix C.

The four group-worthy tasks, from which low-press GEFs were collected, occurred during the first, third, sixth, and eighth weeks of the study and represent a gradual increase in both the complexity of the tasks assigned to each group and the length of time devoted to each task. Task 1 consisted of a group

of students randomly grouped using a deck of cards. Students were instructed to choose five applicants to receive green cards from a list and to explain to the class the criteria that used during their selection process. The task lasted for one class period (50 minutes) and students were given time at the end to fill out the GEF after being guided by the author. It was stressed that the GEF would be used only for data collection and some reflection by the author and would not affect participant grades.

Task 2 required groups of students to portray an interested cultural group during the creation of the U.S. Constitution at the Constitutional Convention of 1787. Students worked for three days in groups of four, with each group roughly consisting of two average readers (at or slightly below grade level), a weaker reader (significantly below grade level), and an advanced reader (above grade level). Students were given the GEF after three days.

Tasks 3 and 4 were embedded within a single learning task, which required student groups of three to develop legal defenses for Supreme Court mock trials. Task 3 was considered the two weeks of legal preparation for trial: researching, reading previous trial transcripts, revisiting past legal defenses, and preparing for the mock trial. Students were given GEFs the day before their assigned mock trial and returned the completed form along with copies of their preparation materials at their mock trial. Task 4 consisted of mock trials and the groupwork that followed: writing a legal brief, drafting a court opinion, and helping their group members revise for the unit's summative assessments. After taking the unit's summative assessments, students were given their final GEF to complete.

In addition to the final GEF, students were asked to complete an extended metacognitive piece in their learning journals as a way of transferring from the low-press reflective GEF to higher-press metacognitive journaling. Students were presented with five questions, three regarding their learning process throughout the unit, and one each related to groupwork. Students were instructed to select three questions that felt relevant to their experiences and wrote approximately one to two paragraphs in their journal responding to these prompts. At the conclusion of the author's student teaching placement, students were given the same Affect Survey that was utilized as a baseline and were given 30 minutes to complete the survey. Coding of student metacognition is based on Scanlon and Chernomas' (1997) three stages of reflection: awareness, critical analysis, and new perspectives. Low-press artifacts were utilized based on the lack of previous explicit metacognitive engagement of the participant sample as a means of possibly scaffolding higher-press reflective learning. Due to time constraints and the limits imposed on the author as a student teacher, no contemporaneous observations were collected pertaining to the study by either Mrs. Stone or outside observers.

CHAPTER 4: RESULTS AND DISCUSSION

This section will broadly examine the six general trends evidenced in the data collected from the two attitudinal surveys, four GEFs, the unit summary journal entry, and the author's observations. These trends are: 1) the decrease in process and communication difficulties during groupwork activities; the decrease in limited or intentionally blank responses in low-press metacognitive tasks; 2) the increase in general metacognitive engagement as students moved toward higher-press reflection tasks; 3) the increase in positive affect towards groupwork; and, 4) the importance of collaborative 'babble' in helping LAP students decipher task-specific instructions.

It is important to first recognize the student sub-groups in which these trends are embedded, as differences were exhibited amongst particular sub-groups in relation to these general trends Using the initial affective survey responses as a guide, students in the study were grouped into four distinct subgroups: male students who had a positive/mixed attitude toward groupwork (n=13), male students who had a negative attitude toward groupwork (n=7), female students who had a positive/mixed attitude toward groupwork (n=28), and female students who had a negative attitude toward groupwork (n=3). As demonstrated in Figure 4.1, male students scored lower in each quintile when compared with their female counterparts, with the difference narrowing as students scored higher positive affective scores on the affect survey. It is also important to note the relatively small incidence of female negative groupwork affect—a likely outcome of the gender-dominated socialization processes males and females experience that can prime female students towards more 'social' (i.e. collaborative work) modalities (Cohen, 1994). It is within this four sub-group framework that the aforementioned trends will be considered.



Figure 4.1 Affect scores distributed by quintile and sex.

The decreases in difficulties associated with collaborative work (e.g. interpersonal communication, time management, staying on task, active listening) were most pronounced in males students who were initially identified as having a negative affect toward groupwork. In the first two tasks, over half of the male students scored the tasks as "fairly difficult" or "extremely difficult," a sentiment shared by less than a fifth of all other students. Students in the subgroup also reported high incidences of conflict within their groups. 'Eric' noted that he did not want to work with his group members again after either tasks because, "I was not given the chance to give my opinion" and indicated that "nobody paid attention to what I said." Eric was not alone. Over the course of the first two tasks, 43% of male students with negative groupwork affect indicated that they would prefer not to work with the same group members again—all indicating difficulties in groupwork communication.

These conditions changed somewhat by the completion of the fourth GEF. After utilizing the information collected from the previous GEFs, the author gave a mini-lecture devoted to active listening, taking turns speaking, and the role of an effective facilitator in a group project. After this instruction—

derived from the information collected through the low-press GEFs—occurred, there was a sharp decline in students in this subgroup reporting difficulties with groupwork (Figure 4.2).



Figure 4.2 Complaints aggregated by affect and sex.

The two complaints that were made utilized the shared language given during the group facilitation mini-lesson. 'Morris' writes that he would like a new partner for his next groupwork project because "I ended up having to do most of the work on my own time by myself because 'Kaleb' was not very good at the computer [doing Internet research]." Although seemingly harsh, this observation is rather descriptive and fairly task-oriented when compared to earlier complaints by group members, which often consisted of "I did all the WORK" (original emphasis) and labeling group members as "racist" or "stupid."

The other three subgroups also experienced similar decreases in difficulties 'doing groupwork,' although none experienced such a sharp contrast as negative-affect males. High-affect males consistently

reported acceptable groupwork experiences, as did their female counterparts (Figure 4.2). It is with the smallest sub-group, negative affect females, that the results are much more nuanced and mixed. All three students routinely indicated on their GEFs that they preferred "working independently" and "I wanna [sic] work by myself." Both 'Cassandra' and 'Cathy' indicated several times that part of their motivation was socially derived. After working with two different groups, Cassandra reflected that "I don't like anybody in it [her group]," and "I'm not really friends with them [her group]." Cathy lamented that "I want to work by myself—maybe if I had friends in this class, then yes," and "I want to work with different people, I don't like this group." Despite these overtly negative statements concerning their groups, all three students evidenced a decline in incidences of feeling afraid to give their opinion, being interrupted by other group members, and receiving little attention. In fact, the three students reported that they got along with everybody in their groups or work alone after the final groupwork task.

Another trend in the student data actually pertains to the richness of the data itself; the decrease in limited or intentionally blank responses in low-press metacognitive tasks, as the study progressed. Students' willingness to respond allowed for greater insights and information to be gleaned from the low-press artifacts. Intentionally blank responses (IBRs) are not actually blank responses but rather responses in which students attempt to make clear their inability to answer the question. Common IBRs are students writing a big question mark over or next to the question, or writing "huh?" or "IDK" (shorthand for 'I don't know'). Because of the inherent difficulty in even low-press metacognitive engagement, one could expect high incidences of IBRs in the first few GEFs, which was demonstrated during the initial tasks evaluated for this study (Figure 4.3).



Figure 4.3 Quanitity of intentionally blank responses in each task-specifc GEF.

It is important to consider the implications of intentionally blank responses as they relate to further metacognitive engagement. Intentionally blank responses, particularly during the completion of the first two low-press GEFs, often precluded students from analyzing their experiences further—in effect they created reflective roadblocks that were difficult to overcome. The two most common questions on the GEF were: "What abilities did you think were important for doing a good job on this task?" and "How did this task benefit from groupwork?" Student attempts to identify the abilities needed for task completion actually predicted their answers on later portions of the GEF. Every student, who left an intentionally blank responses for that question, was also unable to identify whether there was a particular ability or skill in which they performed proficiently—it seems that the inability to identify necessary skills also precluded students from identifying the skills where they excelled. As the study progressed, fewer students were unable to answer that question, and on Task 4, only one student reported that there was no skill where they performed well.

The questions that elicited IBRs also served to illustrate individual student progress related to reflecting on specific tasks. 'Ana' a positive affect female student identified as LAP was unable to give a meaningful response to the question: "what abilities did you think were important for doing a good job on

this task?" But, at later intervals, she wrote answers that were increasingly complex. Ana answered that "Thinking and doing," are important, but later writes that "splitting the work evenly between partners [and] helping each other with stuff we didn't understand" were crucial for task completion. Although both 'Judy' and 'Kathryn' gave intentionally blank responses to the question: "how did this task benefit from groupwork?" during the first two tasks; later, answers were: "you could get other people's opinion on the situation," "you could get two people's opinion on the [court] case and if someone needed help they could ask the other person," and "there was a lot of work to do and if you worked by yourself it would take twice as long." These examples are representative of the further sophistication of initial IBRs that occurred in 90% of the final two GEFs and the unit summary journal entry (n=46).

Concomitant to the decrease in intentionally blank responses was the increase in general metacognitive engagement, as evidenced in the GEFs, when students moved toward higher-press reflection tasks. Under Scanlon and Chernomas' (1997) three stage conceptualization of reflective learning, students can reflect on up to three different levels: awareness, critical analysis, and new perspectives. First level reflection is readily evidenced in the GEFs; students recall what occurred during the groupwork tasks and identify problems or successes. Student responses on the GEFs for Task 1 were very spartan, but as the study progressed, so too did student abilities to explain what occurred. 'Harper' first concluded that Task 1 required "patience" but later expanded upon this idea and became more precise, explaining that "this job required paying attention," "working together and staying on task," and "...how to use a computer." This contrast, between very sparse and simple first level reflective evidence, and more complex awareness level reflection was actually evidenced in all sub-groups (Figure 4.4).

As student responses become richer and more complex, there was also evidence that some emergent critical analysis was occurring. In 'Katrina's' later reflection, there is evidence that she is comparing and contrasting. Implicit in her reflection is the evaluation of what occurred using prior knowledge, something Scanlon and Chernomas identify as characteristic of deeper level of critical analysis reflective learning (1997). Similarly 'Gary' when completing his final GEF, wrote, "I probably did more of the talking because I am a talkative person," and "we both sorta [sic] worked on track and

didn't really need to redirect our discussion...we needed to work together to get our point across." Gary illustrated some important points: he is not only describing what occurred, but is also linking those outcomes to prior knowledge (i.e. being talkative by nature). Gary, along with most of other student participants, were approaching the limits of the low-press GEFs and were beginning to demonstrate readiness for higher order metacognitive engagement.

Student	Earlier Reflection	Later Reflection
Bonnie	"We all listened to each	"We worked together to
	other."	understand the difficult info
		and so we could help each
		other get our work done and
		what to do."
Brandon	"Discuss what to do."	"We were both able to work
		on different parts we liked."
Carly	"We had to choose who to	"I don't want to work with
	give a green card to."	them because I don't really
		have enough patience to work
		with Kaleb or Blake."
Clive	"[F]aster reading the	"Looking at different
	materials."	websites and talking [about
		it], if you miss a day you can
		make it up from your
		partner's work."
Derrick	"[G]ot stuff done quicker."	"We all had good ideas and
		working in a group combined
		them."
Jane	"[T]o get other's opinions on	"Because you need to
	the people for green cards."	research/write a lot down. I
		think there was to [sic] much
		work for one person."
Katrina	"We had to discuss about	"By working in groups we
	everything including what we	didn't individually have to
	wrote down."	remember all the different
		roles. With groups we had a
		chance to discuss all the
		other groups."

Figure 4.4 Chart depicting answers from particular students from earlier reflections (GEFs from Tasks 1 or 2) and later reflections (GEFs from Tasks 3 or 4).

The only medium-press reflective portion of this study occurred after students had already completed four GEFs and were demonstrating increased awareness of both lower level reflective knowledge (Scanlon and Chernomas' 'awareness'), and of higher order reflective reasoning ('critical analysis'). Students were given the opportunity to write their first metacognitive journal entry at the conclusion of week eight in response to three student-selected metacognitively-engaging prompts. These longer entries reflected and expanded upon the general trend of increased metacognitive engagement (Appendix D). 'Marilyn,' reflecting honestly on some issues she identified while completing Tasks 3 and

4 wrote: "Some difficulties were trying to get my partner caught up on his work because he was absent. And sometimes he didn't cooperate very well. No, I couldn't come up with any solutions." Within this short body of student text one can identify both levels of reflective learning, but that the highest level, where 'new perspectives' inform and affect schema is absent—a situation that, now highlighted, can be addressed by Marilyn's teacher. Another example of second order reflective thinking is evidenced by 'Julie,' who wrote in her journal entry that "[r]esearching and preparing for the mock trials helped me master the content by rereading everything. Also [sic] by going over everything with my group." In this light, one can view the low-press GEFs as scaffolds through which students became increasingly primed to higher order reflective thinking processes such as critical analysis.

Another longitudinal trend evidenced in the student data demonstrated an increase in overall groupwork affect by most students, with particularly strong increases in positive affect associated with initially negative affect males. Scores from the affect survey administered at the end of period of study indicated that the lowest two quintiles demonstrated a dramatic increase in affect scores, with smaller increases noted for the upper quintile groups (Figure 4.5). Similar results were evidenced by female students, although the improvements in the lower two quintiles were more muted when compared with gains by initially negative affect males (Figure 4.6). The top three quintiles of female students demonstrated slight decreases in affect survey scores; however, these fluctuations were well within the standard confidence interval of five-point Likert scales.



Figure 4.5 Groupwork affect scores for males at the end of the study.



Figure 4.6 Groupwork affect scored for females at the end of the study.

It is important that one couch the improvements in groupwork affect carefully within the context of the larger study, as this study lacks an adequate control sample. Although this increase in groupwork affect may, in some part, be a consequence of the low-press metacognitive journaling, other equally plausible explanations exist that can partially or wholly help to explain these general trends. Additional explanations include: an increased instructional emphasis being place on groupwork over the course of the study by both the author (in the role of student-teacher) and mentor teacher, increased positive and/or 'fun' student experiences with groupwork, and the inclusion of meaningful groupwork tasks and the resultant increase in engagement that can occur (Cohen, 1997). The increase in affect may also be a product of the residual excitement of Tasks 3 and 4, which saw the vast majority of students become very involved and active within the supporting instructional tasks leading up to and evaluating the Supreme Court mock trials, or a combination of some or all of the aforementioned factors.

The last insight that was supplied by student data indicated that LAP students benefited greatly from groupwork because of the intergroup communicative 'babble' that helped students to clarify taskspecific instructions. The role of peer dialogue in helping less academically proficient students access directions has been noted by advocates of explicit academic language instruction (e.g. Freeman & Freeman, 2009; Haley & Austin, 2004; McKenna & Robinson, 2009) as an important pedagogical tool for academic content literacy. In this case, the data suggests that working within a group significantly helped LAP student understand task-specific instructions. As seen in Figure 4.7, LAP students routinely reported that they were initially confused or unable to decipher the task's complex instructions, but were later able to decipher multimodal instructions via more capable peers within their respective groups. Although instructions were given verbally, in writing, and visually, the initial novelty of meaningful groupwork and later increased complexity and cognitive demand of Tasks 3 and 4 likely decreased the amount of academically comprehensible input for LAP students concerning task-specific instructions. Working within a group allowed for generative 'babble,' or task-specific informal register dialog, to occur. This likely explains the number of LAP students who initially reported difficulty understanding what their group was supposed to accomplish. The phenomenon-of generative intragroup communication assisted in scaffolding academic language and processes (Figure 4.8).



Figure 4.7 Total number of respondents who indicated that they needed others to help clarify what was required of them during a groupwork task.

These trends support the use of metacognitive reflection within the classroom; however, some unpacking remains as to the nature of low-press academic journaling (via the GEFs) and medium-press reflective journaling (via the unit summary journal entry). In addition, the context of an eight week study carried out contemporaneously with the author's first student teaching experience will be addressed.. Although successful in increasing affect and metacognitive engagement, the low-press artifacts are not longitudinally appropriate for developing higher order reflective thinking. As the student data suggests, the eight week period in which students were first introduced to metacognitive tasks appears to be adequate for scaffolding in meaningful and deeper metacognitive journaling tasks such as student voice journaling, learning logs, and other forms of high-press engagement. If given an extended time frame in which more work could be completed concerning this transition, one might find that the benefits of low-press metacognitive journaling some definitive conclusions about the effects of low-press metacognitive journaling some definitive conclusions about the effects of low-press metacognitive journaling within a transitional context, it is

important to see how these trends intersect with micrometric elements of this study: the five case study students.



Figure 4.8 *Quantity of LAP students who indicated that they need help understanding the group task(s).*

Discussion of Individual Case Studies

As the discussion of the five case study students unfolds, it is important to examine both how each individual related to the overarching trends established in the previous section and also how each student's low-press metacognitive artifacts helped the author reach a more nuanced understanding of his or her individual development of groupwork skills, processes, and positive affect. Data was collected on these students using the same artifacts as the other students in the study, with the addition of observer-scored rubrics and notes. The rubric (Appendix E) focuses on five key aspects of productive groupwork: 1) contributive attitude; 2) cooperation; 3) task focus; 4) team role fulfillment; and, 5) information sharing. A contributive attitude was defined as 'meeting expectations' and participating fully in the activity, generally having a positive attitude toward group members, and contributing substantially.

The rubric established for evaluating student behavior and groupwork competencies addressed these five criteria on a four-point scale. Meeting expectations in cooperation required students to work well with others with minimal arguing. Students meeting expectations for focus required them to not introduce unnecessary conflict or off-topic tasks into the group discussion, and to remain engaged with the task most of the time. Information sharing encompassed both listening to, and effectively communicating ideas at the level of meeting expectations, while students needed to fulfill the basic tenets of their individual group roles during the first two group tasks (e.g. facilitator, materials/time manager, recorder, and reporter). The individual case study students were scored between three and five times (due to absences) on the same days during weeks one, three, and five through seven. These rubric scores, combined with the information gathered from the low-press GEFs and higher-press unit summary journal entries help to provide necessary contextualization for the aforementioned trends and results.

Gus is a fairly typical of middle school student supported by special education services but receives most of his instruction in general education classrooms. He is fairly shy, tends to try to blend in, and often acts anxiously during complex instructions (Vaughn, Bos, & Schumm, 2011). Typical behavior for Gus during the first two groupwork activities was to try and hide within the group though he was only tangential focused on group tasks. Such strategies are often employed by marginally-attached students "as to not draw attention to themselves" and are used as a means of coopting situations to limit exposure of self- or other-identified learning deficits or specific learning disabilities (Landau, 2004, p. 139). Gus scored below expectations on the first two evaluative rubrics in cooperation, contributive attitude, and information sharing based on his lack of engagement in the groupwork. Gus self-reported that: "I probably talked the least, the others kind of talked all at once," and that he felt "nobody paid attention to what I said."

Interventions based on this information helped inform the author to make pedagogical decisions that would support Gus to develop competency in these three key areas. The author collaborated with Gus' special education teacher and devised a plan of action that would help him to be successful in the remaining open-ended and groupwork-intensive third and fourth tasks. To support this goal of scaffolded success, Gus choose his partner from a list the author had devised so he could be one of the few two-person groups to complete Tasks 3 and 4. It was decided, based on the data collected from the low-press

GEFs, that perhaps Gus felt overwhelmed by the size of his previous groups and that working with one person would help him to develop competencies in information sharing, cooperating, and contributing to the partnership. In addition, the possible partner candidates Gus could choose from met specific criteria; each was identified as having a higher lexile score, but one within Gus' zone of proximal development, and each one had been observed previously interacting positively with Gus. He chose to be paired with 'Kevin,' a friend he made in seventh grade, and the pair was fairly successful at completing all the learning activities included in Tasks 3 and 4.

In his last two GEFs, and his final rubric score Gus met expectations in information sharing and contributive attitude, and partially met expectations in all other categories. Gus self-reported increased confidence in his groupwork skills, and did not indicate any further instances of feeling afraid to give his opinion, or that his partner did not listen to what he had to offer. Gus also demonstrated an increase in his affect score far above the standard deviation interval, from a score of 2 to 15. It is likely that his successful involvement and completion of Tasks 3 and 4, within the context of a successful pair work experience, was responsible for this incredible increase in positive affect. Gus exhibited the third most significant change in affect over the entire study population—the second largest amongst male students.

Monica, a high-achieving student, also reported a somewhat negative first experience with groupwork. Monica, randomly assigned to work with three other males, found the tasks difficult. Monica reported that "[e]veryone had to make the same decisions and talks about it [the task scenario]...some didn't listen..." and also reported a troubling gender-specific dynamic too, recalling that "I [Monica] was the only girl so I had to write." Although Monica scored in the mixed range on the initial affect survey, she also was noted by the author as exhibiting visible trepidation during the first groupwork task. Monica, an introvert, seemed reluctant to work with her new group—although it is likely that being tasked with recording the group's decisions inhibited her ability to participate fully.

Using the information and observations from the first task, the author had an informal conversation with Monica. Two main subjects were broached during the conversation: the forced writing incident and her reticence in working with her group. It was ascertained from this conversation that

Monica did not want to be the recorder in her group. Also, she felt that, because she was unpopular with her classmates, she couldn't voice her own needs without risking exclusion. Monica explained that she often worked on projects alone because she frequently did not have any friends in her classes outside of band. The author used an adapted version of Monica's experiences when asking students to participate in groupwork scenarios during a lesson in between Tasks 2 and 3 which focused on effective skills and communication.

For her next three groupwork tasks the author placed Monica in groups that had additional females and to provide her with opportunities to develop friendships with classmates. Monica exhibited far more interest in working cooperatively on these tasks, and also reported that "she got to know people that I didn't know before." In fact, Monica is now close friends with her mock trial partners, a phenomenon that was also reported by one other female student and another male student. Monica also did not report again about being forced to do a job or fulfill a role she did not want to do, and also evidenced an increase in positive affect above the standard deviation. In her final two rubrics, Monica was observed to have met expectations in all groupwork skills except focus, in which she was scored as advanced.

Carl, who was also working on specific behavior goals in addition to improving his groupwork competencies, had some challenges regarding focus. Carl's difficulty in maintaining focus for extended periods of time, his propensity to wander—either verbally or in some instances physically—from the task, and his difficulty listening to other group members without interrupting them or blurting out comments are all likely causally linked with his ADHD and perhaps his difficult home life. Carl's first two groupwork experiences demonstrated a wide range of possible competencies primarily situated around the length of the task. During the first period-long task, Carl was very animated but also focused on working with his group to formulate their required artifacts for Task 1. Carl volunteered to be the materials and time manager, and competently met these expectations. He noted in his first GEF that "being ready and paying attention and asking questions will help in this task," and that the task benefited from groupwork because "we had to take turns listening and working together and agreeing with each other." Carl's competency was also commented on by another student in the group who reported that he actually had the best ideas that day. During the following three-day task, Carl had difficulty performing at the same level as the first, shorter task. He left most of his second GEF blank or with IBRs and, this time, his group mates noted that Carl had been distracting and "off task a lot."

In order to support students like Carl, who demonstrated a noticeable discrepancy between short and lengthier group tasks, the longer third and fourth groupwork tasks were organized as linear progressive segments via an advanced organizer. For example, Task 3, focused upon preparing for a mock trial. This was broken up into several much shorter day-long or two day-long tasks. Each learning activity then functioned as its own mini-groupwork task—in turn helping to 'chunk' tasks and support students like Carl, by establishing concrete and explicit daily tasks (Freeman & Freeman, 2009; Vaughn, Bos, & Schumm, 2001). Although outside events prevented Carl from demonstrating improved competency in his contributive attitude in his final three rubric scores, Carl once again met proficiency on focus and partially met expectations regarding cooperation and information sharing. Additionally, Carl maintained a positive affect score on the survey within the standard deviation.

Margaret scored a 32 on her initial affect survey, which placed her on the border between the second highest and highest quintile ranges for positive groupwork affect. Margaret, often described by teachers as "very talkative" and "constantly talking" (personal communication), seemed well suited for groupwork tasks. Margaret enjoyed working with other people and, on her first two tasks, she reported that the groupwork was "very easy." She identified the benefit of working in a group as mainly generative—"we had to work together to come up with more ideas." Margaret's statements regarding the benefit of groupwork, given her abilities as a student, seemed to lack clarifying details. Even more revealing, however, of Margaret's initial schema toward groupwork and groupwork processes, were the observations made by the author concerning her competencies around information sharing. She rarely listened to the other members of her group and primarily talked over or at her group members. Margaret also had difficulty remaining on tasks, and would often engaged in extensive side conversations with her female group mates.

When contextualizing Margaret's low competency scores in 'focus' and 'information sharing' within the larger trends, she represents an important sub-group of initially positive-affect females. Initially, groupwork appeared to be a primary means of teacher-sanctioned socializing—tasks were neglected or dominated by non-task conversations. After the mini-lesson intervention between Tasks 2 and 3 that focused on adequate facilitation and active listening, the trend was partially reversed. Later observations of Margaret, also corroborated by her group mates' GEFs, show an increased competency in active listening and on 'focus.' Margaret reflected after Task 3 that "you needed to listen to each member of the group before you speak," and "[I] need to listen to others and come up with an answer together." Margaret also mentioned listening as a key competency/skill necessary for success in both of the later tasks, which may suggest a shift from viewing groupwork as sanctioned socializing to meaningful academic-oriented collaboration.

Timothy, the final case study student to be examined, represented the highest quintile for initial positive affect scores based on the affect survey. Timothy, like the majority of both female and male students in the upper quintiles, was involved in team sports (Figure 4.9). Timothy also met expectations in all five groupwork competency domains throughout all four tasks. Timothy's affect score did increase on the second survey, but was within the standard deviation and therefore not significant—another phenomenon that is representational of both upper quintile male and female students.



Figure 4.9 Percentages of students who participated on team sports by affect quintile score.

Timothy's unit summary journal entry exhibited higher order reflective thinking; there is ample evidence of 'awareness' and some instances of explicit critical reflective analysis. Timothy explains the benefit of working with others as "forc[ing] you to think deeper because when you would argue to other people they always had an answer. That forced you to think deeper in order to have another argument." This statement demonstrates fairly complex awareness-level reflection—Timothy is able to reiterate the importance of an experience in supporting additional research focused on providing crucial counterarguments. Deeper reflective thinking, on an analytical level, was evidenced by his response to the use of teenage defendants in the final two tasks. Although not concerned with groupwork processes and skills directly, several of Timothy's entries evidence an organic product of the scaffolded low-press metacognitive journaling. "I think that you [the author as the student teacher] used real cases with teenagers because we're teenagers and we can relate with some of the cases," Timothy journaled, "[i]t could also be easier for kids to understand because they are the same age." As a result of prior low-press metacognitive engagement with the GEFs, Timothy was able to create and engage in higher-press metacognitive tasks that show advanced levels of reflective thinking at the conclusion of the study. All five students provide concrete examples of the myriad ways in which low-press metacognitive engagement facilitated differentiated and targeted instruction to help develop groupwork competencies and affect. As a direct result of the information obtained from Gus' first two GEFs, additional instructional decisions were made with the cooperation of the special education teacher. Individualized attention and interactions benefited Monica and Carl, as they sought to increase their groupwork competencies while simultaneously working on other longitudinal goals. Margaret benefited from targeted instruction on active listening which was informed by the GEFs from her peers. Finally, Timothy was aided by the low-press metacognitive GEFs which promoted higher order reflective thinking, later captured by the use of higher-press metacognitive journaling.

In each of these examples, the information derived from student-authored metacognitive tasks helped inform pedagogical decision-making that aided in the delivery of differentiated and meaningful instruction not only in regards to academic content, but to the important groupwork skills and processes that are integral in effective collaboration.

CHAPTER 5: CONCLUSION

The results of this investigation into low-press metacognitive journaling, as a way of engaging in teaching groupwork competencies and promoting positive groupwork affect, in a middle school setting can be distilled into three important conclusions. First, the results of this study support the larger current academic discourse concerning the role of metacognition in the acquisition or improvement of competencies. Secondly and embedded within the context of the current discourse, the results help to inform the directions in which fruitful additional research may expand upon this research. Lastly this research provides valuable insights for possible future use, not only by the author as a teacher educator but by other pre-service student teachers during their student teaching experiences.

Through interpreting the data and trends, one can overall conclude that low-press metacognitive artifacts likely have a correlative effect on improving groupwork competencies. Over the course of the study, GEFs demonstrated an increased student awareness of both the skills necessary for effective groupwork and for the student's own actions and skills. Students routinely reflected on their own listening and communication, their ability to work with others in the group, the contributions and on task behavior of their fellow group members, and evaluated how their efforts were benefited by groupwork.

During the study, students showed significant growth in positive affect and reflective engagement. As a result of these two trends, students also exhibited and reported lower incidences of difficulties while working in a group. They were also increasingly complex in their responses to low-press metacognitive prompts. Students increasingly cited groupwork as productive and generative; the number of students reporting that everyone or most individuals within the group had the 'best ideas' increased three-fold to suggest a fundamental shift in the participants' prior schema. In addition, low-press metacognitive journaling organically supported higher order reflective thinking that was increasingly visible in student-authored artifacts—particularly by the end of unit summary journal entry. Essentially one can view both the growth in metacognitive engagement and in groupwork competencies as mutually concurrent, that is, growth within each domain was co-embedded within the growth of the other.

It is important to consider this study's limitations again in light of this co-embedded conceptualization. As a result of only considering the effects of low-press metacognitive artifacts, both out of consideration for the participants' readiness and for the time constraints imposed by contemporaneous student teaching by the author, the data, although fairly rich, is nonetheless unable to support further demarcation amongst positive growth in groupwork competencies and higher-order reflective engagement. In addition, the inability to decouple both of the major positive outcomes either casually or referentially from one another, this study also encountered complications from uncontrolled-for elements of the underlying participant profiles—specifically concerning team sports participation. The high correlation (0.6) of initial positive affect and participation in a team sport within the last year is somewhat problematic. These experiences likely reinforced groupwork competencies outside of the classroom, as student athletes inherently engage in high-press meaningful groupwork tasks. When taken into consideration with the inseparability of both groupwork competencies and reflective engagement, this study would benefit from having instituted initial bifurcation amongst the participant sample based on team sports enrollment and participation.

Even with these detractions, the importance of low-press metacognitive journaling is demonstrable, if for no other reason than it serves to reinforce the need for substantial future research regarding metacognitive journaling in relation to groupwork skills and processes. When situated within the limited extant literature, this study points to the continued need to explore: the relationship between reflective thinking and growth in reflective abilities and capacity, the effects of metacognitive engagement on reflective capacity as it relates to specific tasks, and the nature of groupwork competency growth as an outcome of increased metacognitive engagement via higher-press metacognitive journaling artifacts. Students, educators, and interested parties (such as market stakeholders) alike will be better served as additional research is carried out and specific strategies and conceptualizations come to the forefront of the academic metacognitive discourse.

Finally, it is important to visit this study's implications for the author-as-pre-service-researcher. Low-press metacognitive journaling, when intentionally employed as a means of scaffolding in higherpress metacognitive journaling, appears to support not only student-centered growth in both reflective thinking and groupwork competencies, but has also acted as an important source of student data. This student data was routinely used by the author and other faculty members at QMS to make pedagogical decisions. In addition, this study gave the author a chance to participate in live action research, and to understand firsthand the immeasurably complicated task of analyzing and observing students as live subjects.

As a pedagogical tool, low-press metacognitive journaling functions well within some defined parameters. Low-press metacognitive journaling, when implemented as an initial priming component and early scaffold towards higher order reflective thinking toward specific complex competency domains (e.g. groupwork skills, processes, and affect) appears fairly promising. Students are afforded the chance to organically increase their competencies in reflective learning and thereby experience concomitant development of higher order cognitive modalities such as groupwork competencies. Although much more research is needed to conclusively establish the causal importance of low-press metacognitive journaling in developing complex competencies, this study helps to highlight the potential benefits of continued interest in investigating this burgeoning field. Further interest in utilizing metacognition as a means of teaching and reinforcing collaborative skills championed by both educators and business leaders alike can not only improve student outcomes, but also promote deeper and more reflective student learning.

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APPENDIX A

Feelings toward Groupwork Survey Name:	ings toward Groupwork Survey Name: Per: _				
DIRECTIONS—This questionnaire contains a number of statements about ho	w you	ı migh	t feel	about	
working in groups. If you feel the statement is very true of you, circle the '5'.	If you	i feel t	hat sta	itemer	it is
Remember that there are no right or wrong answers. Please respond to all state	, CIICI	e the	2,3	, 01 4	•
1 Leniov working within a group		5.			
1. Tenjoy working within a group.	[1]	[2]	[3]	[4]	[5]
2. I prefer working a group of the same sex.	r-1	r_1	[-]	Γ.]	r. 1
	[1]	[2]	[3]	[4]	[5]
3. I sometimes feel nervous when I have to give my ideas or share in a group.	F 1 3	[0]	[0]	F 4 3	
	[1]	[2]	[3]	[4]	[5]
4 Lunderstand information better after explaining it to others in a group					
1. I understand information better after explaining it to others in a group.	[1]	[2]	[3]	[4]	[5]
	Γ]	LJ	F. 1	LJ	r. 1
5. I feel more accepted by others after working within a group.					
	[1]	[2]	[3]	[4]	[5]
6. I often find it difficult to understand what the group task is.	Г 1]	[2]	[2]	[4]	[5]
	[1]	[4]	[3]	[4]	[3]
7. I like to work alone, even when placed in a group.					
	[1]	[2]	[3]	[4]	[5]
8. I think groups should take the time to set up group goals.	F 1 3	[0]	[0]	F 4 7	573
	[1]	[2]	[3]	[4]	[5]
9 I prefer to work within a group rather than work alone					
y. I protor to work wrann a group ration than work atone.	[1]	[2]	[3]	[4]	[5]
10. I prefer to work in groups with both boys and girls.					
	[1]	[2]	[3]	[4]	[5]
11. Even when the group is achieving its goals. I don't really feel involved on	antiafi	ad			
11. Even when the group is achieving its goals, I don't rearry leer involved of	5801511 [1]	eu.	[3]	[4]	[5]
	[1]	[~]	[2]	נדן	[9]
12. I often have a strong feeling of satisfaction when I become totally involved	d in a	group			
	[1]	[2]	[3]	[4]	[5]
13. It is important that the other group members take responsibility for everyo	ne's le	earnin	g.	Г И Л	[5]
	[1]	[2]	[3]	[4]	[5]
14. I don't like it when one member of the group takes over from everyone els	se.				
i i i den e inte it viten one memoer of the group takes over nom everyone en	[1]	[2]	[3]	[4]	[5]
15. Groups should organize themselves so that the work is divided evenly.					
	[1]	[2]	[3]	[4]	[5]

Teaching Toward a Better World

16. I usually make a strong personal contribution to the groupwork.	[1]	[2]	[3]	[4]	[5]
17. I am often afraid to ask for help with within my group.	[1]	[2]	[3]	[4]	[5]
18. I often feel less motivated to learn within a small group.	[1]	[2]	[3]	[4]	[5]
19. I like groupwork more when we can make up your own groups.	[1]	[2]	[3]	[4]	[5]
20. I do not like to study within a group.	[1]	[2]	[3]	[4]	[5]
21. Contributing ideas within a group often makes me feel better about myself] [1]	[2]	[3]	[4]	[5]
22. I can usually understand other group members' ideas.	[1]	[2]	[3]	[4]	[5]
23. Even when groups are well organized, I don't believe they are a more effective of the state	ective way of using class				
time.	[1]	[2]	[3]	[4]	[5]
24. It is best when each person helps each other within a group.	[1]	[2]	[3]	[4]	[5]
25. I often think the work becomes too confusing when done in a group rather	than i [1]	indivic [2]	dually. [3]	[4]	[5]
26. Groupwork is better when the teacher tells us which group we are in.	[1]	[2]	[3]	[4]	[5]
27. I rarely feel relaxed within a group.	[1]	[2]	[3]	[4]	[5]
28. I do not feel responsible for others' learning in groups.	[1]	[2]	[3]	[4]	[5]
29. I sometimes feel let down by other group members.	[1]	[2]	[3]	[4]	[5]
30. I often feel in charge when working within a group.	[1]	[2]	[3]	[4]	[5]

APPENDIX B

Mr. Joseph Boyer 15620 143rd Ave SE Yelm, WA 98597

September 2011

Dear Parent/Guardian:

As part of the requirements for my master's degree from The Evergreen State College, I am conducting research that involves the use of journaling in the classroom to help students become better at working in groups and have a more positive overall attitude towards groupwork.

This project will take place over an eight week period of time. During that time, there will be several times in which specific journal entries are collected by me so that I can collect and analyze some data.

Student participation in this project is voluntary, will not affect their grade in US/Pacific Northwest History, or interfere with their daily instruction and learning—in fact your student may benefit from the research conducted during my student teaching. Names are no reported and no information will be given or used except in the writing of my master's thesis.

I am very excited to have this opportunity to work with your child.

Thank you for your support.

Regards,

Mr. Joseph Z. Boyer
APPENDIX C

1. How interesting did you find your work in	5. Was there an ability on which you
the group today?	thought you did well?
Very interesting	Yes No
Fairly interesting	
Somewhat interesting	How many times did you have the chance
Not very interesting	to talk in the group today?
I wasn't interested at all	None1-23-4 5+
How difficult did you find your work in	
the group?	If you talked less than you wanted to,
Extremely difficult	what were the main reasons?
Fairly difficult	I felt afraid to give my opinion
Somewhat difficult	Somebody else interrupted me
Not too difficult—just about right	I was not given the chance to give my
Very easy	opinion
	I talked as much as I wanted to
3. Did you understand exactly what the	Nobody paid attention to what I said
group was supposed to do?	I was not interested in the task(s)
I knew what to do.	I was not reeling well today
At first I didn't understand.	8 Did you get along with everybody in your
It was never clear to me.	s. Did you get along with everybody in your
4. What abilities did you think were	Ves No Some
important for doing a good job on this task?	
Fram werk communication	
research abilities.	
9. How many students listened to each other's i	Seed
Evenuence listened to evenue	abidaa
10. Who did the most talking in your group? The	eleast?
I did the most talking.	did the least.
11. Who had the best ideas in your group today	?
& I di	d
12. Who did the most to direct the discussion?	
I directed the discussion	n
13. Would you like to work with this group again	n?
YesNo	
If not, why?	
NA	
14. How did this task benefit/require groupwork	Kr .
Everyone had to listen an	nd stay on tack
I got to know seale th	at E did it lock,

	Nan
. How interesting did you find your	work in 5. Was there an ability on which you
he group today?	thought you did well?
× Very interesting	Yes 📉 No
Fairly interesting	
Somewhat interesting	6. How many times did you have the chance
Not very interesting	to talk in the group today?
I wasn't interested at all	None 1-2 3-4
	× 5+
. How difficult did you find your wo	ork in
he group?	7. If you talked less than you wanted to,
Extremely difficult	what were the main reasons?
Fairly difficult	I felt afraid to give my opinion
🦟 Somewhat difficult	Somebody else interrupted me
Not too difficult—just about ri	right I was not given the chance to give m
Very easy	opinion
	I talked as much as I wanted to
. Did you understand exactly what t	the Nobody paid attention to what I said
roup was supposed to do?	I was not interested in the task(s)
× I knew what to do.	I was not feeling well today
At first I didn't understand.	
It was never clear to me.	Did you get along with everybody in you
	group?
. What abilities did you think were	Yes No Some
mportant for doing a good job on th	his task?
communication	
teamwork	
ECTION TWO-	
ECTION TWO	ach other's ideas?
ECTION TWO	ach other's ideas?
ECTION TWO	ach other's ideas? r group? The least?
ECTION TWO	ach other's ideas? r group? The least?
ECTION TWO	ach other's ideas? r group? The least?
ECTION TWO	ach other's ideas? r group? The least? group today?
ECTION TWO	ach other's ideas? r group? The least? group today?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again?
ECTION TWO	ach other's ideas? r group? The least? group today? discussion? s group again? e groupwork? 'nceed 'the unit each optic
ECTION TWO- How many students listened to ea A. How many students listened to ea A. How did the most talking in your A. Who had the best ideas in your g A. Who did the most to direct the d A. Would you like to work with this Yes No f not, why? A. How did this task benefit/require because you to communicate With	ach other's ideas? r group? The least? group today? discussion? s group again? e groupwork? inceed i fh your partner

APPENDIX D

-	
_	Unit Reflection
١,	I think the purpose (s) of this unit was to help us
	understand what goes on in law out in the big picture " of
	the world. Doing the trials made us realize that real things
	happen to real people in real life. I think the legal briefs
	helped us summarize more. We also had to pay more
	attention to the amendments.
2,	Researching and preparing-for the mocktrial helped with
	my mastery of the content because I had to know
	which amendments were which. Also, I got to know
	what actually goes on in the world. Legal briefs
	give me a better understanding of my case.
2	Whenk has a first the designed in the
3	Bill of Rillion La Hank apper about the
	case walkies and need and if so which cast of
	which one? You also got to see what different people
1 10 1	thought of their case.

APPENDIX I	Ξ
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	Advanced	Meets expectations	Does not fully	Does not meet
Skills			meet	minimum
			expectations	expectations
Contributive Attitude	Always willing to help and do more, routinely offered useful ideas. Always displays positive attitude.	Cooperative, usually offered useful ideas. Generally displays positive attitude.	Sometimes cooperative, sometimes offered useful ideas. Rarely displays positive attitude.	Seldom cooperative, rarely offers useful ideas. Is disruptive.
Cooperation	Did more than others – highly productive Works extremely well with others, never argues	Did their part of the work – cooperative. Works well with others, rarely argues.	Could have done more of the work – has difficulty, requires structure, directions and leadership, sometimes argues.	Did not do any work – does not contribute, does not work well with others, usually argues with teammates.
Focus on task	Tries to keep people working together. Almost always focused on the task and what needs to be done. Is very self- directed.	Does not cause problems in the group. Focuses on the task and what needs to be done most of the time. Can count on this person.	Sometimes not a good team member. Sometimes focuses on the task and what needs to be done. Must be prodded and reminded to keep on task.	Often is not a good team member. Does not focus on the task and what needs to be done. Lets others do the work.
Role fulfillment	Participated in all group meetings, assumed leadership role as necessary. Did the work that was assigned by the group.	Participated in most group meetings. Provided leadership when asked. Did most of the work assigned by the group	Participated in some group meetings. Provided some leadership. Did some of the work assigned by the group.	Participate in few or no group meetings. Provided no leadership. Did little or no work assigned by the group.
Information sharing	Always listens to, shares with, and supports the efforts of others. Provided effective feedback to other members. Relays a great deal of information – all relates to the topic.	Usually listens to, shares with, and supports the efforts of others. Sometimes talks too much. Provided some effective feedback to others. Relays some basic information – most relates to the topic.	Often listens to, shares with, and supports the efforts of others. Usually does most of the talking – rarely listens to others. Provided little feedback to others. Relays very little information – some relates to the topic.	Rarely listens to, shares with, or supports the efforts of others. Is always talking and never listens to others. Provided no feedback to others. Does not relay any information to teammates.

Creativity and Critical Thinking Skills in the Visual Arts Classroom

Kellia A. Brinson

Abstract

This literature review examines research that looks at if and how art can serve to develop creativity and critical thinking skills. One responsibility of educators is to help students prepare to participate in a global economy which increasingly necessitates the ability to think creatively, critically, and divergently. One way to provide students with these important thinking skills may be through an arts rich curriculum. Ten research studies were reviewed that looked at fostering creative and critical thinking skills through the visual arts. These studies explored student involvement in the arts as well as the connections between art education and levels of and critical thought. Overall, positive correlational and causal relationships were found between arts education and higher levels of creative and critical thought. Research supports that by promoting original thought and engaging students in activities to promote their cognitive growth, creative tendencies may be reinforced and critical thinking skills effectively fostered and that the visual arts provide an ideal opportunity for teaching students not *what* to think, but *how*.

Keywords: creativity, critical thinking, art, art education

Creativity and Critical Thinking Skills in the Visual Arts Classroom

Throughout the public education system, there is a substantial lack of consideration for creativity and critical thinking within the school curriculum. Political and economic agendas attempt to minimize the amount of school subjects that are not easily quantifiable or adaptable to standardized testing, such as the arts (Hope, 2010). The result is that students are expected to exhibit skills such as divergent and creative thinking without actually being taught how to do so, which the arts may provide. As an arts educator, I have witnessed a lack of value placed in the visual arts in schools. In my own classroom, I have also seen students' difficulty in open-ended problem solving, creative/critical inquiry, and metacognitive reflection. As a result of these observations. I have become increasingly interested in studying the development of creative and critical thinking skills. Critical thinking should be at the center of the educational experience, with emphasis placed on creativity and divergent thinking throughout the curriculum. Paulo Freire (2007) saw an emphasis on critical thinking as the most appropriate way to organize our educational focus in schools to benefit our students. Through creative teaching and an emphasis on experiential learning, arts educators can help students become critical thinkers who are able to reflect and work creatively in multiple subject areas (Efland, 2002).

One of the responsibilities among educators is to help our students become well-rounded. Educated citizens are better able to participate in a global economy, which increasingly necessitates the ability to think creatively, critically, and divergently(Hope, 2010). One way to provide students with these important skills may be through an arts rich curriculum (Covington, 1967). Since the implementation of No Child Left Behind (2001), the presence of visual arts in schools has diminished drastically and has been replaced with an increased emphasis on high stakes accountability (Au, 2009). Teachers have less time to provide students with experiential

learning opportunities, and must spend more time teaching convergent thinking strategies to prepare students to pass the next exam. This results in students' having increased difficulty in meeting, exploring, and tackling non-linear, open-ended problems through critical thinking and creativity. Supporting the arts in public schools allows students the opportunity to develop these skills more deeply, particularly in areas where other subjects may not be able to provide them (Efland, 2002). Teaching for creativity and critical thinking may help students break the pattern of 'one-right-answer' thinking that has become so pervasive throughout the public education system (Woodman, 1997).

Creativity and critical thinking are difficult to define in any context. Part of the dilemma in advocating for these skills in the education system is that both terms have been historically ambiguous and indefinite, so that no common and widely agreed upon definition exists (Milbrandt & Milbrandt, 2011). For the purposes of this review, the terms *cognitive development, creativity, critical thinking, art,* and *art education* are specifically defined as follows. Cognitive development will be used to refer to general learning processes and concepts of the mind, both in reference to lower-level and higher-level thinking. In this paper, creativity will refer to cognitive, emotional, and operative experiences. These involve the development of ideas through a specific mental process (cognitive), internal response as the creative progress develops (emotional), and development through physical interaction with artistic media (operative) (Efland, 2002). Critical thinking will encompass reflection through metacognition, reflective reasoning, context, and response to an open-ended question. Art in this paper will refer to the visual arts. Art education will refer to the promotion of cognitive and social development through the study, application, and appreciation of the arts in a school setting, guided by an instructor (Cropley, 2006).

While searching for research articles to support my inquiries, I realized several important things. One was that there are many similarities between certain creative and critical thinking skills, many of which overlap and were found to be directly interrelated. In particular, this has made the definitions of specific subsections of these terms difficult to pinpoint, as well as order in terms of the literature review. Creativity has been grouped into several subsections of relatable topics: self-efficacy, imagination/originality, self-expression, flexibility, and exploration/resistance to closure. Critical thought has been grouped in subsections using divergent/convergent thought, reflection/metacognition, inquiry, observation, and reasoning. The literature review of the research articles have been grouped together by these topics and subtopics. However, it is important to note that there is a fair amount of overlap between many of the articles, thus making separation and juxtaposition problematic. Additionally, although there is a vast amount of literature written on the topics of fostering creativity and critical thinking skills through the arts, little quantifiable examination has been done, making it somewhat difficult to find suitable research to support investigation into these areas.

In summary, this paper reviews research that examines if and how art can serve to develop creativity and critical thinking skills such questions as: do the visual arts help to build cognitive development in the areas of creativity and critical thinking skills? what practices are effective in doing this? what implications does this have for teaching?

Literature Review

Catterall and Peppler (2007) examined visual arts contribution to children's self-efficacy, world views, and creative thinking. The researchers studied a sample of 179 inner city third

grade students from public elementary schools in Los Angeles and St. Louis. Six 3rd grade classrooms were chosen from Los Angeles: three scheduled to participate at the Inner City Arts program (ICA) in the fall and three non-participating third grade classrooms as control groups. In St. Louis, three classrooms participated in the study, all of which received instruction at the Center of Contemporary Arts (COCA) which was serving an inner city public housing project.

Through analyzing pre and post program surveys, significant progress was found in students who studied art in regards to self-efficacy and self-concept (Catterall & Peppler, 2007). The interview questions asked about students' sense of control over their goals, obstacles, and future.

The creativity scales used for this study were based on the Torrance Test of Creativity, but modified for elementary school students (Catterall & Peppler, 2007). Four sub-categories of creativity were examined: originality, fluency, flexibility, and elaboration. Students in all groups, regardless of participation in a high quality visual arts program, made some positive progress in the creative sub-categories of fluency, flexibility, and elaboration; about one-third to one-half depending on the group, specifically. On the sub-scale of originality, however, students who took part in a visual arts program made improvements of approximately 55% to 33% from previous scores.

The results of this study suggest that creativity and self-efficacy have the potential to directly influence one another, and suggest that involvement in the arts transfers to greater creativity in general (Catterall & Peppler, 2007). Original thinkers have more expansive views in general, allowing for consideration of multiple solutions to a problem and assisting further confidence and self-efficacy. The overall growth of self-efficacy and tendency towards creative thinking also suggested that increased confidence contributes to higher levels of creativity. Self-

efficacious students believed that they had the ability to create something original and were motivated to try multiple approaches to a problem.

Caterall and Peppler (2007) conducted this study over the course of five months. Though this was sufficient time to make some observations as to specific benefits of a high quality arts education program, the researchers note that a longer study would have provided further insight. Additionally, the control group was only conducted in Los Angeles, possibly skewing some of the information in favor of positive impacts of arts education due to environmental factors. A final critique of the study is that while students seemed to lack self-efficacy in their home classrooms in many cases, this was the opposite at ICA and COCA. To gain knowledge into the reasons for this, further research would be needed to examine classroom environment, resources, teaching technique, and culture.

An empirical study by Luftig (2000) attempted to define and identify particular educational outcomes that could be produced from a school wide arts curriculum. The investigation focused on the extent to which the arts could engender creative thinking, academic achievement, self-esteem, affective functioning, and arts appreciation among elementary school children.

The study examined the effects of the School, Parents, Educators, Children, Teachers Rediscover the Arts (SPECTRA+) program, a multi-disciplinary, integrated curriculum which focused on the incorporation of the arts into daily curriculum (Luftig, 2000). The SPECTRA+ program had several main focuses, including specific arts instruction, arts integration into other content areas, and evaluation and advocacy for the arts. The study participants focused on 615 students from four elementary schools in two districts in southwest Ohio. Three conditions were

used in this study: an experimental condition (the SPECTRA+ program), a modified control condition, and a full control condition.

As measured by the Torrance Test of Creative Thinking, involvement in the arts was found to foster creative thought and thinking skills (Luftig, 2000). The test measured fluency, originality, abstractness, elaboration, and resistance to closure. Students who were part of the SPECTRA+ group were found to have considerable advantages in overall creativity, more specifically in the areas of originality, elaboration, and resistance to closure. Other areas investigated yielded no results of great significant difference between groups.

In the arenas of originality and imaginative thought or elaboration, Luftig (2000) found that children involved in the arts were more likely to have imaginative responses to problems. This was not related to the amount of variance in response, but rather with the uniqueness. Two things were assumed in regards to the association between involvement in the arts and the ability for elaboration. One is that creativity necessitates the ability to detect a specific theme of an art piece. Additionally, explanation and ingenuity are general functions of creative elaboration and imagination. Students involved in both the SPECTRA+ program and the modified control group scored significantly higher in the area of creative elaboration than the full control group, strongly suggesting that the arts have the ability for noteworthy impact on expansion of theme and details within the realm of creativity.

Luftig's (2000) current research covered only one academic year, resulting in some inconclusive results as well as some results indicating no benefit at all in specific areas. A longitudinal study of students over the course of several years could yield more telling results, whether they would be sustained, heightened, or lessened. Studies of the SPECTRA+ program

on at-risk populations and/or children from culturally different backgrounds could also yield interesting and possibly different findings.

A study by Covington (1967) analyzed the effectiveness of an instructional arts program administered to approximately 350 fifth and sixth grade students and a control group from the Berkeley, California area. Covington's research explored problem-solving abilities such as examination, divergent thinking, self-efficacy, and creative thinking skills including imagination, exploration, creating meaning, and self-expression. The tests administered by the researcher were in the form of booklets and packets and required students to use creative and critical thinking skills, but not necessarily visual arts skills.

In one test to determine problem-solving ability using divergent and convergent thought, students were asked to devise solutions to eliminate a tumor inside of a human's body using an X-ray beam (Covington, 1967). If the beam was too strong, it would kill the healthy tissue as well, but if it were too weak, nothing would happen. Students were given some time to work on their own and then given deliberate hints in the form of visual cues. Generally, this question was too difficult for students to solve without some prompting; however, the students who did achieve this without aid were children who had received instruction in the arts. With outside help, 35% of arts instructed children achieved one or both of the two anticipated solutions, whereas only 13% of non-arts instructed children from the control groups did so. This test was an example of the use of convergent thought, in which the solution to the question is narrowed from a range of possibilities, until the *most appropriate* resolution is found. In comparison, tests focusing on divergent thought were administered as well, which will be described next.

A major finding of this study is that divergent thinking calls for an assortment of ideas and solutions that will answer the problem sufficiently (Covington, 1967). Students taking part in

the divergent thinking test were asked to name all the possible ways to make a stuffed toy dog more fun to play with by changing it, a question adapted from the Torrance Creativity Test. Children who had received arts instruction produced a significantly larger number of plausible solutions than control children did. What is particularly informative about the results however, are the overall differences in types of answers given by the two groups. There were solutions frequently suggested by both groups, but the control children stopped with those commonplace explanations, such as changing the color of the dog, while the instructed group offered a greater amount of more abstract ideas.

Covington (1967) also found that children instructed in the visual arts were more likely to persist in the exploration of new ideas and multiple avenues to solve challenges without coming to premature conclusions in both visual and written problems. Actual artwork of instructed children was not necessarily more advanced as far as artistic ability, but reflected more original, non-literal interpretations of the given task while still solving the visual problem. Here, Covington notes that it is vitally important to teach the development of original idea, even in students deemed to be artistically gifted. Without this, children who have a natural inclination to art may learn to only become competent copiers of artistic style and realistic drawers.

Though this study was done in 1967 and is therefore somewhat outdated, it is important to note that the research findings are consistent with what newer research in this area has concluded as well. One reason for including this study in the literature review is the fact that many of the findings are still relevant today. Additionally, though there is a large body of literature written about the relationship between the arts, creativity, and critical thinking, quantifiable research is just beginning to surface and overall not as common due to the arts and creativity being intrinsically difficult to describe quantifiably.

Madeja (1967) examined the effects of divergent and convergent emphasis in art instruction. The purpose of the study was to examine two teaching methods in art: one which placed emphasis on divergent thought and one which placed emphasis on convergent thought. Instruction that placed emphasis on divergent thought was hypothesized to lead students to more original thinking, idea fluency, problem-solving ability, and abstract reasoning.

The study focused on suburban high school students perceived to have either 'high' or 'low' art ability based on past art grades and teacher assessment of skills (Madeja, 1967). Six groups were selected for the study: three high in art ability and three low in art ability, with two experimental groups and one control group matched for both the high and low art ability student groups. Instruction was executed in a classroom environment whereas the analysis took place in a laboratory setting and focused on answering four main questions under the focus of the study: (1) are there significant differences after treatments which relate to the general development of creativity? (2) is there any change in attitudes that relates to the subjects and the methods of teaching used? (3) are there any significant differences in the finished artworks of the study groups? (4) is there any significant relationship between art ability and general creativity? Levels of creative self-efficacy were also studied. The subjects were tested using the Minnesota Tests of Creative Thinking and Burkhart's Self-Concept Checklist.

Madeja (1967) found divergent and convergent methods of arts instruction effected students of both high and low art ability, but in different ways. Students of high art ability were most successful when instructed using divergent teaching methods, whereas low ability art students generally had higher classroom success when instructors used convergent methods of teaching. In fact, both instructional models were found to positively benefit students of high art ability, particularly in relation to growth in creative originality and aesthetically awareness in

end-products. Because of this, arts educators must differentiate instruction based on the previous experiences and knowledge of their students to allow for maximum success, growth, and development of creative attitudes. One implication is that students who have had less experience in the arts need greater structure and scaffolding before being able to explore on their own and find voice for sufficient self-expression.

A meta-analysis (Moga, Burger, Hetland, & Winner, 2000) examined eight studies that looked at the relationship between studying arts and creative, critical, or higher-order thinking. Subject participants ranged in grade level from first grade to undergraduate students. All studies used were empirical and assessed the effects of visual arts either alone or in combination with another arts discipline. Additionally, each studies had a control group that received no additional arts instruction. The studies included in this meta-analysis were either correlational or experimental, and assessed creativity through verbal measures and/or figural (visual) creativity tests. The meta-analysis examined several questions: Does studying visual art make people more creative and imaginative? Does studying visual art help to develop creative thinking skills that can be transferred to other contexts?

Correlational studies used in this meta-analysis examined the effects of art education between one and nine years with participants ranging from fourth grade to college undergraduates (Moga et al., 2000). Each study measured creative tendency through the use of written tests, with two using verbal assessment and two using figural assessment. Overall, these studies found correlational evidence that supports a linkbetween studying the arts and creative performance. It should be noted, however, that all but one of the studies used participants who voluntarily chose involvement in the arts, possibly indicating that individuals interested in the arts may have a natural inclination towards creative thinking in the first place.

Experimental studies that specifically analyzed results through verbal creativity measures took place between 1963 and 1969, with grades of participants ranging from seventh to eleventh graders (Moga et al, 2000). Each of these experimental studies examined students perceived to have varying abilities in creativity – high, average, and low with arts study and ranged from four days to four months. These studies found no significant evidence for a causal relationship between verbal creativity and art education. However, the lack of correlation could be linked to the short amount of time these students spent involved in arts study.

Other experimental studies examined in the meta-analysis measured creativity outcomes through figural measurement, with studies taking place between 1963 and 1993 and ages of participants ranging from kindergarten to eleventh grade students (Moga et al., 2000). Students involved in these studies had varying ranges of perceived creativity levels. These studies varied between four days, seven months, and one year, and the tests used for assessment were the Torrance Test of Creative Thinking, Thinking Creatively with Pictures, and the Minnesota Tests of Creative Thinking, respectively. Some evidence was found suggesting causal relationships between arts study and creativity measures, though the exact correlation is largely ambiguous. Overall, the experimental studies found that when the measure was verbal or conceptual, no evidence for a causal relationship was found. However, studies that used figural reasoning as a form of assessment found positive evidence between arts study, creativity, and transfer. These results suggest a causal relationship between arts and creativity, but only when the area for transfer requires the same skill set.

Feldhusen, Bahlke, and Treffinger (1969) investigated the development of creativity among students who have participated in a creativity training program. The study examined the implementation of an auditory creativity series that students listened to for 15 minutes and then

participated in creativity building exercises. The program allowed students both verbal and experiential practice in the creative areas of fluency, flexibility, originality, and elaboration.

Participants for this study included 265 students ranging in age from 3rd to 5th grade (Feldhusen et al., 1969). One hundred and twenty nine children received instruction through a creativity program and served as the experimental groups. One hundred and thirty six children received no additional creative instruction and served as the control groups. Each grade level had two experimental groups and two controls groups for uniformity of variables. Classes that were part of the experimental groups listened to the audio program once a week for 28 weeks. The control groups received the standard curriculum. Students in the experimental groups and control groups were each given the Minnesota Test of Creative Thinking to determine the amount of effectively of the program on creative thought.

Students who participated in the creative program were found to have higher scores in the area of originality on both the verbal and non-verbal tests than did students in the control group (Feldhusen et al., 1969). There were no significant differences found in the overall intelligence between the two groups. Creative problem solving was also found to be positively impacted by specific instruction. Additionally, though the study found that though the creativity-building program was shown to have positive impact in the fluency, flexibility, and elaboration, this was only the case for fifth grade students.

Implications for this study suggest that programs and instruction designed specifically to assist students in creative problem solving are largely effective in some areas, but not all. It is also worthy to note that though this information is not subject specific, it may be easily applied to the arts as well as other content areas.

Turkan and Yasar (2011) examined visual culture studies in primary school visual art curriculum. Questions examined in this study include: (1) do students examine visual culture tools with a critical perspective? (2) how are students encouraged to participate into the visual culture studies? (3) do students present their perspectives via previous knowledge and experiences? (4) do students transform images they have obtained through visual culture studies into an artistic product? and (5) what are the student views of the visual arts courses in which visual culture studies are conducted?

This study used an action research design in which research was conducted in the natural setting of a classroom within a school and took place over the course of three weeks (Turkan & Yasar, 2000). Content of the visual culture studies included examination of relationships between visual communication/codes and traditional art skills such as drawing and painting. Types of data used for analysis were comprised of observational video recordings, researcher reflections, student demographic information, semi-structured interviews, student journals and student work in the form of verbal assignments and artistic products.

A group of 30 3rd grade students from Eskisehir, Turkey served as the participants for this study, with seven students serving as the focus (Turkan & Yasar, 2000). An internal sampling model was used through a criterion method to develop assessment criteria and to determine individual student participation. Descriptive data analysis was used to review information weekly and examined on a reliability scale.

Turkan and Yasar (2000) found that students who participated in visual culture studies used diverse thought and critical thinking processes to answer abstract questions. Students were able to effectively support their ideas and beliefs through critical perspective, including the ability to interpret and analyze visual product, see connections between content and real life

experiences, and apply observation skills in terms of detail. The students who discussed personal thoughts and feelings on a particular topic routinely used previous knowledge and metacognitive reflection to support their lines of reasoning in addition to having increased ability to envision personal goals. Students were able to effectively reflect on object and meaning within specific story-based drawings, in terms of artistic production.

Turkan and Yasar (2000) based their study on constructivist learning theories, with students taking an active role in their learning. This is largely interesting since no other studies included in this literature review mention pedagogical theory as a framework. It is important to mention culture as a variable in this study that could influence results. Further research could seek to carry out this same model in a different setting to determine the amount that this influenced the findings.

Lampert (2006) conducted an empirical study to determine what effect art education has on critical thinking dispositions. The study specifically focused not on students' ability to think critically, but rather their actual inclination to do so. The body of the research was based around several key questions: How do curriculums that include art positively influence students' disposition to think critically? Do students who study art exhibit higher levels of inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, critical thinking self-confidence, and critical thinking maturity?

Data for this study was collected at one point rather than longitudinally, and analyzed using the California Critical Thinking Disposition Inventory (CCTDI) (Lampert, 2006). The CCTDI is a 75-item attitudinal measure which tests intrinsic motivation to approach problem framing or problem solving by using thinking and reasoning. The seven subscales of the instrument measure were as follows: inquisitiveness, systematicity, analyticity, truth-seeking,

open-mindedness, critical thinking self-confidence, and critical thinking maturity. The study compared critical thinking dispositions across several variable contexts.

Participants for this study were 141 undergraduates at a large, urban, public university on the east coast of the United States (Lampert, 2006). The sample consisted of two discipline groups: arts and non-arts undergraduates; and two class rank groups: freshman and juniors/seniors. Individuals were recruited from introductory psychology classes, fine arts, and art education courses. The cross-sectional sample consisted of four groups, which contained students from a variety of the above mentioned demographics.

Lampert (2006) found that fine arts students scored significantly higher than non-arts undergraduates on truth-seeking, critical thinking maturity, and open-mindedness. Other subscale ratings showed no significant differences. Fine arts undergraduates were found to have weaker disposition in the area of *systematicity* than non-art students, the subscale being described as measuring "the tendency toward organized, orderly, focused, and diligent inquiry." (Lampert, 2006) Juniors and seniors were also found to have a higher disposition toward critical thinking than freshman, indicating that time spent in higher education increases the overall disposition to think critically.

This study did not compare the classroom climate or the culture that arts and non-arts students experienced (Lampert, 2006). As this is one of the few empirical studies to compare these specific dispositions and demographics in relationship to one another, further research is necessary to determine if the findings in this study will be maintained. A larger-scale longitudinal study could provide this, in part. Also, because this study tested freshmen art students after one semester of exposure to arts curriculum, testing all subjects upon entry to the

institution and then tracking changes in critical thinking dispositions along the way would provide further insight.

Through the study, Lampert (2006) found empirical evidence to support the argument for the positive influence of inquiry-based education of critical thinking, The research findings also suggest that arts curriculum and instruction enhances this disposition. It also suggests support that learning in the arts exerts its greatest effect on truth-seeking, critical thinking maturity, and open-mindedness.

Eason, Giannangelo, and Franceshini (2009) studied differences in creativity between public and private schools. The study considered effects of teacher perspective and creative selfefficacy on students as well as differences between kindergarten and third grade.

Fifteen teachers from public schools and 24 teachers from private schools each rated four of their students, who were selected at random (Eason et al, 2009). The teachers who participated were chosen by the principles of 12 schools in a large urban area of Tennessee. A total of 156 students ranging from five to nine years old were rated using a 12 question survey called the Early Childhood Creativity Rating Scale (ECCRS).

In the schools surveyed, Eason et al. (2009) found that creativity is typically valued more in early grades than later grades and more experiential opportunities that allow for creative problem solving are given. As the grades progress, it was found that less emphasis was placed on innovative thinking and critical thought processes and more was placed on tests and correct answers, leaving little room for creative growth. It was also noted that teachers in private schools were more likely to view their students as having creative ability, possibly due to private schools' greater freedom of curriculum design and instruction. These factors allow teachers to be more creative and experimental in in their pedagogical practices, which may ultimately transfer

to how they view their students. Teachers who rated themselves as creative were significantly more likely to perceive their students as having higher levels of creativity.

One strength of this study (Eason et al., 2009) is that the samples of the actual survey questions given to teacher participants are included, something unique to any other studies included in this literature review. A handful of these survey questions are specifically addressed through verbal analysis. However, including only some of the particular questions is an inconsistent model for reporting research findings.

Snow and McLaughlin (2005) conducted a study that examined effects of teaching drawing perspective in a structured and systematic way, and whether or not this method improved art skills among sixth grade students. Two sixth grade classes were studied at a large public elementary school in eastern Washington. Both classes received visual arts instruction once a week, with one group serving at the experimental group and the other serving as the control group. Classes were heterogeneously mixed, and class size ranged from 25 to 30 students.

A pre/post test cross over design was used to evaluate three perspective drawing assignments for each class throughout the study using a 10-point system (Snow & McLaughlin, 2005). For the pre-test still-life drawing, neither class received art instruction. The post-testing control group received no sequential perspective drawing instruction, whereas the experimental group received two 55 minute lessons on various concepts of perspective drawing and completed several step-by-step perspective drawing exercises. After the experimental group had been trained, students in the control group were taught sequential perspective drawing. In addition to each drawing being rated by the art instructor on a 10-point system, three drawing were chosen

at random from each group and given to two other art teachers for evaluation using the same 10point rating system. These scores were compared and calculated to assess reliability.

Results of the study indicated that learning to draw realistic perspective through a systematic and sequential method ultimately allowed for greater originality and expressiveness in artworks (Snow & McLaughlin, 2005). In fact, students who received structured drawing instruction were able to better express their ideas and were found overall to have higher levels of imagination in their final art pieces. Teaching drawing in a sequential order allows students to more effectively draw what they see. Ultimately, this allows individuals to operate more creatively in the area of visual arts, since the mind becomes a richer resource from which to draw (Edwards, 1999). Overall, Snow and McLaughlin (2005) concluded that learning drawing skills in a systematic and structured manner allowed students to draw more realistically overall, which is valuable to learning observation skills necessary in critical thinking.

Conclusion

Ten research studies were reviewed that looked at fostering creative and critical thinking skills through the visual arts. These studies explored student involvement in the arts and associations between art education and levels of creativity in the subcategories of originality/imagination, self-expression, flexibility, and exploration. These studies looked at connections between the arts and critical thought including divergent/convergent thinking, reflection/metacognition, inquiry, observation, and reasoning. Overall, positive correlational and causal relationships were found between arts education and higher levels of creative and critical thought. Several studies noted strong correlations between student self-efficacy and creative thought (Catterall & Peppler, 2007; Covington, 1967; Eason et al., 2009; Luftig, 2000; Turkan & Yasar, 2011). An implication of these findings is that through good practices, educators may

help foster student self-efficacy, which can lead to higher levels of and critical thinking both in and outside of the arts classroom.

Another interesting finding of this literature review is the effect of the type of arts program and the development of thinking. Catterall and Peppler (2007) specifically noted that while instruction in the arts does lead to creativity, originality, and self-efficacy, it is important that the program is one of high quality. This includes and instructor that is knowledgeable in both content as well as teaching practices, there are sufficient resources for students, and the classroom culture is a positive one. Madeja (1967) also noted that students who were classified as high arts-ability benefitted from divergent instructional practices, the effect was the opposite for students classified as low art-ability.

These findings suggest that students with little to no experience need sufficient scaffolding before they can be successful with fewer parameters in the arts classroom. Additionally, Snow and McLaughlin (2005) found that teaching drawing in a systematic way allowed for students to ultimately be more creative because they had gained the necessary skills with which to do this. For many students, setting parameters to work within compels them to come up with more creative ideas, since they must work within problem-sets using higher order thinking. However, it is significant to note that students must still be allowed to explore within the limitations to be the most successful in problem solving and creativity.

In the areas of developing creative and critical thought through the arts, there is a clear need for further research to be conducted. Much of the literature published in this area is philosophy or opinion. While these make interesting points and help to promote reflection of teaching methods and educational policy in regards to the arts, further quantifiable data must be gathered in order to inform teaching practices.

By promoting original thought and engaging students in activities to promote their cognitive growth, creative tendencies may be reinforced and critical thinking skills effectively fostered. Students involved in the arts have overall been found to interpret tasks as well as artworks in unusual ways in addition to exhibit a greater ability to re-interpret and rethink many situations successfully. Overall, a main conclusion of these studies is that the arts can expand higher order thinking when used effectively. Additionally, students from a variety of backgrounds were found to gain cognitive benefits through involvement in the arts. This is partially because art is a universal experience. It is something that all humans have been exposed to in one way or another, whether through hushed, white-walled galleries, drawing pictures in the dirt, or walking past graffiti-laden walls – art is all around us.

Though this literature review focused on fostering creative and critical thought through the visual arts, this is clearly not the only subject area that may achieve this. Being involved in a visual arts curriculum allows students the opportunity to build thinking skills through exploration and examination and provides a creative outlet through which to ask and answer problems. This may (and should be) done in all content areas if we are to teach with our students' best interests in mind, so that they may become educated, well-rounded individuals able to tackle challenges as they arise. The visual arts provide an ideal opportunity for teaching students not *what* to think, but *how*.

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Strategies That Support Struggling Readers in the Intermediate Grades

Hannah Brunink

Abstract

Many students enter the intermediate grades struggling with reading. Identifying strategies to support these students in improving their reading skills is an important part of ensuring their academic success. This literature review examines strategies that support struggling readers in an intermediate grade general education classroom. The studies fall into three categories: explicitly teaching comprehension skills, scaffolding academic vocabulary acquisition, and using higher-level questioning strategies. Findings suggest that (i) reading comprehension improves when students are explicitly taught reading comprehension strategies; (ii) reading comprehension improves when students are frequently engaged in text-based discussion and asked inferential questions about their reading.

Strategies That Support Struggling Readers in the Intermediate Grades

Reading is the foundation of a successful academic career, but many students struggle with their reading skills. It is important for teachers to find ways to support students in their classroom who are reading below grade level. The focus in the primary grades tends to be toward learning to read, with students primarily interacting with narrative text and learning to decode words and comprehend fictional texts. However, as students move into the intermediate grades, more complex reading skills are required. Rather than encountering reading as a discrete skill to be mastered, students are suddenly expected to be able to read as a means of accessing information across content areas. In social studies and science, students encounter textbooks and other forms of nonfiction text, which serve as a primary source of information and learning. For many children, this is a new skill that needs to be developed. Many students are skilled readers by the time they reach the intermediate grades. However, there are many more students who still struggle with reading. For these students, this new skill can be very difficult to master. It is crucial for teachers to find ways to help students to improve their reading skills to ensure their academic success in the intermediate grades, and as they move on to middle and high school. This literature review focuses on specific strategies that can be employed in the intermediate grade classroom to help struggling readers improve their reading skills.

Struggling readers often do not receive the support they need in the intermediate grade general education classroom. Research has shown that students reading below grade level get less reading practice and are asked fewer and simpler reading comprehension questions than their classmates (Poole, 2008). The main support struggling fifth grade readers received in Poole's (2008) study involved teachers or peers prompting students when they stumbled over a word or phrase during oral reading turns. Poole notes that "these efforts seem to be directed

more toward getting [the struggling reader] through her turn than toward helping her gain fluency with [a] particular segment of text."

There are several different types of strategies that have been identified as being helpful for intermediate grade students who are struggling readers. One approach is to explicitly teach and model the reading comprehension strategies naturally used by more advanced readers. Nelson and Manset-Williamson (2006) noted that students with reading disabilities or significant reading struggles "do not naturally own, access, and apply as many strategies as typically achieving students." Many students reading below grade level struggle with being able to actively interact with a text and monitor their own understanding of what they are reading. Concrete examples of comprehension strategies include activation of prior knowledge, prediction, summarization, and identification of the main idea. While more advanced readers do these things naturally and often without thinking about them, struggling readers need more explicit instruction and guidance to be able to access these techniques. Similarly, teaching students how to navigate common textbook structures has been shown to help students improve their nonfiction reading comprehension. Meyer, Wijekumar, Middlemiss, Higley, Lei, Meier, and Spielvogel (2010) showed that when students are explicitly taught how to use textbook structures such as captions and headings, reading comprehension improved. Students in this study were also taught how to identify some of the main ways expository writing is structured. For instance, students were taught how to identify if a social studies text was written with an emphasis on presenting events in chronological order, or if the structure was more focused on highlighting cause and effect. Again, this helped students improve their comprehension as well as their ability to summarize a text.

Academic vocabulary acquisition has also been shown to have an effect on reading comprehension and content area knowledge. Lesaux, Kieffer, Faller and Kelley (2010) showed that teaching high-frequency academic vocabulary helped sixth grade students to improve their reading comprehension in their content area classes. Baumann, Edwards, Boland, Olejnik and Kame'enui (2003) showed similar results with low-frequency, or content area specific, vocabulary instruction in a fifth-grade social studies classroom. Nonfiction text often contains language that children do not use or hear in daily conversation and explicitly teaching students that academic language has been shown to have an impact on struggling readers' abilities to comprehend unfamiliar expository text.

Teacher questioning strategies have also been shown to have an impact on students' reading skills. Students whose teachers asked them more inferential questions or questions requiring critical thinking performed better on reading comprehension tests than students whose teachers asked them for a specific piece of information (Taylor, Pearson, Peterson & Rodriguez (2003).

This literature review will focus on specific strategies for helping intermediate grade students improve their reading skills, specifically in relation to expository texts. The studies presented address strategies for students in grades 3-6 with an emphasis on strategies that can specifically be employed in a general education classroom. While much research exists on supporting primary grade students, less was available on supporting intermediate grade students. Most of the studies presented in this review examine both struggling and average readers. Very few studies look exclusively at struggling readers at this grade level. Study results include specific information on how the strategies presented impacted struggling readers. However, future studies that specifically look at struggling readers would be useful.

Literature Review

Many students enter the intermediate grades reading below grade level. Utilizing strategies to support the academic success of these students is vital for any teacher. Research shows that there are specific strategies available to support students. The studies largely fall into three categories: the explicit teaching of reading comprehension strategies, the support of academic vocabulary acquisition, and the use of teacher questioning strategies to encourage student interaction with text.

The explicit teaching of monitoring skills, such as pre-reading and prediction, has been shown to help struggling readers improve. Additionally, students can better make sense of nonfiction text when they have skills to decipher text structures and use textbook features. Bryant, Vaughn, Linan-Thompson Ugel, Hamff and Hougen (2000) examined the effectiveness of explicit comprehension strategy instruction for students with and without learning disabilities in a sixth grade general education classroom. This strategy yielded positive results for struggling readers without a specific learning disability. Nelson and Manset-Williamson (2006) replicated these results with a similar summer intervention program for students with a diagnosed learning disability in grades 4-8. Meyer, Wijekumar, Middlemiss, Higley, Lei, Meier and Spielvogel (2010) found that teaching fifth- and seventh-grade students to utilize common textbook structures had a positive impact on reading comprehension measures of nonfiction text, even on a delayed post-test, given three months later.

Examinations of academic vocabulary instruction were wide-ranging, but multiple interventions were associated with growth in student vocabulary acquisition and reading comprehension. Baumann, Edwards, Boland, Olejnik and Kame'enui (2003) found that academic vocabulary improved reading comprehension in the social studies content area. This

included instruction in both contextual and morphological analysis of unfamiliar vocabulary as well as explicit instruction of low frequency or content area specific words. Another study by Lesaux, Kieffer, Faller and Kelley (2010) monitored a linguistically diverse sixth grade classroom and came to similar conclusions. When students were taught academic vocabulary, they scored better on measures of reading comprehension than those who received no additional vocabulary instruction in the classroom. Researchers additionally found that struggling third grade readers who received explicit instruction in semantic ambiguity also performed better. Semantic ambiguity refers to those words, phrases, and sentences that could yield several possible meanings. Students who received this instruction performed notably better on reading comprehension tasks requiring recall and inference skills (Zipke, Ehri & Cairns, 2009).

Additionally, teacher questioning strategies were associated with an impact on student reading comprehension. McKeown, Beck and Blake (2009) compared classrooms using extensive text-focused whole-group discussions to classrooms focusing on strategies instruction. The strategies instruction group outperformed classrooms using a traditional basal textbook reader program. However, students in classrooms where higher-level questioning was the norm performed significantly higher on recall comprehension tasks than students in the other two groups. Likewise, Taylor, Pearson, Peterson & Rodriguez (2003) conducted a large-scale study of high-poverty schools across the United States to identify pedagogical characteristics of successful elementary school teachers. In these struggling schools, they found that students whose teachers asked open-ended inferential questions and spent significant time focused on text-based discussion made the most improvements in their reading comprehension and writing abilities. Conversely, students in classrooms that focused on oral reading through taking turns and focused phonics instruction after first grade made very little advancement. This points to the

need for teachers to engage their students in meaningful conversations about texts in order to encourage deeper understanding of what is read.

Teaching Reading Comprehension Strategies

Research has shown that struggling readers in the intermediate grades have qualitatively different experiences in school than their peers reading near, at, or above grade level. Poole (2008) conducted a case study with fifth grade students in an urban school in southern California. The study examined whether or not students reading below grade level received different treatment than their peers in a heterogeneous classroom setting. She spent two days with three struggling readers as they read a science text in small heterogeneous groups.

When the researcher analyzed transcripts from her classroom observations, a series of unsettling trends emerged. The struggling readers were given smaller portions of text to read during oral reading segments compared to their peers. Furthermore, the teachers were more likely to prematurely end their turns and request that more skilled readers participate instead. Struggling readers were also less likely to be asked follow-up comprehension questions by the teacher. When they were called upon by the teacher, struggling readers tended to receive simple questions requiring them to identify a specific fact. Meanwhile, advanced readers were more likely to be asked questions that required inferences or critical thinking. Finally, this study also indicated that struggling readers were more likely to be interrupted or prompted by a teacher or another student when they struggled to decode a word or phrase. Teachers often told students the words they couldn't decode orally so they could complete their turn, but did not tend to support them with strategies. Peers often mimicked these teacher behaviors during reading group thus establishing differentiated academic status.
In light of this disparity between struggling readers and their peers, research has uncovered specific strategies that can be help struggling readers to improve their reading skills. McKeown, Beck and Black (2009) conducted a two-year study, which examined the effects of three different literacy instruction models on the reading comprehension of fifth graders in an urban Pennsylvania school where 48% of students were identified as reading below grade level. One group received what the researchers termed a "content approach." Teachers in the content approach classrooms focused heavily on classroom discussion around meaning-based questions. Reading was regularly stopped to initiate discussion around major events, the introduction of new characters, or any segment of text that students might find confusing or problematic. Questions were intentionally designed to bring forth important ideas in the text.

A second group received a "strategies approach." Students in strategies classrooms were explicitly taught reading comprehension strategies to guide their interactions with text during reading. At major stopping points in the text, teachers would use a specific strategy, such as prediction or summarization, to initiate discussion.

The third group used a traditional basal textbook. This group read stories straight from a textbook selected by the district several years prior to this study. The teacher used the sample discussion questions provided by the textbook authors at the end of each story while students were asked to complete all supplemental materials, such as worksheets and quizzes.

McKeown, Beck and Black (2009) found that students in content approach classrooms scored the highest on a measure of reading comprehension that tested the ability to read narrative text and then accurately provide a textual summary briefly discussing the main points. When the same assessment was administered using an expository text, the students in the content and strategies groups performed equally well. Both groups outperformed their peers in the basal

textbook group. Findings indicated that struggling and average readers improved their reading comprehension when they were exposed to higher-level questioning or comprehension monitoring strategies. Students spent more time talking about text in the content and strategies classrooms as compared to the traditional basal textbook classroom. While students in the basal textbook group spent their time completing worksheets, the other two groups actively worked with a text to conduct discussions with classmates and teachers.

Bryant, Vaughn, Linan-Thompson, Ugel, Hamff, and Hougen (2000) studied the impact of a reading intervention model for sixth grade students in their content area classes. The participants in this study consisted of three groups: students reading at grade level, students reading below grade level, and students receiving special education services for a reading disability. The intervention model used in this study focused on explicit strategy instruction in word recognition and comprehension as well as guided fluency practice. The word recognition component of this particular intervention taught students to recognize familiar parts of unfamiliar words and examine the context to provide an educated guess about the meaning of the word. Students were taught to look at context clues first to see if they could figure the word out by examining the surrounding text. Next, students were taught to identify and separate any prefixes or suffixes to see if they were left with a familiar root word. If these strategies were still not helpful, then students used a dictionary.

The reading comprehension component involved the explicit instruction of specific reading strategies to guide students in self-monitoring their own reading comprehension. Students were taught to activate their own prior knowledge by previewing textbook selections before they began reading. They then used text features such as illustrations and headlines to make predictions about the content. Next, students were taught to read short segments of text to

then use word recognition strategies to identify unfamiliar vocabulary. To improve fluency, teachers facilitated oral partner reading where students with stronger reading skills modeled fluent reading for their less skilled peers. Students took turns reading short segments of text, and then asked each other comprehension questions.

This study showed improvement in reading comprehension for both the struggling readers and the students reading at grade level. Notably, the intervention was less successful with the students with learning disabilities. However for students in the general education classroom full-time, who were reading below grade level, this combination of strategy instruction and extensive practice helped students develop their skills in non-fiction reading.

While Bryant et al.'s (2000) intervention did more for the average struggling reader than for children with specific learning disabilities, Nelson and Manset-Williamson (2006) found that their model of explicit strategy instruction helped students with reading disabilities improve their reading comprehension. Unlike Bryant et al.'s (2000) study, Nelson & Manset-Williamson (2006) conducted their intervention during the summer months with students entering grades 4-8 in the fall. The study utilized nonfiction text that was characterized as high interest and low readability. In other words, the text selections were on topics that the students found engaging, but were intentionally chosen just beyond their reading level.

Students were then taught a series of comprehension strategies, including: setting goals for the reading, using prior knowledge, predicting what will happen next, explaining the main idea, retelling the most important parts of the text, and giving themselves feedback on their reading. The strategies were introduced one at a time and students were given as much time as they needed to master each new strategy. To support students, teachers used "think aloud" models to demonstrate what an experienced reader might be thinking as he/she reads. The

students who received this explicit strategy to support instruction made more gains in comprehension than the control group, who received additional tutoring but did not receive any unique instruction.

Nelson and Manset-Williamson's (2006) study also examined the role of self-efficacy, or the belief that one is capable of accomplishing the task at hand, and its effect on student reading. The pre-assessment data showed that, in general, the students tended to have a very high sense of self-efficacy compared to their actual reading ability, meaning that they believed themselves to be capable of things they were not yet able to do. The reported self-efficacy levels of students in the control group did not change noticeably at the end of the study; however, those who received the instructional intervention reported lower levels of self-efficacy than they did at the beginning. During the post-assessment, the researchers noticed that student self-efficacy was more closely aligned to actual demonstrated ability. In addition to showing gains in reading comprehension, students also demonstrated an increase in metacognitive ability. When students learned to effectively use these reading strategies, they tended to take ownership over their own learning and their abilities to self-assess.

While the above-mentioned studies included strategies that helped students to access and use comprehension strategies, another group of researchers specifically examined the benefits of teaching students to use common textbook structures when reading. Meyer, Wijekumar, Middlemiss, Higley, Lei, Meier, and Spielvogel (2010) provided reading support to fifth- and seventh-grade students over the course of six months. Students were average and struggling readers who were given this instruction during elective time, several days a week from January to June. The students were instructed using a self-paced computer program that taught them to use common textbook features and text structures in social studies and science texts. The intent

of the study was to teach students to use textual features such as headings to aid their reading and understanding. Students were also taught to understand common expository text structures such as chronology and cause-and-effect patterns. At the end of each textbook selection, students were asked to summarize the text, and researchers would provide feedback on their thoroughness and accuracy. Two feedback models were used for Meyer, et al.'s (2010) study. Half of the students received simple feedback (i.e. "Good job") while the other group received extensive feedback that told them what elements were missing from their summary, and how they could improve.

The study found that teaching students about the explicit textbook features and corresponding text structures helped most students to improve. All of the students who were reading at grade level prior to the study improved their comprehension during the study, regardless of the feedback model they received. Struggling readers, too, made overall improvements in reading comprehension; however, they only made significant progress if they received the extensive feedback. When teachers demystified the structure of the textbook, students improved their reading comprehension when they received extensive feedback concerning areas of improvement. This study's findings, combined with the previous studies addressing explicit comprehension strategy instruction, points to a major overall finding in this field. Teachers cannot make assumptions regarding student understanding of reading comprehension skills. An important difference between a student who struggles with reading and a student who excels at it, is an understanding of appropriate reading strategies. These strategies – whether students are looking at textbook captions or predicting what is going to happen – need to be taught and modeled to ensure that all students understand and can apply these strategies.

Academic Vocabulary Acquisition

Another set of intermediate grade reading research focuses on the impact of academic vocabulary acquisition on reading comprehension. There appears to be a strong link between reading ability and vocabulary, particular academic vocabulary. Many students who struggle with expository text comprehension seem to have difficulty with understanding. This pattern stems from the fact that academic vocabulary may be vastly different from the language students use and hear in everyday conversation.

Baumann, Edwards, Boland, Olejnik and Kame'enui (2003) studied the impact of two vocabulary instruction models on reading comprehension and content area knowledge acquisition. The instructional interventions were implemented in the social studies curriculum during one unit of study on the Civil War, lasting for several months. The first instructional model explicitly taught students new vocabulary, while also showing them how to use contextual clues. The second model taught students to decipher unfamiliar words using morphological cues such as affixes to orient themselves to new words and their definitions. This group also received instruction in the use of context clues to make an educated guess about the meaning of an unfamiliar word.

Pre- and post-assessments were designed to measure student reading comprehension, their ability to define vocabulary related to the Civil War, and their content area learning in social studies. The eight classrooms that participated in this study were academically, ethnically, and socioeconomically heterogeneous.

The results of the study indicated that students learned what they were taught. Those who received explicit vocabulary instruction outperformed their peers in the sections of the postassessment requiring definitions for specific words that were not contextually or morphologically

decipherable, such as *blockade*. However, the students who received instruction in vocabulary strategies outperformed the first group when asked to define words that could be morphologically deciphered, such as *reconstruction*. Neither group had any clear advantage when it came to content area knowledge, and both improved their reading comprehension skills with unfamiliar expository text. Nearly all who participated, regardless of the method of instruction they received, reported applying the skills they learned in their social studies coursework to other content areas.

These findings highlight the need for a balanced approach to vocabulary instruction to include both instruction in strategies and morphology, as well as explicit instruction in the definitions of academic words that may not be decipherable. A unique feature of academic vocabulary is that is not always contextually or morphologically decipherable, especially to struggling readers, so introducing students to this language is important to ensure their academic success.

The instruction in the previous study was focused on low frequency academic vocabulary, or vocabulary that is found with near exclusivity in a specific field of study, such as science or social studies. High frequency academic vocabulary refers to those words that are not typically used in everyday conversation but occur across content area study. This study, by Lesaux, Kieffer, Faller and Kelley (2010), also taught students to understand the use of such simple transitional terms as *which* or *yet* to help them improve their reading skills. Lesaux et al. (2010) explored the impact of an academic vocabulary intervention program with sixth grade students in a linguistically diverse middle school. Instruction took place in the language arts block classes and focused on high frequency academic vocabulary.

Approximately three quarters of the students in this study were classified as English Language Learners (ELL) and the other quarter were native English speakers who were performing below grade level in reading.

Students received academic vocabulary instruction while reading nonfiction text in their language arts courses. The study lasted for approximately four months. The instruction included whole-group, small-group, and independent work with nonfiction texts and incorporated many opportunities for students to listen, speak, read, and write about the texts. Rather than memorize vocabulary words, students worked together to predict word definitions using context clues and checked their definitions against a dictionary. Students then practiced new vocabulary words by answering text-based questions containing the new vocabulary, and by producing original writing containing the target words. Regardless of language learning status, the struggling readers in this program made significant gains in their content area reading comprehension abilities.

Sadoski and Willson (2006) examined the effects of a vocabulary-based reading intervention in a Colorado school district. The model specifically included the use of multisensory and visualizing techniques to improve reading comprehension to help students to acquire new vocabulary in both traditional reading and content area instruction. The study examined test scores of students in grades 3-5 for one year following the implementation of the program. The Colorado state standardized reading test was used as an assessment of the program effectiveness.

A unique feature of this vocabulary program was the use of multisensory techniques when learning new vocabulary words. For example, students were asked to draw or act out the definition of a new word. This technique could be very beneficial for students who access their

visual or bodily-kinesthetic intelligences more frequently when learning. Students were encouraged to use other mechanisms to learn new words and retain information. The program appears to have been successful with many of the district's struggling intermediate grade readers. The first year post-implementation indicated an increase in the number of students meeting or exceeding the reading benchmark on the Colorado statewide standardized reading assessment.

Zipke, Ehri and Cairns (2009) studied the effects of explicitly teaching third grade students about semantic ambiguity in the English language. Semantic ambiguity refers to words or sentences that can have multiple definitions. For example, this could refer to words that are spelled the same but pronounced differently, such as *bow*. It can also refer to words that can have multiple meanings in different contexts, such as *shed*. Students were also instructed in sentences that can mean two different things. For instance, children were given sentences such as *The woman saw the broken cups and dishes*. This sentence could mean that the woman saw broken cups and broken dishes, but it could also mean that the woman saw broken cups and additionally saw intact dishes. Students learned to tease out alternate meanings for these sentences and to discern, in context, which meaning made the most sense.

Participants in this study were third graders from two public schools in a large northeastern city. The sample was racially and socioeconomically diverse with 63% of students being classified as living at or below the poverty line. Participation was limited to native English speakers, as the concept of semantic ambiguity could be confusing for students in the process of learning English. Pre-tests and post-tests measured student abilities to perform a standardized reading comprehension test, an oral reading comprehension test, and a comprehension test requiring students to identify and fill in missing words in a paragraph. Students in the control group received instruction complimenting their classroom instruction, while students in the

experimental group were given instruction in semantic ambiguity. They studied things such as heteronyms, words or sentences that could potentially have multiple meanings, and performed activities involving word play and riddles.

On the standardized reading comprehension test, no significant difference was reported between the experimental and control groups. In contrast, on the other two measures of reading comprehension, students in the experimental group outperformed students in the control. Struggling readers in the experimental group made more improvement during the study than students reading at grade level. Semantic ambiguity instruction does not appear to have any significant impact on student abilities to perform well on standardized reading assessments. That said, this study indicates that students who received this instruction made improvement on measures of reading comprehension that required students to recall information and fill in missing words in incomplete paragraphs. These skills are indicative of more advanced reading comprehension and, when used in conjunction with strategies aimed at improving comprehension skills of the kind assessed in standardized tests, could be an asset to the instruction of struggling intermediate grade readers.

The results of these studies indicate that students improved their reading comprehension skills when their vocabulary improved and that these skills may oftentimes be highly specific. In other words, students who are taught morphological deciphering techniques did not necessarily improve their inferential reading techniques and vice versa. This points to a need for intermediate grade educators to develop diverse and flexible vocabulary instruction programs to meet the needs of their students, in particular students who find reading difficult. Teaching academic vocabulary and giving struggling students access to the unique vocabulary of academic texts may help students gain access to higher-level reading tasks.

Questioning Strategies

The third group of studies focuses on the questioning strategies teachers use when working with struggling intermediate grade readers. This body of research examines the ways in which teachers encourage student interaction with text. As noted earlier, Poole's (2008) research showed that teachers tend to ask higher level inferential questions of their advanced readers but focus on factual recall when discussing text with struggling readers. However, McKeown, et al.'s (2009) study indicated that this could be a problematic practice. This study showed that students made the most improvement in reading comprehension when they were instructed in classrooms that focused on text-based discussion and higher-level questioning. In-depth text discussion helped students perform better on recall tasks requiring students to read an unfamiliar piece of text and then recall the main points in detail. Students who experienced open-ended questioning and extensive text-based discussion improved their skills in reading for big ideas and recalling pertinent information, even when the text was not in front of them.

Taylor, Pearson, Peterson and Rodriguez (2003) found similar results in a large-scale examination of successful teachers in underperforming high poverty schools across the country. Nine high poverty schools across the United States were selected to participate, including a rural area in the southeast, an eastern city, two small towns in the Midwest, one large city in the Midwest and one large city in the southwest. In each school, at least 75% of the teachers agreed to participate. Two teachers per grade were randomly selected to participate in classroom observations and interviews.

The study examined reading and writing growth of students in grades 1-5 during a single academic year. In the fall and spring, students were assessed on a standardized reading comprehension test, a comprehension test from a basal reader program, a measure of oral reading

fluency, and a writing prompt scored on a four-point rubric. Additionally, teachers were observed to note the type of questioning used during instruction along with the amount of time spent on reading and writing activities, direct instruction, and focused phonics instruction.

The researchers found that the students of teachers who asked higher-level questions made improvement in reading comprehension and writing ability over the course of the year. This was true for average and struggling readers alike. Students who were asked lower-level questions and/or spent time on phonics instruction after first grade made little improvement on their reading comprehension, writing, or reading fluency during the year. Students who were in classrooms that practiced a variety of reading strategies and engaged with extensive independent reading made more gains in comprehension than students who regularly participated in oral reading activities.

The research revealed that explicitly teaching reading comprehension strategies and academic vocabulary to intermediate led to improved reading comprehension abilities. However, there is also a lot to be said for how teachers treat their students, and how they encourage students to interact with text as they read. Just because students are struggling in reading does not mean that they are not capable of doing higher level thinking, and they should be given the opportunity to develop critical thinking skills. Good readers interact with text as they read, ask questions, make predictions, and make connections between texts and life. Struggling readers need to be encouraged to do the same things as they read. It may take some work to get them to the point where they are able to think deeply about what they read, but it is worth the effort.

Conclusion

There are several important conclusions that can be drawn from the research on supporting intermediate grade struggling readers. These conclusions can inform effective teaching practice in significant ways.

The research found that explicitly teaching comprehension strategies to struggling readers improves their ability to understand text. Many struggling readers do not independently possess the skills to predict, summarize, or identify main points. Realizing that students may or may not have these skills, and taking the time to explicitly develop these skills in students, will help them become better readers. Additionally, according to Nelson and Manset-Williamson (2006), this type of instruction may also help students improve their abilities to self-assess their own reading. Along these lines, teaching students to use textbook features as they read appears to improve comprehension (Meyer, et al., 2010).

The research also indicates that teaching academic vocabulary to students who struggle with reading has a positive impact on comprehension. Studies examined both high frequency and low frequency academic vocabulary instruction. According to Baumann, et al. (2003), students' reading comprehension and content area knowledge acquisition improve with vocabulary instruction. Furthermore, the type of vocabulary instruction students receive has a direct impact on their performance on tasks requiring them to define certain words. If students are explicitly taught low frequency vocabulary, they will be able to produce definitions for that vocabulary later on. If students are taught to decipher vocabulary in context, they will be able to define morphologically or contextually decipherable words later on. There are times in school when students need to possess both skills. Teaching students how to both learn unfamiliar low frequency words and decipher words in context will contribute to their success in reading.

Lesaux, et al. (2010) found similar success in a high frequency academic vocabulary instruction program. Students in this study were taught high frequency academic words through context clues, repeated practice and exposure to new words, and using new words in their own writing. This combination of strategy use and repeated practice had a positive impact on reading comprehension even in classrooms where the majority of students were classified as English Language Learners.

The research suggested that teacher questioning strategies also influence student performance. Taylor, et al. (2003) examined teacher practices in underperforming schools across the United States and found that the most effective teachers were the ones who engaged their students in frequent in-depth discussions about text. These teachers asked inferential questions and required their students to think critically. Students in these classrooms made significant improvements in reading comprehension, reading fluency, and writing ability during the school year. In contrast, students whose teachers asked simpler comprehension questions, engaged students in oral reading practice, and focused on phonics instruction made very little improvement during the year. McKeown, et al. (2009) also found that students who were exposed to frequent discussions about text performed better on comprehension tasks than students who read from a textbook and filled out worksheets on their readings.

The three categories of research overlap in important ways. All of the studies point to the need for teachers to take the time to explicitly help students develop the skills they need to become better readers. Comprehension strategies, vocabulary skills, and in-depth analysis of text are things that advanced readers do naturally as they read. However, teachers don't always take the time to systematically develop these skills in all students. As a result, those who may find reading more difficult often do not possess these skills naturally and all students, regardless

of reading level, can benefit from more explicit instruction in these areas. This is perhaps the most important thing teachers can take from all of these studies. When students were taught comprehension strategies, they used them and their comprehension improved. When students were taught to identify and understand academic vocabulary, their vocabulary and comprehension both improved. When students were asked to discuss text and answer higher level comprehension questions, their comprehension improved. Explicitly teaching specific skills that students need to be successful goes a long way toward ensuring their future academic success.

The other main conclusion to be drawn from this research is the need for teachers to maintain high expectations for all students, regardless of their demonstrated ability. Poole's (2008) study indicated that struggling readers may not be receiving the same treatment as their more able peers in the classroom. They are asked to read less and they are asked fewer and simpler questions about what they read. However, the research indicates that students perform better when they are held to higher expectations. McKeown, et al. (2009) and Taylor, et al. (2003) both found that students made more significant improvements when their teachers frequently engaged them in class discussions about reading and expected them to answer more inferential and critical thinking questions. Likewise, Nelson and Manset-Williamson (2006) and Lesaux, et al. (2010) both specifically noted using texts that were slightly above their students' reading levels for their instructional programs. In both cases, students were explicitly taught the strategies they needed to read these texts and they were ultimately successful with these readings.

Teachers can use these conclusions to inform classroom practice by developing a curriculum that teaches students the skills they need to be more effective readers. This could

include a combination of comprehension and vocabulary strategies that students can use to better understand their reading. Teachers can also include in-depth discussion of text and inferential questioning as a regular part of classroom practice. These strategies will benefit struggling readers in the classroom, but they will also help advance the skills of average and even advanced readers.

This is possibly the most significant point that teachers can take away from this body of research. These strategies were shown to have a positive impact on struggling readers, but most of these studies did not examine struggling readers exclusively. Most of these studies looked at students with a range of abilities and found that students made improvement under these instructional models across the board. Explicitly teaching strategies and asking students to engage in high levels of thinking and discussion about text will ultimately benefit all students, and therefore contribute to overall effective teaching practices.

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Exploring Research-Supported, High-Payoff Instructional Strategies

Anthony J. Cacchione

Abstract

This literature review investigated instructional strategies identified by research as having the greatest likelihood of positively affecting student learning. Each strategy is treated by one peer-reviewed research study. The nine strategies included in this review are: cooperative learning, summarizing and note taking, utilizing prior knowledge, analogies, advance organizers, meta-cognitive thinking, homework, intervening on performance attribution, and praise. Findings from the studies reveal that all nine strategies demonstrated positive gains relative to students' academic achievement and/or motivation to learn. Possibilities for further research are discussed.

Exploring Research-Supported, High-Payoff Instructional Strategies

In the United States, teachers are expected to create curricula that differentiate instruction for a diverse population of students (Tomlinson & Imbeau, 2010). As a beginning teacher, however, providing tailored instruction to accommodate a wide variety of learning needs and styles can prove to be a daunting task, especially when much of the theoretical and practical knowledge acquired in teacher education has not yet been put into practice. With increasing pressure to close the learning gap for all racial and ethnic groups, gender groups, students identified as disabled, students living in poverty, and students whose primary language is not English, beginning educators – and educators generally – would benefit from the identification of strategies that appeal to, and have been proven to positively affect, all students regardless of their particular subgroup.

During my practicum experience teaching Sophomore English at Centralia High School in Centralia, Washington, I would often make curricular modifications that served students I was either well acquainted with (like students who enjoyed and excelled in English) or those students whose needs I understood less well, like students marginalized by the education system. In the process, I neglected to consider and implement strategies that provided a broader framework of effective instruction that applied to all students, including modes of learning that were consistently shown to improve student success for all learner types.

The purpose of this literature review is to explore those instructional strategies that have been identified by research as being "high-payoff," both in terms of their ability to increase student success, as well as for their ability to increase success rapidly. Additionally, for the purpose of this review, high-payoff will also be defined as those strategies that have the greatest probability of enhancing student achievement (increased motivation to learn and improvement

on test scores) for all students in all subject areas at all grade levels (Marzano, Gaddy, & Ceri, 2000). My hope is that once research-supported, high-payoff instructional strategies have been explored, teachers will have an idea of how to build a pedagogical framework upon which more specialized, differentiated instruction can be developed.

Based on a meta-analysis published by Robert Marzano et al., which summarizes findings from more than 100 studies involving over 4000 comparisons of experimental and control groups, I selected nine high-payoff strategies identified by their research to include in this review (2000). The studies were chosen based on how well they demonstrated (by statistical significance) the efficacy of the given strategy when compared to other primary research studies encountered, and also by how well they represented the principles of the strategy as defined by Marzano et al. (2000). The articles were gathered in 2012 from the following resources: Educational Resources Information Center (ERIC), Google Scholar, Academic Search Complete, and JSTOR.

The nine research-supported, high-payoff instructional strategies explored in this review are: cooperative learning, summarizing and note taking, utilizing prior knowledge, analogies, advance organizers, meta-cognitive thinking, homework, intervening on performance attribution, and praise (Marzano et al., 2000).

Each strategy will be examined separately in a subsection that includes: 1) a definition of the strategy as defined by the research, 2) a brief overview of the theoretical hypothesis behind the research, 3) a description of the research objectives, 4) an analysis of the methodology and research results, and last, 5) a brief discussion of potential limitations to the study as well as possible questions for further research.

Review of Literature

What follows are reviews of research articles that explore some of the high-payoff instructional strategies identified by Marzano et al. (2000).

Cooperative Learning

Gokhale (1995) defined cooperative learning as the grouping and pairing of students for the purpose of achieving an academic goal. He hypothesized that cooperative teams would achieve at higher levels of thought and retain information longer than students who worked quietly as individuals.

The following two questions were examined in this investigation of cooperative learning: 1) Will there be a significant difference in achievement on a test comprised of "drill-andpractice" items between students learning individually and students learning collaboratively? and 2) Will there be a significant difference in achievement on a test comprised of "critical-thinking" items between students learning individually and students learning collaboratively (Gokhale, 1995)?

The independent variable in this study was the method of instruction, which included two categories: individual learning and collaborative learning (Gokhale, 1995). The dependent variable was the posttest score. The posttest was made up of drill-and-practice items and critical-thinking items. The sample population consisted of undergraduate students enrolled in a Basics Electrics course at Western Illinois University. The class had two sections made up of 24 students each. Thus, a total of 48 students participated in this study.

The treatment was comprised of two parts: lecture and worksheet (Gokhale, 1995). Initially, the author delivered a 50-minute, common lecture to both treatment groups. After the lecture, one section of the course was randomly assigned to the "individual working group"

while the other section was assigned to the "collaborative learning group." The two groups worked in separate classrooms.

In individual learning, the task was explained to students and they were given 30 minutes to complete the worksheet by themselves at their own level and rate (Gokhale, 1995). After 30 minutes, students were given another sheet with answers to the questions on the worksheet, and were then asked to figure out how each problem could be solved. The participants were finally given a posttest comprised of both drill-and-practice and critical-thinking items.

The collaborative learning group was also assigned a clearly defined task (Gokhale, 1995). It was then divided into six, self-selected groups, consisting of four students each. All six groups were given instructions on the collaborative process. Each student was required to contribute comments on potential solutions, as well as to listen carefully to comments of their group members regarding questions on the worksheet. After each member had contributed an idea, the group arrived at a solution. Finally, the groups were given 30 minutes to complete the posttest using the same procedures of group consensus and collaborative working.

Gokhale (1995) found that the mean posttest scores on the factual knowledge test were slightly higher for the participants in the group that studied collaboratively than for the group that studied individually. However, a t-test on the data did not show a significant difference between the two groups. The results also indicate that the mean posttest scores on the critical thinking test for students who studied collaboratively were higher than for the group that studied individually. This research supports the conclusion that students who participate in collaborative learning will perform better on critical-thinking activities than students who study individually.

The applicability of these results to "all grade levels and all subject areas," as defined by Marzano et al. (2000) is undetermined here, as the sample of this particular study was limited to

college students (Gokhale, 1995). In addition, future studies could support the use of this strategy in the classroom by controlling for specific variables in the collaborative learning process. Group composition, group learning styles, and amount of teacher intervention, for instance, could be further investigated to better understand the role of collaborative work in the learning process.

Summarizing and Note Taking

Summarizing. King, Biggs, and Lipsky (1994) conducted a study to investigate the strategy of summarizing. The researchers described summarization to include: 1) ignoring unimportant information, 2) ignoring repeated information, 3) grouping lists under labels, 4) picking topic sentences, 5) inventing topic sentences (when missing), 6) writing down 3-5 topic sentences in abbreviated form, and 7) listing important details.

King et al. (1994) hypothesized that summarizing could be an effective strategy used by readers, particularly less able ones, to perceive and encode the important aspects of a text. The goal of their study was to measure the effectiveness of summary statements as student-generated study strategies. Specifically, it compared one group of college-age readers' use of self-generated post-reading summary statements as a study aid with a second group's use of self-generated rereading questions. Results were derived from an objective test, an essay test, and a free recall test. The participants were students who had voluntarily enrolled in nine sections of a college developmental reading and study course (N=87). Students participated in this study as part of the course. Classes were randomly assigned as self-questioning, summarizing, or as a control group that did note taking.

The study involved three phases: training, reading, and recall (King et al., 1994). For all three phases, instructors followed predetermined scripts and strategies. During the first training

session, students read a text. Instructors demonstrated surveying the chapter headings. This was followed by a demonstration of recording chapter information on the glossing strips. All three groups were shown how to use glossing strips for note taking while reading. For the self-questioning group, students were told to form higher-level questions based on the text, record them on the glossing strips, and then read the passage to answer the question. For both groups, students evaluated the quality of their peers' questioning and summarizing through discussion.

The second phase included self-questioning, summarizing, or note taking (the control group) as part of the reading process (King et al., 1994). The assessments included free recall, an objective test, and an essay question, which was designed to tap into higher levels of comprehension.

The third and final phase of the study, the recall phase, took place in a class session 48 hours after the reading phase (King et al., 1994). Students in all three groups studied their glossing strips from the previous reading for ten minutes, and then were given an oral recall exam.

The results of the study indicated that for free recall the summary group had a significantly higher mean score than the control group, although no differences were found to distinguish the self-questioning group from either the summary group or the control group (King et al., 1994). As for the objective test scores, the results showed that both self-questioning and summary groups had significantly greater mean scores than did the control group. Finally, the results for the essay scores demonstrated that the summary group had a higher group mean score than did the self-questing or control group.

This means that summarizing appeared to be an effective reading study strategy (King et al., 1994). Students trained in summarizing segments of text had higher scores than the control

group on all three dependent measures and higher scores than the self-questioning group on the essay. Also, students who generated summary statements about a text outperformed both the self-questioning and control groups in essay writing.

Similar to the previous study (Gokhale, 1995), the present research was limited in its capacity to demonstrate the efficacy of summarizing for all learners, at all levels, in all subject areas (King et al., 1994). However, since no study is likely to prove such a claim by itself, it can be assumed that the rest of the studies explored in this review will have a similar limitation vis-à-vis the definition of "high-payoff" described by Marzano et. al (2000). Another limitation to be considered is that the study results were based on one passage, rather than on multiple texts that included creative writing, informational texts, rhetorical passages, etc. In this way, more research is required to understand how to best use this strategy in the classroom to improve student achievement.

Note Taking. Dyer, Riley, and Yekovich (1979) describe note taking as a study strategy that helps students retain content information. Their research had two objectives. The first was to determine which study strategy resulted in the greatest retention of text over time: note taking, summarizing, or rereading. The second goal was to identify the relationship between a study strategy and the type of information learned.

Three factors, note taking (N), summarizing (S), and rereading (R), were combined factorially in this study to yield eight experimental groups (Dyer et al., 1979). The final design therefore included 2 N (notes vs. no notes), 2 S (summary vs. no summary), 2 R (rereading vs. no rereading), and 2 I (immediate vs. delay test groups). A control group (C) was included to account for effects due to familiarity with the material and communication between persons during the seven-day test interval.

Upon entering the room, students were randomly assigned to treatment conditions (Dyer et al., 1979). After being seated, each subject received instructions, text, and supplementary materials appropriate to their condition (i.e. note taking or summarizing or rereading). After twenty minutes, each subject turned in the summary section materials. One half of the students reread the text but did not take notes. The control group worked on placebo tasks involving special relation and symbolic progression problems. After 15 more minutes, time was called and materials were turned in. Seven days later, the participants were asked to take another test with the same number of factual and idea questions as the initial test. In order to measure the type of knowledge gained, one-half of the posttest questions focused on verbatim facts, while remaining questions requested "substance information."

Several conclusions were drawn from the analysis of this data (Dyer et al., 1979). The first is that the difference in test scores between the control group and the pooled experimental group were highly significant, indicating that those unfamiliar with these testing strategies were less able to answer posttest questions than those who used them. Further, note taking and rereading were shown to improve students' recall of text material equally, but summarizing passages without reference to the original text did not. The presence of the original material was therefore shown to be essential for greater gains in textual retention and comprehension for students using summary as a study strategy. Finally, note takers took considerably longer to complete the test than those who utilized other strategies.

Although the note taking and rereading strategies demonstrated a statistically significant affect on student learning, it remains unclear whether this was due to the efficacy of the strategies themselves, or to the extra time students using these strategies spent working on the assignment (Dyer et al., 1979). Thus, further research is required to better establish: 1) the

efficacy of note taking and rereading as compared to other strategies when given equal amounts of time, and 2) which strategy best supports the learning of what kinds of information.

Prior Knowledge

Thomspson and Zamboanga (2003) define prior knowledge as preexisting knowledge and expectations. Their concept of prior knowledge includes confirmation bias, preattentive processing, selective perception, and prejudice, all of which, they believe, significantly influence learning.

The objective of their study was to measure the impact of prior knowledge on student achievement (Zamboanga & Thompson, 2003).

422 undergraduate students enrolled in an Introduction to Psychology course participated in this study (Zamboanga & Thompson, 2003). There were two sections of the course, each taught in an identical manner by the same instructor.

Participants took a 25-item, five-alternate multiple-choice pretest (Zamboanga & Thompson, 2003). All the questions on the test pertained to ideas, issues, or concepts commonly taught in an Introduction to Psychology course. Students subsequently completed four unit exams at approximately one-month intervals throughout the semester. Each noncumulative exam was identical in format to the pretest. Exam questions assessed students' direct recall and comprehension of course concepts and their ability to apply these concepts to new situations and to integrate them in novel ways.

The results showed a mean pretest score of 37 out of a total 100 points, suggesting that students had some prior knowledge of psychological concepts (Zamboanga & Thompson, 2003). By contrast, 78% of the participants were able to answer the same questions on later exams, and two of the three questions yielding the strongest performance were the same as those eliciting the

strongest pretest performance – indicating the possible facilitating effects of prior knowledge. The results therefore show that the knowledge students bring with them to the first day of class is positively and significantly predictive of their future course achievement. Furthermore, this study also demonstrated that the concepts with which students are most familiar at the beginning of a course are those with which they will later achieve greatest proficiency.

The fact that the study's author was also the instructor of the psychology course seems to present the potential for confirmation bias (Zamboanga & Thompson, 2003). If the author knew the outcome of the pretest scores in advance, how can we be sure he did not teach those concepts more thoroughly, or with more effort, than other concepts throughout the course? What mechanisms were employed in the research to avoid instructional bias? Further research could be done to support the concept of prior knowledge as a learning strategy by controlling for instructional methodologies and student interest levels on particular students.

Analogies

Glick and Holyoak (1979) define analogy as a system of representation that has the ability to describe a fundamental property of a relational system. They explain that the development of new theories frequently depends on noticing and applying an analogy drawn from a different domain of knowledge, such as describing atomic structure using the analogy of planets orbiting the sun.

The authors designed their study to investigate how the use of analogies between disparate domains helped students find solutions for ill-defined problems (Glick & Holyoak, 1979).

42 students from various colleges and universities from around the United States participated in this study (Glick & Holyoak, 1979). The experimental procedure was to provide

students with a story analogy, describing a problem and its solution, and then to observe how the students used the analogy in solving a subsequent target problem.

Four experiments were conducted to test the research question (Glick & Holyoak, 1979). The first experiment was designed to demonstrate that the students could use an analogy from a remote domain as a hint for solving a problem. Students first read a story analogy, then attempted to propose as many solutions as possible to the "radiation problem" – a fictional narrative used in a previous study.

The second experiment entailed a new story, called the Parade-Dispersion story (Glick & Holyoak, 1979). This story retained the critical enabling conditions for the dispersion solution, but in other ways was disanalogous to the radiation problem. Thus, even though the surface description of the solution is the same in both stories, the solution contexts differ.

The third experiment involved four separate stories – two new, one previously used, and another for the second part of the test, where students were asked to generate solutions to the story problem (Glick & Holyoak, 1979). Students read the three stories before attempting the final one. The fourth experiment reduced the total memory load required of the students by eliminating the two "distractor stories" from the recall phase. Also, the story analogy was presented after the students had read and begun to work on the final story problem.

Results for this study led to several conclusions (Glick & Holyoak, 1979). The first was that using an analogous problem from a very different domain helped students develop a solution to a problem. The second finding was that analogical thinking was not the most effective strategy for solving computational problems. Third, one of the major blocks to successful use of analogy may be failure to spontaneously notice its pertinence to a target problem.

Research could further support analogical thinking as a learning strategy by examining

precisely how analogical processing works in the brain (Glick & Holyoak, 1979). Once the process of activating prior knowledge is better understood, researchers may find ways to improve students' ability to spontaneously use analogical thinking to problem solve.

Advanced Organizers

Shihusa and Keraro (2009) describe advanced organizers as a kind of mental scaffolding that teachers use to help learners make links between what they know and what is to be learned. The purpose of their study was to determine the effect of using advance organizers as a teaching strategy on students' motivation to learn. Their thinking was that students would become more interested in topics with which they found an immediate connection, and that this connection would in turn provide greater motivation to learn.

One hundred and sixty six Kenyan secondary biology students participated in this study (Shihusa & Keraro, 2009). The samples were taken from in-progress classes. The design of the experiment involved a random assignment of intact classes to four groups, each representing a different class at a different school.

A Students' Motivation Questionnaire (SMQ) was used to collect data about students' motivation to learn biology (Shihusa & Keraro, 2009). Teachers were trained in the use of advance organizers. At the end of the intervention period, a posttest (SMQ) was administered to all four of the groups.

The advance organizers used in the study were a film, a chart, and a handout (Shihusa & Keraro, 2009). The two groups that received intervention utilized the advance organizers, while the other two groups did not. Quantitative data regarding the pre- and posttests were then scored and analyzed.

The two groups showed mean scores of 83.28 and 80.34, respectively (Shihusa & Keraro,

2009). The level of student motivation between the two groups was therefore slightly different at the start of the study. Groups that received the intervention had means on the posttest of 86.00 and 86.33, respectively, while the groups that didn't receive intervention had posttest mean scores of 78.22 and 80.07, respectively. These results appear to indicate that advance organizers improved students' motivation to learn.

One limitation to consider, however, is that the authors did not define the type of instruction typically used in this setting, which they specified only as "traditional teaching methods" (Shihusa & Keraro, 2009). It is therefore impossible to determine from this study what standard advanced organizers were compared against. Future research could support the idea of advanced organizers as effective instructional tools by demonstrating their efficacy in comparison to other learning strategies in the same context.

Metacognition

Baird and White (1984) define metacognition as the knowledge, monitoring, and control of one's own learning. In relation to the three levels of learning (processing, evaluating the processing, and deciding), they hypothesized that when learners make conscious decisions in association with the application of a cognitive strategy, learning outcomes improve.

This study investigated the impact of classroom metacognitive strategies on learning and attitude towards learning (Baird & White, 1984).

The study took place in a Melbourne suburban high school, and included one researcher, one teacher, and 64 students who were in two ninth-grade science classes and one eleventh-grade Human Biology course (Baird & White, 1984).

There were four main phases to their research. During Phase 1, the researcher examined pre-intervention attitudes, behaviors, and performances of the teacher and students (Baird &

White, 1984). In Phase 2, students were given opportunities to enhance their awareness of the process of learning and to their personal attitudes towards it. Students were also involved in identifying their learning difficulties and in reflecting on ways of overcoming them. The Question-Asking Checklists, Evaluation Notebooks, and Technique Workbooks were administered in Phase 3, and in Phase 4, students independently monitored their attitudes, procedures, and techniques, and reflected on developments. Observations continued throughout the study.

Data was collected in multiple ways, including class observation, audio recordings of lessons, class discussions about the project, and interviews with students (Baird & White, 1984).

The results supported the conclusion that students, particularly during and after Phase 3 of the study, gained greater control over their learning through more effective decision-making, and that they also became more effective independent learners by finding purpose in tasks, asking questions of themselves, and reflecting on their own learning habits to make plans for improvement (Baird & White, 1984).

One of the difficulties with this study was that it produced a large volume of evidence, providing more data than the researchers were able to analyze (Baird & White, 1984). Thus, the authors were not able to demonstrate the efficacy of their intervention in relation to all of their objectives. Furthermore, because the lack of one-to-one correspondence between the objectives and the sources of data, it was also difficult to determine which metacognitive strategies supported which specific learning objectives.

Homework

Voorhis (2003) describes homework as an effective instructional strategy that improves student achievement and motivation to learn when student-family interactions are involved. He

hypothesized that effective student-family participation in certain aspects of the homework process would increase student engagement in class work and give students greater feelings of responsibility over their own academic progress.

The purpose of this study was to investigate the effects of weekly interactive homework assignments on family involvement in homework and student achievement (Voorhis, 2003).

Two sixth- and two eight-grade science teachers conducted homework intervention over the first 18 weeks of the school year (Voorhis, 2003). A subsample of the teachers' classes was chosen, including six sixth-grade and four eighth-grade classes. A total 253 students participated.

Six classes were assigned to the TIPS (Teachers Involve Parents in Schoolwork) interactive homework group, and four classes were assigned to the noninteractive homework group (Voorhis, 2003). Each student's family (in both groups) received a letter at the beginning of the school year that described either the interactive or noninteractive homework assignments. In class, teachers explained the concept of the assignment to both groups of students, and in the TIPS group only, teachers pointed out the sections requiring family-partner involvement.

Teachers graded the activities weekly and included the same homework-related questions on student examinations for both groups (Voorhis, 2003). At the end of the 18 weeks, teachers asked all students to complete a brief, in-class survey of their perceptions of family involvement in TIPS interactive or noninteractive science homework assignments. Parents in both groups were also asked to complete a survey regarding their opinions of their child's science homework.

Results associated with increased family involvement were significant (Voorhis, 2003). Over 80% of students in the noninteractive condition said that their families were never, rarely, or sometimes involved in their science homework assignments over the 18-week study period,

whereas 80% of TIPS interactive students said that their families were sometimes, frequently, or always involved in science homework assignments. Furthermore, parent reports of involvement followed the same pattern as the student reports; namely, TIPS parents felt more involved in their child's homework than did non-TIPS parents.

The study results also indicate that family-involved homework assignments positively influenced students' academic achievement (Voorhis, 2003). TIPS students not only turned in homework more often and more accurately than did their peers, but they also earned significantly higher science report card grades. This suggests a strong correlation between the TIPS interactive process and student success in school.

This study was limited in two important ways (Voorhis, 2003). First, the achievement tests used to measure students' academic gains were not standardized. Teacher grading was thus an uncontrolled variable that had an influence on student scores. Second, teacher implementation of the experimental procedures varied from class to class, teacher to teacher – again leaving a significant variable regarding student achievement uncontrolled. Future research could benefit by controlling for both variables, as well as from further investigation into the characteristics of quality parent-student homework interactions.

Performance Attribution Intervention

Wilson and Linville (1985) believe that student achievement is directly related to the beliefs students have about the causes of their performance. They suggest that learning outcomes improve when students feel secure about their current academic ability, and are encouraged by the idea that their grades will improve, but that hard work and determination will be necessary for future success.

This study attempted to measure the effect attribution interventions had on both short-

and long-term student achievement (Wilson & Linville, 1985). Attribution was defined as the things to which students attribute their performance.

39 college freshmen participated in this study (Wilson & Linville, 1985). They were chosen based on whether they met the following criteria: 1) they had GPAs below 3.0, and 2) they were self-described worriers regarding their academic success.

Two groups were formed midway through fall semester (Wilson & Linville, 1985). There were 25 students in the treatment group and 14 students in the control group. Both groups saw videotaped interviews with upper-class students. The control group received information from the videos indicating that grades were low in the freshmen year, but was told nothing about whether or not grades improved in the upper-class years. The treatment group, on the other hand, was given information indicating that grades are low in the freshmen year, but improve thereafter.

One week after the experiment, students were asked to answer sample items from the Graduate Record Exam (Wilson & Linville, 1985). Results from this activity showed that for short-term performance, males in the treatment group performed better than males in the control group. On average, however, females in the two groups performed at very similar levels.

After fall semester was complete, grade point averages were obtained from students willing to disclose them (Wilson & Linville, 1985). Grades earned the semester after each study was conducted were compared with grades earned before the studies were conducted. Students in the treatment group appear to have improved their grades more than did students in the control group. Once again, the effect was larger for males.

It is interesting that student scores on sample GRE questions improved so significantly only a week after the attribution intervention (Wilson & Linville, 1985). The application of
attribution interventions in the classroom would benefit from future studies that help explain the connection between grade attribution and kinds of information learned. Furthermore, the relationship between time and quality of intervention and the effects on student achievement over longer periods of time needs to be investigated in greater depth. This will help educators better understand the efficacy of attribution intervention in the classroom.

Praise

Hancock (2002) defines verbal praise as an important mediator in the enhancement of students' motivation in the classroom. He hypothesized that students exposed to welladministered verbal praise by a teacher would demonstrate higher achievement levels on a teacher-made examination, would spend significantly more time doing homework, and would demonstrate higher levels of motivation to learn. The purpose of this study, therefore, was to gauge students' reactions to verbal praise in the classroom.

54 first-year graduate students enrolled in a one-semester course participated in this study (Hancock, 2002). The course was divided into two groups, "verbal praise" and "no verbal praise," each of which contained 28 and 26 students respectively. Each group met a total of 16 times during the semester. During the first lesson, each student in each group was given a personal copy of a "Time spent on homework" log. Throughout the course, the instructor would randomly select a lesson and ask students to log how much homework time they spent preparing for the day's lesson. Students were told it was expected of them to spend an average of three hours of homework preparing for each lecture. However, the instructors made clear the time spent on homework would in no way reflect their cumulative grade in the class.

In the "no verbal praise" group, when the instructor saw that three or more homework hours had been recorded in the log, he responded to the individual by saying, "thank you"

(Hancock, 2002). In the "verbal praise" group, however, the instructor would respond to the same situation with an enthusiastic "good job," "great work," or "very good." Students in both groups were able to hear the instructor's responses to their peers' homework logs.

During the fifteenth lesson, students were asked to fill out an 81-item questionnaire designed to measure their motivation to learn in the course (Hancock, 2002). For the final lesson, an instructor-created final exam was administered to both groups to determine students' knowledge of the course information, ideas, and concepts.

Once all the data were collected, the average scores on the test and time spent on homework were calculated for each group (Hancock, 2002).

An analysis of the results revealed that the 28 students in the "no verbal praise" group scored an average of 81.86% on the examination, whereas the 26 students in the "verbal praise" group scored an average of 85.11% on the examination (Hancock, 2002). This indicates that students exposed to well-administered verbal praise by a teacher demonstrate higher achievement levels on class exams than students who received little to no well-administered verbal praise.

Furthermore, a t-test analysis showed that the students in the "no verbal praise" group spent an average of 137.14 minutes studying for each lesson, whereas students in the "verbal praise" group studied an average of 149.38 minutes per lesson (Hancock, 2002). This supports the idea that students exposed to well-administered verbal praise by a teacher spend significantly more time doing homework than students who have not received well-administered verbal praise.

The results also establish that students exposed to well-administered verbal praise by a teacher demonstrate higher motivation levels to learn than their non-praised peers (Hancock,

2002). In this case, students in the "no verbal praise" group averaged 4.97 on the motivation instrument, whereas the "verbal praise" group averaged 5.11.

One limitation to this study is that the term "well-administered praise" is never defined; it is left for the reader to assume that the teacher's actions represent well-administered praise (Hancock, 2002). Without a more detailed description of what the authors meant by this important term, the usefulness of these results are limited in their applicability to the classroom. Future studies could therefore support the concept of praise as an instructional strategy by identifying the variables that allow praise to positively affect student achievement.

Conclusion

The purpose of this literature review was to explore the current research conducted on nine of the high-payoff instructional strategies identified by Marzano et al. (2000). As a beginning teacher transitioning from educational theory into praxis, I wanted the opportunity not only to investigate the kinds of strategies demonstrated by research to be high-payoff, but also to determine, if possible, what fundamental properties of the strategies made them effective in the classroom. The results of the studies were informative.

All nine of the instructional strategies reviewed demonstrated positive gains relative to students' academic achievement and/or motivation to learn. The studies examining cooperative learning (Gokhale, 1995), summarizing and note taking (Dyer et al., 1979; King et al., 1994), prior knowledge (Zamboanga & Thompson, 1993), analogies (Gick & Holyoak, 1979), meta-cognitive thinking (Baird & White, 1984), homework (Voorhis, 2003), performance attribution intervention (Wilson & Linville, 1995), and praise (Hancock, 2002), all indicated that student test scores and course grades improved when their respective strategies were integrated into classroom instruction. Also, when advance organizers (Shihusa & Keraro, 2009), meta-cognitive

thinking strategies (Baird & White, 1984), and interactive homework assignments (Voorhis, 2003) were introduced into classroom instruction, students were found to be more engaged and motivated to learn course content.

A review of the studies' guiding principles may indicate why all nine strategies were academically effective. Despite their differences, each principle clearly supported the idea that the function of an instructional strategy was to make course content more accessible and engaging to students. The meta-cognitive study, for example, demonstrated that self-efficacy motivated students to learn on their own, making course content more available and valuable to students as independent learners (Baird & White, 1994). On the other hand, the TIPS assignments in the interactive homework study found that academic success and motivation came through making clear connections between classwork and students' relationships outside of school (Voorhis, 2003). This evidence suggests that effective instructional strategies are ones that deepen the relationship between individual learners and the subjects being taught.

While these studies showed significant gains in students' academic achievement and motivation to learn, they were not able to establish whether the strategies employed were in fact high-payoff as defined by Marzano et al. (2000). In particular, none of the nine studies offered any evidence that their instructional strategies could be applied to all students in all grades in all subject areas. Because cognitive development is so integral to learning, it seems counterintuitive that one strategy could positively affect all students' learning, regardless of age or prior experience. Future studies could therefore provide more insight into the developmental appropriateness of each strategy by testing their efficacy with students of various ages and backgrounds.

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Promoting Intrinsic Motivation and Self-efficacy in the Classroom

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Abstract

Academic success for students is impacted by their experience of self-efficacy and intrinsic motivation in school. This literature review investigates research on learner-centered teaching and assessment strategies that are connected to self-efficacy and intrinsic motivation. Strategies that research suggests promote intrinsic motivation and self-efficacy include: clear instructor communication of mastery classroom goal structures, explicit teaching of self-regulated learning strategies, and authentic instruction. Strategies that were detrimental to the development of intrinsic motivation and self-efficacy in students include: performance classroom goal structures, adult surveillance, and extrinsic rewards.

Keywords: self-efficacy, intrinsic motivation, learner-centered instruction, assessment, mastery goal structures, performance goal structures, self-regulated learning strategies, multidimensional instructional activities, instructional rubric use, extrinsic rewards

Promoting Intrinsic Motivation and Self-efficacy in the Classroom

Highly competitive environments continue to exist in public schools in the United States (Spring, 1999). I have personally witnessed classrooms where competition between students is promoted, and where comparative, public grading practices seem to lead to student discouragement and apprehension. Consequently, I have wondered whether competitive assessment and instructional practices contribute to an erosion of self-efficacy, intrinsic motivation, and success in school. Responding to these concerns, the purpose of this literature review is to examine research on effective teaching and assessment strategies that may support the maintenance and development of intrinsic motivation and self-efficacy in students. This literature review will examine teaching strategies in the specific grade range of the elementary and middle level grades.

Important terms used in this review include self-efficacy, intrinsic motivation, learnercentered instruction, classroom goal structures, and self-regulated learning strategies. Selfefficacy is defined as students' self-oriented judgment of their own ability to cope with novel situations (Schunk, 1983). Students who experience high self-efficacy have the ability to confidently organize and execute activities that may be unfamiliar or unpredictable. Self-efficacy differs from intrinsic motivation, which can be described as the internal motivation within a person to maintain interest for an activity, rather than being motivated by external factors.

Learner-centered instruction focuses on individual learners, as it attempts to positively impact student motivation, learning and achievement (McCombs & Miller, 2007). Classroom goal structures are specific messages in the classroom environment that can influence student motivation (Urdan, 2004). Zimmerman and Pons (1986) describe self-regulated learning

strategies as actions that are intended to gain information or skills that include a sense of agency, purpose, and goals by a learner.

This review examines research that focuses on learner-centered instruction and assessment strategies that may promote self-efficacy and intrinsic motivation. These strategies include: classroom goal structures, teaching of self-regulated learning strategies, coping strategies, and adult surveillance of tasks and external rewards. Assessment strategies included in this research are instructional rubric-use and self-monitoring of progress— two popular, learner-centered, student-involved assessment strategies.

This literature review includes the viewpoints of researchers who support learnercentered teaching strategies as well as research that was done from an oppositional perspective. For example, some research looked critically at previously unchallenged assumptions about learner-centered teaching strategies. By including a range of researcher perspectives, including supporters and skeptics, this review attempts to presents a balanced of research on the value of instructional strategies that support self-efficacy and intrinsic motivation.

All of the studies reviewed were conducted in the United States and include a focus on students from the ages of 4 to 15. Recent research on students' intrinsic motivation and self-efficacy is scarce; consequently, some of the research reviewed dates back to the 1970s, when that topic was a more prevalent theme in educational and psychological research.

Literature Review

There are a variety of different teaching and assessment strategies that can be used to promote self-efficacy and intrinsic motivation in students. The research studies reviewed in this paper are organized thematically by the type of strategy investigated. Under the umbrella of "teaching strategies," the review is organized thematically into the following sections: classroom

goal structures, self-regulated learning strategies, adult surveillance of tasks/extrinsic rewards, instructional rubric use, and self-monitoring. The review of each research article will include a summary and explanation of the purpose, research question(s), methodology, participants, findings, and limitations, in that order.

Classroom Goal Structures

Classroom goal structures are specific messages in the classroom environment that can influence student motivation (Urdan, 2004). These structures refer to messages in the environment, while there are also personal goal orientations. There are two types of goal structures. *Mastery goals* focus on developing new skills and include a respect for the learning process as well as evaluation against internal norms (Ames & Archer, 1988). An individual with mastery orientation views success as the result of effort. *Performance goals* are centered on the appearance of being judged competent by an external observer. An individual with a performance orientation may feel successful academically only when his or her performance surpasses others, or when he or she performs successfully with little effort. Teachers' own goal orientations play an important role in the classroom environment, as the goal messages they promote in the classroom can erode or support intrinsic motivation and self-efficacy.

Urdan (2004) examined how students interpret and respond to classroom goal messages. Research was done in order to help determine the effects of classroom goal structures on student motivation, as well as determining students' perceptions of goal structures. The researchers sought to understand how teacher practices affected student perceptions of goal structures in the classroom.

The first study used observational and interview methodologies, and took place in four elementary school classrooms (Urdan, 2004). It was guided by three main research questions (1)

How do teachers discuss the goals of instruction in their classroom? (2) How do students in these classrooms perceive and interpret goal-related messages? (3) How do teachers' motivational beliefs guide their instructional practices?

Each classroom teacher chose six students in the classroom, three boys and three girls--with high, middle and low achievers represented in this sample (Urdan, 2004). A range of achievement levels was included to establish whether student perceptions of classroom goal messages were influenced by the student's level of achievement. The selected students were then introduced to three typical classroom sessions. These sessions were videotaped and included experiences that represented performance goal messages, such as evaluation of students, and mastery goal messages, such as introducing a new topic. Researchers viewed the videos and examined the types of goal-related messages teachers conveyed as well as the frequency of these messages. The students and teachers were also interviewed to understand whether teacher motives were understood and to what extent the teacher's goal orientations were internalized by the students.

Findings of this study demonstrated that three out of four teachers did not clearly express instructional goals with their students (Urdan, 2004). Urdan demonstrated that a mixture of both mastery and performance goal practices were present in these classrooms. While three out of four teachers did not clearly express instructional goals to their students, findings showed that these same three out of four teachers, when interviewed, had no clearly articulated motivational philosophy. Only one teacher had a clear sense of her motivational beliefs— notably, students in her classroom were more likely to report pursuing mastery goals in her classroom. Other classrooms sent mixed messages. This made it difficult for students to interpret a teacher's single goal emphasis, and students in these classrooms also reported having more mixed personal

motivational goal orientations. Findings from the mastery goal-oriented classroom showed that the teacher was clear in his or her own motivational beliefs and expectations and also expressed these clearly to students. Therefore, students were not only able to interpret the message clearly; they also internalized it and adopted it as their own.

Limitations for this study are that it relied on a small convenience sample. With a small sample, the research states that it is not clear whether the results of the study could be generalized to other contexts (Urdan, 2004). The socioeconomic class of the students selected should also be taken into account, as the elementary classroom was a private school that served mainly affluent families, while the middle level classrooms were both from the same school in a working-class neighborhood. This could contribute further to a lack of transfer of these findings to the context of other, more diverse school environments.

Urdan's second (2004) study investigated the difference between student-level perceptions of classroom goal structures and classroom-level perceived goal structures. The purpose of this study was to understand whether individual or shared classroom perceptions are more strongly correlated with academic and motivational success. The researchers also attempted to determine whether overarching perceptions of classroom goal structures aligned with the classroom teacher's instructional practices.

Methodology involved the use of survey data, which was collected for 880 students in 49 English classrooms from three high schools (Urdan, 2004). The survey was designed to assess students' observations of mastery and performance goal structure in their classrooms as well as their personal goal structures. These results were intended to establish whether there were classroom-based mastery and performance goal structures, and whether individual-level

perceptions of mastery and performance goal structures differed from the classroom-based goal structures.

Results of the survey suggested that students are most impacted by the goal structures they perceive (Urdan, 2004). This depended on the subjective interpretations of individual students, rather than shared perceptions of the classroom goal structure. Findings indicated that there is a classroom-level goal structure outside of individual student goal orientations. Limitations of this research are that the results are unclear. The classroom goal structure survey questions gathered information on performance goal structure scale by asking students if students in their class want to do better than other students (Urdan, 2004).

Ames & Archer (1988), in their research study about achievement goals, suggest that mastery goals are task-involved rather than ego involved. The researchers investigated how mastery and performance goal constructs in the classroom affected students' perceptions of their task choice, attitude and motivation. Ames & Archer also sought to establish how students' perceptions of classroom goals relate to their choice of learning strategies. Methodology for this study involved the use of a student questionnaire that was designed to assess students' perceptions of the mastery and performance dimensions of the classroom and the relation of these parts of the classroom environment to their use of learning strategies, attitude and task choice.

Participants included 176 students (91 boys and 85 girls) in grades 8-11 (Ames & Archer, 1988). All participants attended a junior high/high school for academically advanced students. Four students were randomly selected from every English, math, science and social studies class during one semester.

Research findings showed that when students perceived a classroom emphasis on mastery goals, they subsequently used more learning strategies, preferred tasks that offered challenged, and had more motivation in class (Ames & Archer, 1988). Findings demonstrated that the degree to which the classroom environment emphasized mastery goals, rather than performance goals, determined how much students used learning strategies. A greater degree of mastery goal emphasis correlated with a greater use of learning strategies and increased confidence in academic work, which is a component of developing self-efficacy. Limitations for this study are that it included a homogenous group of students in respect to achievement level. With a restricted range of ability level, I suspect the findings may not be generalizable to all students, particularly lower-achieving students.

Turning next to (Friedel, Cortina, Turner & Midgley, 2007), these researchers explored the roles that teachers' and parents' goal emphases played on students' own goal orientations. Research questions were: do children distinguish between the goals parents emphasize for them and those that teachers emphasize? How do boys and girls, and children with different ethnic backgrounds, differ with respect to their perceptions of goals emphasized within classroom and family contexts? The researchers wanted to understand whether or not there were differences in efficacy and use of coping strategies by gender and ethnicity.

Participants were chosen from four ethnically and economically diverse school districts in three Midwestern states (Friedel, et al., 2007). This study utilized data from 1021 students, and while the majority of the students were Caucasian (65%), 26% of participants were Black and 4% identified as Hispanic. This study used survey methodology to evaluate students' personal mastery and performance-approach goals in mathematics, as well as their perception of the goals

their math teacher emphasized in the classroom. The survey also examined children's perceptions of their parents' goals for them in mathematics.

Findings showed that while both teachers' and parents' contributed somewhat to the goals that children took on as their own; children's personal goals more strongly correlated with goals they perceived to be emphasized by their parents than by their teachers (Friedel, et al., 2007). Additionally, mastery-oriented, rather than performance-oriented children, were more likely to feel a strong sense of self-efficacy in mathematics. These students attempted to learn from mistakes and had a tendency to have optimism about future performances. Gender differences were apparent, as boys tended to perceive a stronger emphasis on performance goals from both teachers and parents, and tended to endorse personal performance goals more strongly than girls did. No ethnic differences were found in this study relating to children's efficacy beliefs in mathematics.

A limitation of this study is that it focuses on one narrow subject area. (Friedel, et al., 2007). While mastery goal structures may promote student self-efficacy and motivation in the study of mathematics, it is not readily apparent that these results are generalizable to other subject areas. Additionally, mathematics is a subject area that is steeped in strong and varied cultural expectation of success for boys and girls. This was not acknowledged in this study, but it would have added merit to the study if the mention of gender differences had included attention to the prevalence of sexism in mathematics classrooms.

Self-regulated Learning Strategies

Zimmerman & Pons (1986) defined *self-regulated learning stratagies* as actions that are directed at acquiring information or skill and that involve acting with purpose in a way that includes self-perceptions by a learner. The researchers investigated students' use of self-

regulated learning strategies and compared the use of these strategies between students from both low and high academic achievement tracks. They examined student use of 14 different strategies in a free-response interview format, comparing responses from students between high and low achievement tracks in a suburban high school.

The findings of this study show that the use of self-regulated learning strategies directly correlates to high achievement motivation in school, displaying evidence that 93% of the students interviewed could be correctly classified into their appropriate achievement track group through knowledge of their self-regulation practices (Zimmerman & Pons, 1986). High-achieving students relied more heavily on social sources of assistance than lower achieving students did, showing evidence that one valuable self-regulation strategy is the use of help from either more experienced peers or adults. Seeking social assistance was included as a self-regulating learning strategy in this study. Results also showed that one category (self-regulation) failed to correlate to student achievement.

A limitation of this study is that by not including observation of the students in their natural environment and relying on survey, students may not always report the strategies they actually use in the real academic environment (Zimmerman & Pons, 1986). In particular, lowachieving students may be reluctant or unable to discuss their strategies and may have less of a likelihood of being conscious of academic-related learning strategies.

Moving from the general student population to groups of at-risk students, Gee (1999) examined whether instructional characteristics predict at-risk students' motivation during learning activities they were engaged in. In this study, six adolescents in an alternative education program for students eligible for school expulsion were given a survey format called an

Experience Sampling form. This form was used to interpret each individual's psychological state and how it varied between contexts as they participated in school activities.

Findings showed that instructional characteristics can predict at-risk students' motivation during learning activities, as students' motivation was significantly associated with the amount of control perceived by them over their learning situation. Newmann & Wehlage (1995) described four important components of authentic instruction that can contribute to enhanced student motivation in instructional activities: (1) higher-order thinking skills, (2) depth of knowledge, (3) substantive conversation, and (4) connections to the real world (as cited in Gee, 1999).

Results also demonstrated that students who felt too challenged by a task reported more confusion and less competence and did not feel as intrinsically motivated to succeed (Gee, 1999). Control was significantly and positively related to involvement and the experience of competence and it was negatively correlated with boredom, confusion, and desire to be doing a different activity. However, challenge was also positively related to confusion. Therefore, it is important for teachers to monitor a low-skill/high challenge combination as this combination seems to increase feelings of anxiety in at-risk students.

Gee (1999) states the importance of autonomy-supportive instructional environments for engaging at-risk students. Additionally, Gee states that using multidimensional instructional activities is an important way to promote students' motivation. Multidimensional instructional activities are complex activities that allow room for differentiation for interest. They are autonomy-supportive within topics, process, and products; and they require self-evaluation based on self-defined objective.

A limitation of this study is that it only included a sample size of six students. While Gee's findings are reasonable, it may not be possible to generalizing the results of this study for all at-risk youth when the sample size is so low.

It is apparent, considering Gee's description of multidimensional activities, that these activities would probably serve *all* students by engaging them in autonomy-supportive instructional environments. According to Winebrenner (2001), gifted, or high-achieving students, also perform better in autonomy-supportive instructional environments. Winebrenner states that gifted students thrive in challenging environments where individual differences are valued and nurtured. Therefore, it is important to note the implications of autonomy-supportive curriculum in the classroom across the board for a wide range of student needs, but when applied to at-risk students it is particularly important to remember to monitor the effect that challenge level can have on student motivation, particularly when working with students who are sensitive to negative past experiences with limited success and low self-efficacy.

Adult Surveillance of Tasks & Extrinsic rewards

In the traditional model of schooling, the teacher is typically seen as the evaluator and the student as the subject of evaluation. However, educators may wonder at times whether their role as evaluator has the capacity to hinder students' intrinsic motivation for their work. Lepper & Greene (1975), studied the effects of adult surveillance on student motivation during experimental sessions involving 80 preschool children, ranging from four years to five years, three months. The children were selected from a nursery school located on the Stanford University campus.

During each experimental session, an individual child was observed through a television camera (Lepper & Greene, 1975). During the session, a manipulation of reward expectancy

occurred. In the expected reward condition, an experimenter interacted with the subject and exposed toys that were hidden behind a cloth screen, and asked the subject if he would like to play with them, suggesting that they might be able to earn an opportunity to play with those toys if they first did a good job on some puzzles. In the unexpected reward conditions, the toys were not shown and no mention was made of a reward for doing the puzzle. One to three weeks after the completion of the individual sessions, subjects were observed in the classroom through a one-way mirror in order to assess the subjects' intrinsic interest in the original target activity, the puzzles.

Findings of this study suggested that adult surveillance during the time a child was engaged in a task was sufficient to produce a decrease in later intrinsic interest in the activity (Lepper & Green, 1975). The knowledge that one's performance at a task was being observed and evaluated by someone else, even when there is no expectation of any tangible reward for engaging in the activity, appeared sufficient to decrease later interest in the task.

Limitations of this study involve both the young age of the children and the decrease in novelty that may naturally arise in a students' interest in a familiar task over time (Lepper & Green, 1975). Additionally, the study did not include measures of pre-experimental interest in the target materials. Without measuring pre-experimental interest, it is possible that interest in the materials might have been increased under non-surveillance and unexpected reward conditions rather than decreased by surveillance and expected rewards.

Research by Schunk (1983), examined the effects of progress self-monitoring on children's achievement and their own self-efficacy ratings in the context of mathematical skill development. Researchers set out to determine how self-monitoring of instructional progress in mathematic skills development affects achievement and perception of self-efficacy. This study

involved three groups of children; one who received external monitoring of their work, one who participated in self-monitoring of their own work, and one group that received the same lessons but no monitoring.

Methodology used was mainly observation and self-observation, and reviewing and recording (Schunk 1983). One group of children, self-monitoring, reviewed their work at the end of each training session and recorded the number of pages they completed each session. The second group, external monitoring, had their work reviewed at the end of each session by an adult supervisor who recorded the number of pages the students had completed. A third group, the control group, received the same sessions but did not receive any monitoring.

Participants were 30 predominantly middle-class children ranging in age from 8 years, 6 months, to 9 years, 5 months (Schunk, 1983). 15 male and 15 female children were drawn from two elementary schools. Students were chosen by their teachers, who nominated students who they thought would not be able to correctly solve more than 25% of the math problems.

Findings showed the self- and external monitoring led to significantly higher percepts of efficacy, skill, and persistence compared with no monitoring (Schunk, 1983). The two progress monitoring conditions did not differ significantly between self- and external progress monitoring. Schunk reports this is because self-assessment takes place under both circumstances, with explicit self-assessment as well as during adult assessment of the task, and that both self-evaluation and evaluation from a teacher increase students' sense of self-efficacy equally. It seems to be that the monitoring process itself, and not the monitoring agent, was the important factor to consider. Consequently, a system in which students pursue attainable goals and periodically monitor their progress toward those goals should prove highly effective in cultivating skills and validating a sense of self-efficacy.

A limitation of this study is that it included the acts of both reviewing and recording progress, when recording progress, in and of itself, may promote achievement outcomes beyond the effects from solely reviewing.

In another study, Lepper and Greene (1973) examined the possible effects and long-term consequences of systems of extrinsic rewards on children who started out being intrinsically motivated to do an activity. This research was conducted specifically to determine its relevance and applicability to public schools.

Participants in this research study included middle to upper middle-class preschool children who showed initial intrinsic interest in a drawing activity (Lepper & Greene, 1973). Children ranged in age from 40 to 64 months, were predominantly Caucasian, and were described as being average to above-average intelligence.

In this study, preschool children who showed initial intrinsic interest in a drawing activity were observed, using unobtrusive one-way mirrors and sound equipment (Lepper & Greene, 1973). Researchers introduced a novel target activity into the ongoing nursery school program on a periodic basis and monitored the subjects' responses.

The findings of this study demonstrated that when expecting rewards, the subjects showed decreased interest in the drawing activity after having undertaken it, in order to obtain a goal which was extrinsic to the drawing simply for enjoyment's sake (Lepper & Greene, 1973). Important practical implications for systems of rewards in the classroom come into play here, as teachers who want students to maintain or develop intrinsic interest in an activity may want to step away from using extensive extrinsic rewards systems.

One limitation of this research is that the results achieved with preschoolers may not be generalizable to older children (Lepper & Greene, 1973). Preschoolers are finicky and perhaps

their short attention spans might have created a natural loss of interest in the activity. If the goal is to truly engage students in an intrinsic manner, then this research shows that using external rewards does not best serve students when the goal is to maintain and develop their intrinsic motivation for mastering coursework.

Assessment Strategies Overview

Since some of the most shaping and profound experiences students have in school stem from center around assessment, positive or negative experiences with testing can heavily impact a students' overall attitude towards success, self-efficacy and achievement. Some forms of assessment claim to involve students more immediately in the learning process, but are these claims accurate? Can assessment practices play an important role in students' development of self-efficacy and motivation, and do some assessment strategies have a greater impact on student self-efficacy and motivation than others?

Research relevant to these questions can be found on the subjects of *instructional rubric use* and *self-monitoring of progress*, two assessment strategies that are popular in classrooms focusing on student-centered assessment. Rubric use is popular with teachers as a way to communicate expectations for student work, provide detailed feedback on student work, and add clarity and give feedback when grading (Andrade, et al., 2009). There is a common underlying assumption that using instructional rubrics correlates with greater self-efficacy in students, yet little research exists actually connecting the two.

Instructional Rubric Use

Andrade, et al., (2009) investigated whether there was a relation of short-term rubric use and elementary and middle school students' self-efficacy for a writing assignment, and also whether there was a relation of long-term rubric use and self-efficacy for a writing assignment.

Researchers measured the impact of long-term rubric use, and short-term rubric use was manipulated by using a treatment that involved reviewing a model and using a rubric to self-assess drafts. Self-efficacy ratings were collected three times, using an adapted version of the Writing Self-Efficacy Scale used by Pajares, Hartley, and Valiante (2001), which contained consisted of an 11-item writing self-efficacy scale. Students' previous exposure to rubrics was also taken into consideration and measured.

The sample for this study included 307 participants in a convenience sample of volunteers from 18 elementary and middle school classes participated in this study (Andrade, et al., 2009). Nine classes were from a lower to middle class public school, and seven classes were from a private school for girls. Two classes were from a private school for boys.

While rubric-reference assessment relates somewhat to increases in self-efficacy for a written assignment, this study does not support this claim entirely (Andrade, et al., 2009). Findings suggest no association between rubric-referenced assessment and self-efficacy for the full sample as a whole, but the relation between rubric use and self-efficacy differed for boys and girls in the treatment group.

Girls' self-efficacy ratings seemed to be considerably influenced by rubric-referenced self-assessment (Andrade, et al., 2009). In exploring this phenomenon, this research shows that middle school girls tend to be more concerned with mastering a writing task than do boys, who have a tendency to be more interested in showing someone else they are capable. Returning to the mastery vs. performance-goal approach, girls usually have a tendency to hold task (or mastery) goals, while boys often hold performance-approach (or ego) goals, in writing.

The results for boys in the Andrade, et. al (2009) study showed no positive relation between self-efficacy and long-term rubric use or short-term rubric referenced self-assessment;

but also did not show any negative relation either. The researchers suggested that educators who want to positively impact the self-efficacy of boys are advised to seek other approaches, however, recall that Urdan (2004) made the claim that goal messages in the classroom *do* impact students own goal orientations. If teachers can intentionally shift the classroom environment from a performance goal orientation to a mastery goal orientation, they may also have the potential to shift students goal orientations as well. Urdan (2004).

Friedal et. al. (2007) also supports this concept of socialized, gender-related goalorientation. Boys interviewed by researchers noted a perceived stronger emphasis on performance goals from both teachers and parents, and they also tended to orient themselves towards personal performance goals more strongly, than girls do.

Self-monitoring of Progress

In addition to instructional rubric use, another popular instructional strategy involves students' self-monitoring their own progress. Schunk (1983) studied the effects on children's selfefficacy and achievement through self-monitoring of their own progress.

This research was specific to mathematics skill development (Schunk, 1983). The results of this study demonstrated the importance of active monitoring of progress in the classroom. Findings also showed that self-assessment may be no more effective than assessment by an outside observer, as evaluation of one's own work actually takes place under both circumstances, and will be more accurate with explicit criteria that can be applied to an observation. As both self-monitoring and monitoring from a teacher increase students' sense of self-efficacy, it seems that the monitoring process itself, and not the monitoring agent, was important.

This is meaningful news to educators, who may allow students to self-monitor their own work so they can devote time to other matters in the classroom (Schunk, 1983). Other benefits of

self-monitoring are that it can help students develop responsibility for their own work. Goalsetting and self-monitoring processes should be integrated regularly through classroom instruction. A system in which students pursue goals within reach and periodically monitor their progress towards those goals should prove to be highly effective in promoting achievement, motivation and stable self-efficacy.

Conclusion

Through this literature review, I hoped to gain a better understanding of teaching strategies that promote self-efficacy and student motivation in the elementary and middle level grades. Research findings suggested that eight teaching strategies promote self-efficacy and student motivation.

First, clear instructor communication of mastery classroom goal structures is important (Urdan, 2004). When teachers clearly communicate mastery classroom goal structures, students report experiences of self-efficacy and motivation.

Next, explicit teaching of self-regulated learning strategies directly correlates to high achievement motivation in school (Zimmerman & Pons, 1986). Academic achievement requires the use of self-regulation, particularly in competitive or evaluative settings.

Authentic instruction is another strategy that contributes to enhanced motivation (Gee, 1999). There are four factors to authentic instruction that a significant impact on motivation: higher-order thinking skills, depth of knowledge, substantive conversation, and connections to the real world.

Particularly when working with at-risk students, teachers must provide close monitoring of student challenge (Gee, 1999). Students who are accustomed to past failure and who report low self-efficacy are particularly sensitive to frustration when faced with challenge.

Multidimensional instructional activities are an important aspect to all students' motivation (Gee, 1999). Gee refers to multidimensional instructional activities as activities that are complex, allow room for differentiation for interest; are autonomy-supportive within topics, process, and products, and they require self-evaluation based on self-defined objective.

Autonomy-supportive instruction is a strategy that works well with a wide range of students. Both within at-risk and gifted populations, findings showed that students' motivation was significantly associated with the amount of control perceived by them over their learning situation.

Self- and external monitoring led to significantly higher percepts of efficacy (Schunk, 1983). Findings also suggest that because self-assessment takes place under both circumstances, with explicit self-assessment as well as during adult assessment of the task; both self-evaluation and evaluation from a teacher increase students' sense of self-efficacy equally. It seems to be that the monitoring process itself, and not the monitoring agent, is the important factor to consider with monitoring of progress.

Lastly, girls' self-efficacy ratings were considerably influenced by rubric-referenced selfassessment, while boy's self-efficacy ratings did not show a significant change influenced by rubric-referenced self-assessment (Andrade, et al., 2009). This could be because girls, generally speaking, tend to hold mastery goals, while boys often hold performance-approach, or ego, goals in writing. Apparently, rubric-use helps students attain awareness of tools needed for mastery of an assignment in a way that particularly helps students who typically hold mastery goals. In the circumstances this research was implemented, more girls than boys held mastery goals. It may not be possible to undo years of socialization otherwise, but it seems that it might be possible to influence students' performance-based approaches to learning and gradually influence them

towards a mastery-goal orientation simply through consistent rubric use over a long period of time.

Some teaching strategies were demonstrated to be ineffective or detrimental to the development of intrinsic motivation and self-efficacy in students. Performance or mixed classroom goal structures can cause students to have decreased self-efficacy and motivation in school (Urdan, 2004).

Beyond high-stakes, performance goal structures; adult surveillance (Lepper & Greene, 1975), extrinsic rewards, and control and coercion of students all have a negative affect on intrinsic motivation and self-efficacy (Gee, 1999).

I suggest that more research should be done on specific assessment methods and their impact on self-efficacy and student motivation, with particular attention to gender. Further research should include a focus on the impact that socialization can have on girls and boys differing responses to developing self-efficacy. Additional research is also suggested in the area of examining the long-term impact of standardized tests on students' self-efficacy and motivation, and other specific assessment methods where a body of research is missing.

Based on this research, teachers should find ways to downplay their role as observers and evaluators and give those jobs to the students themselves in the form of peer and self evaluation, if the goal is to help students remain intrinsically engaged in school activities. Extrinsic rewards should not be abandoned entirely, but teachers should use only minimal rewards and pressure to elicit the desired behavior in students (Lepper & Greene, 1975).

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Promoting Student Engagement and Learning through Applied Science

Jason M. Dearborn

Abstract

Student engagement is a primary factor in learning science. In order to understand the underpinnings of engagement, researchers have studied how students' emotions and motivations interact with achievement and learning. This literature review focused on the question: How can student engagement and learning be promoted through applied science instruction? Research on the direct relationship is limited; therefore, this literature review is approached from three perspectives: engagement, learning, and applied science instruction. The studies reviewed were performed in a variety of settings, from single schools to large surveys of international data. Research that directly examined applied science curricula and its potential impact on student engagement and learning was limited to studies performed in the United Kingdom due in part to national science curriculum reform initiated there in the 1990's. This literature review suggests that applied science positively affects students' learning through the following strategies: encouraging student engagement through real-world tasks using the relevancy of science in their daily lives; facilitating scientific literacy; focusing on procedural understanding and scientific processes rather than products; and providing increased opportunities for students who would normally be discouraged in traditional science courses. Researchers also observed that applied science could be difficult to translate into classroom practice and curriculum by non-practicing scientists who may not have had professional experience outside of the classroom. This literature review was motivated in part by the Next Generation Science Standards (NGSS) proposed by the National Research Council.

Promoting Student Engagement and Learning through Applied Science

Studies have found that strong predictive relationships exist between students' personal value of science, enjoyment of science, and interest in learning science. When students believe that the topics they are dealing with in science have personal relevance and meaning for their lives they are more likely to experience enjoyment and interest from engaging with the science content (Ainley & Ainley, 2011).

As children transition from elementary school to middle school, academic subjects become isolated from one another, both physically in separate classrooms and psychologically as discrete entities. Venturini (2007) studied a group of 13 to 16 year old physics students and found that physics learning held meaning and value only for one out of five students and that lack of engagement in learning physics regularly increases from 13 to 16 years old. In this context an activity that has "meaning" refers to the importance and value given to it by the individual. This decrease in engagement, coupled with the social and psychological changes of adolescence, can lead to loss of enthusiasm and academic success in science classrooms. This loss of interest and engagement is especially pronounced for boys and children from ethnic and racial minority groups and low socioeconomic status groups (Skinner, Furrer, Marchand, & Kindermann, 2008). But how can teachers best present meaningful science content?

Through student-centered, applied science inquiry, learners can become collaborators, with teachers functioning more informally as facilitators or tutors, encouraging students to pose questions and seek out answers independently (Miedijensky & Tal, 2009). This method of instruction has been shown to encourage student interest and engagement in learning, resulting in more authentic learning and retention of knowledge (Hug, Krajcik, & Marx, 2005). Unfortunately, this model of active teaching and learning is often reserved for higher level or

gifted courses, thereby remaining out of reach of the general education student (Bransford, 2000).

As a science teacher, I am challenged to first engage my students in the content by encouraging them to care about it enough to engage in learning. As a practicing earth scientist, when I taught in a middle school science classroom, I found that most students were intrigued and genuinely interested in science and scientific content that related to their daily lives or personal interests. However, they often lost interest as soon as a formal lesson or learning task was undertaken. Science is a process of inquiry in order to learn about the world. Unfortunately, science is often taught as discrete facts handed down to be memorized or internalized for a coming exam, with little focus on the relevance or usefulness of the scientific content. Science is often projected as an abstract and difficult discipline, removed from the daily lives of students and accessible only to an elite subset up the population (White & Frederiksen, 1998), and consequently, often perceived by students to be something conducted in far-off laboratories by people who could not be more at odds with the average student's self image. As the meaning of "knowing" moves from being able to remember and repeat information to being able to find and use it (Bransford, 2000), students need to be given opportunities to apply science and scientific ideas to their lives – they need to be able to not simply know science but to be able to do science. The ability to foster student engagement and scientific interest early in their educational career may not only persist throughout their formal schooling, but set the direction for students to become lifelong learners.

New national science education standards are under development and will include a significant curricular shift towards technology and engineering, which will in turn transition some of the focus of science education from inquiry towards practice (Bybee, 2011). These Next

Generation Science Standards (NGSS) have been outlined by the Committee on Conceptual Framework for the New K-12 Science Education Standards (National Research Council, 2012) and are based on a new conceptual framework that includes *Engineering, Technology, and the Applications of Science* as one of four disciplinary core ideas. These scientific practices, which rely on both knowledge and skills, will reflect those of professional scientists and engineers. This literature review is being undertaken in an effort to better understand the research base that supports applied science instruction, as well as ways that professional scientific and engineering experiences may inform science curriculum and classroom practices that support student engagement and learning.

A survey of peer-reviewed research gathered through library and online database searches, as well as national and international statistics, has revealed numerous studies addressing issues of student engagement, learning, and either project or inquiry-based science instruction. However, little research was found outside of the United Kingdom that examined the use of applied science instruction as a method of promoting student engagement and learning. Consequently, this literature review is being undertaken from a social constructivist learning perspective in order to draw connections, identify causal relationships, and better understand the value of applied science teaching and its ability to promote student engagement and learning.

In order to understand how applied science instruction might influence student engagement and learning, this literature review begins by exploring student engagement and its connections with student emotions, interest, and achievement motivation. This review then describes studies that analyze the connection between student engagement and learning outcomes, by focusing on studies that consider how the processes of learning, student reflection,

and metacognition can activate student interest and engagement to improve learning outcomes. This review then examines studies of a new applied science curriculum implemented in the United Kingdom beginning in 2001, the research supporting this curricular change, and the implications of an applied science curriculum to support student engagement and learning. This review concludes with a summary of the overall themes presented and the ways in which this selected body of research informs pedagogical practice.

Literature Review

Student Engagement

Student engagement is a multi-faceted term that is often discussed in educational policy and research. For the purposes of this literature review, *engagement* is defined as students' cognitive motivation and interest in learning exhibited through active participation in academic activities in the classroom. Positive student engagement has been correlated with improved academic achievement (Finn & Rock, 1997; Marks, 2000), increased student sense of belonging in school and other social institutions (Willms, 2003), and higher school completion rates (Finn, 1989).

Harris (2008) conducted a phenomenographic study of 20 secondary teachers' conceptions of student engagement and understandings of how student engagement can be facilitated. Harris's research identified six teacher conceptions of student engagement: (1) motivation and competence in school participation, (2) involvement by thinking, (3) participating in classroom activities and following school rules, (4) enjoyment and interest in school participation, (5) purposeful learning in order to reach life goals, and (6) ownership and value of learning. This study found that some teachers focused on students' behavioral and psychological engagement rather than engagement in learning. This study was limited by its small sample size

and geographic extent (Central Queensland, Australia), but it raised the point that teachers need to reflect critically on the underlying purposes of the activities they design to engage students.

Harris's (2008) research suggested that student engagement was developed through positive classroom and school experiences that cultivated a student's interest and motivation in learning. Pekrun, Goetz, Titz, and Perry (2002) studied the impact of academic emotions, from enjoyment and pride to shame and boredom, on students' learning and achievement. Seven cross-sectional, three longitudinal, and one diary study were conducted using an Academic Emotions Questionnaire (AEQ). The study groups included both secondary school and university students and found a significant relationship between academic emotions and student learning and achievement. Perhaps not surprisingly, the studies found that enjoyment, hope, and pride correlated positively with students' interest, motivation, and self-reported academic effort, while the negative emotions of boredom and hopelessness led to a decrease in these variables. Using the AEQ with university students, the researchers found that students' emotions measured at the beginning of the semester predicted cumulative grades as well as final course exam scores at the end of the semester.

Based on the findings of Pekrun et al. (2002), it is clear that positive emotions such as enjoyment, hope, and pride are correlated with student motivation and academic achievement. However, the causal relationship between emotions, motivation and achievement remain undefined. In order to more clearly describe how engagement is promoted or undermined in the classroom, Skinner, Furrer, Marchand, and Kindermann (2008) conducted a four-year longitudinal study of 805 students in grades four through seven, utilizing the self-system model of motivational development. This study was based on self-report questionnaires administered by trained interviewers where students reported on their engagement versus disaffection in the
classroom, their sense of perceived competence and control in the academic domain, autonomy in the classroom, and relatedness to their teacher and their impressions of the support they received from teachers. Teachers also reported on the support they provided for each student.

The study's findings for fourth and fifth grade students showed high levels of engagement and low disaffection. However, after the transition to middle school, students showed lower levels of engagement and higher levels of disaffection, with emotions again playing a central role. This trend of increasing disaffection and disengagement continued to worsen in seventh grade. Older children also showed lower levels of self-systems and teacher support. This study underscored the need to support student engagement and motivation through the middle school transition in order to provide a solid academic foundation for students' secondary education. This study was limited to two schools whose student population was largely middle- to working-class and Caucasian. Although demographically limited, the research reinforced the need to encourage positive student emotions through classroom support and encouragement in order to promote engagement in learning.

In order to better establish the causal relationships between positive achievement emotions and academic success, Ainley and Ainley (2011) examined how the activating emotion of enjoyment combines with other variables to define students' engagement with learning science. To accomplish this on a broad scale, the researchers analyzed data collected from over 400,000 15 year-old students from 57 countries in the 2006 international study of science achievement through the Programme for International Student Assessment (PISA). The PISA 2006 was commissioned by the Organisation for Economic Co-operation and Development and published in 2007. It also included an additional feature as part of the science knowledge assessment that asked a series of questions to gauge students' interest in learning more about the

specific topic content of the science questions posed. In their quantitative analysis, Ainley and Ainley used structural equation modeling to test predictions based on a model of interest development and the control-value theory of achievement emotions proposed by others. The researchers found strong correlations between students' value of science, enjoyment of science, and interest in science, and also between these variables and students' embedded interest scores. The study concluded, therefore, that when students viewed science topics as personally relevant and meaningful they were more likely to experience enjoyment and interest when engaging with that science content.

Ainley and Ainley (2011) found that the model they tested with these data achieved an acceptable fit as depicted in the path diagram (Figure 1). The strongest path in the model links personal value (PVS) with enjoyment (ENJ) that in turn is linked to embedded interest (EIS) through interest in learning science (INS). The focus of this study on four specific countries, Colombia, United States, Estonia, and Sweden, suggests that a similar study of other countries may yield different results. Although limited, these findings point to the importance of both early experiences with science and the maintenance of a sense of excitement and enjoyment while learning science.



Figure 1. Model of relations between predictors of embedded interest. SCK=science knowledge; EIS=embedded interest; SES=socio-economic status; PVS=personal value of science; INJ=enjoyment of science; INS=interest in learning science. (p. 9)

The PISA 2006 worldwide survey also measured *scientific literacy*, a term used to emphasize students' understanding and the application of knowledge in real-life situations. Rather than focusing on curricular outcomes, the PISA 2006 study looked at scientific processes and students' ability to acquire, interpret, and act on evidence in order to describe scientific phenomena. In this regard, the United States ranked 16th out of 29 OECD countries surveyed (Baldi, Jin, Green, & Herget, 2007). This below-average ranking underscores the need to find ways to relate scientific content and processes to students' lives in order to support scientific literacy for all students.

Millar (2006) studied the initial outcomes of a major national project in England, *Twenty First Century Science*, whose aim was to test and evaluate a more flexible science curriculum structure for 15 to 16 year-olds. This program was designed to promote scientific literacy, but the term is somewhat elusive, requiring the researcher to begin the study with a review of literature to locate the view of scientific literacy that supported the *Twenty First Century Science* project. Millar (2006) described scientific literacy in its simplest form as science education in

itself, but with a stronger emphasis on what it enables the learner to do: "participate in discussion of issues; continue science learning after school; experience curiosity and wonder about the natural world" (p. 1502). This study proposed that the development of scientific literacy is a lifelong task.

The *Twenty First Century Science* pilot project involved over 12,000 students from 78 schools across England between 2003 and 2005. This project divided the typical science curriculum into two equal parts: a required Core Science course, taken by all students and designed to explicitly develop scientific literacy, and an optional Additional Science course, which is offered with either a "pure" or "applied" emphasis. The Core Science course is supported by two components - *Science Explanations,* and *Ideas about Science* - which are designed around specific thematic modules on topics chosen to be of interest to the students. The promotion of critical discussion about data and evidence was central to this course design.

Data was collected via questionnaires administered to 40 teachers attending two of three training courses provided by the project team towards the end of the first year of the pilot. After the first year, nearly 88% of the teachers surveyed in Millar's (2006) study described the pilot project as successful in improving the general scientific literacy of students. Teachers pointed specifically to students' increased engagement as a result of students' willingness to express their concerns and opinions, discuss experiences and current events, and independently initiate scientific discussions both in and outside of lessons. The few teachers who criticized the project referred almost universally to the literacy demands of the text-based materials, citing vocabulary that led to frustration and disengagement by students who struggled with the text. The teacher questionnaire was completed again after the second year of the project and showed a significant increase in teachers' positive views of the program from the first year survey.

Millar's (2006) study was based on teachers' self-reports and personal interpretations of student success and engagement as reported to the project team. Additionally, as the project pointed out, new innovations may provide a heightened interest and commitment of those who have chosen to adopt them, sometimes leading to an abnormally high initial positive response. Even with these limitations, Millar suggested that the *Twenty First Century Science* approach provoked real change in practice and in teachers' conceptualization of the role and possibilities of science curriculum for students of this grade level. His study provided an initial overview of teacher perceptions of program value and success that may be anticipated in an applied science course. Millar gave a descriptive account of potential implications of a student-centered applied science course focused on the development of scientific literacy. However, he did not address student outcomes or classroom teaching methods or practices.

How Learning Happens

As described in research, applied science instructional techniques involving authentic inquiry and project-based learning have been shown to increase student engagement, motivation to learn, and scientific literacy. However, tying these beneficial effects to academic achievement and standards-based learning outcomes requires further investigation.

White and Frederiksen (1998) hypothesized that metacognition and an instructional approach that develops students' metacognitive knowledge and skills through a process of scaffolded inquiry, reflection, and generalization could make scientific inquiry accessible to a wide range of students. In order to test this idea, the researchers collaborated with teachers to develop a computer-enhanced middle school science curriculum. The resulting product, *ThinkerTools Inquiry Curriculum*, centered on metacognitive processes known as the *Inquiry*

Cycle and Reflective Assessment. Through the implementation of this curriculum, White and

Frederiksen (1998) sought to answer the following questions:

- 1. How well did students develop skill at scientific inquiry?
- 2. How did the Reflective-Assessment Process affect the learning and doing of inquiry?
- 3. How did the students' grade level or achievement level affect their inquiry performance? (p. 31)



Figure 2. A model of the scientific inquiry process from White and Fredriksen (1998).

Prior research cited by White and Frederiksen (1998) has shown that many students, particularly lower achieving students, have inadequate metacognitive processes that impact their ability to learn (Campione, 1987; Chi, Bassok, Lewis, Reimann, & Glaser, 1989). The researchers hypothesized that the metacognitive process of reflective assessment would be beneficial, particularly for students from more disadvantaged backgrounds.

In White and Frederiksen's (1998) study, three teachers in two schools implemented the curriculum in twelve individual classrooms. On average, the *ThinkerTools Inquiry Curriculum*

took 10.5 weeks to complete. The three teachers in this study, two of whom were at the same school, received scaffolded curricular materials, attended weekly research group meetings to report on the classroom implementation of the curriculum and discuss teaching strategies with the other participating teachers. However, no other supports were provided for the teachers by the research team.

White and Frederiksen (1998) collected data through pre- and post-tests measuring students' inquiry skills, science knowledge, and attitudes about learning science. They also collected students' research books and projects, as well as videotapes of a small sample of the classes and conducted interviews with some of the students at the end of the curriculum. In their project work, students generally worked in groups, although they were instructed to prepare individual write-ups of their joint research. In control classes where reflective assessment was not practiced, lower achieving students (based on standardized test scores) were more likely to submit written reports identical to that of their group members. This raised questions about students' ability to independently demonstrate their understanding of the ideas and outcomes of their project. Interestingly, White and Frederiksen observed that in classes where reflective assessment was mastery of the concepts and experimental outcomes of their collaborative project work as were the higher achieving students.

Students in the *ThinkerTools* classes were free to choose their project partner(s). Consequently, there was a variability of research group composition that could affect students' performance on their projects. White and Frederiksen (1998) hypothesized that students with poorer prior educational achievement would benefit from working with students with higher educational achievement, and that this advantage would be particularly strong for students in the

reflective-assessment classes. In order to evaluate this hypothesis, the researchers categorized groups as *Homogeneous groups* containing only low- or only high-achieving students and *Heterogeneous groups* containing a mix of both low- and high-achieving students. The researchers found that the mean performance of low-achieving students was higher when they worked in heterogeneous groups than when they worked in homogenous groups. For high-achieving students, there was no effect of the group composition. In the control classes, where reflective assessment was not practiced, there were no effects of group composition on either low-or high-achieving students, indicating that low-achieving students benefit most when they participate in reflective analysis and monitoring of their work in collaboration with a higher achieving partner (Figure 3).



Figure 3. Final project scores. The mean scores of the Final Projects for students who did and did not provide relevant evidence when justifying their self-assessment scores, plotted as a function of their achievement level on national standardized tests (White & Frederiksen, 1998).

White and Frederiksen (1998) conducted an Inquiry Test in two of the three schools (one school began the curriculum before the Inquiry Test had been developed). This test was administered as both a pretest and posttest as a way of measuring students' understanding of the inquiry process; whether or not students' hypotheses and conclusions expressed the correct science content was irrelevant. As expected, the overall scores on the inquiry test improved significantly, with an average gain of 15 percentage points. The researchers found that students who practiced reflective assessment had an average gain of 23 percentage points, whereas

students who did not practice reflective assessment had an average gain of only eight percentage points, and low-achieving students showed greater improvements in inquiry scores when they engaged in reflective assessment than did the high-achieving students. Figure 4 below shows the average pretest and posttest scores on the Inquiry Test for students in the reflective-assessment classes compared those in the control classes for both high- and low-achieving students.



Figure 4. Inquiry test scores. The mean scores on the Inquiry Test for high-and low-achieving students in the reflective-assessment and control classes (White & Frederiksen, 1998).

White and Frederiksen (1998) carefully scaffolded the creation of a classroom research community by providing detailed and explicit lesson plans, computer simulations and activities, and student research materials. Through their work they were able to demonstrate the power of student metacognition through reflective assessment to impact student learning. Based on comparison to the control group, which did not engage in reflective assessment, the researchers were able to conclude that reflective assessment increased motivation, confidence in ones' own ability to work independently, and fostered communication and collaboration that improved learning. This impact was especially prominent for lower achieving students. However, the study detailed two important caveats related to the implementation of reflective assessment practices in the classroom:

- All participants must understand that it is performance that is being rated, not people, where performance is what you actually do, not what you are capable of doing.
- Students must be given the means to understand how to do well in their performances; otherwise, performance ratings may be damaging to students. (p. 80)

One of the key findings of this study was the value of reflective-assessment processes integrated throughout the curriculum. By encouraging metacognition, students were continually "learning how to learn," which is a key component of science education. However, the researchers made these explicit statements in order to call attention to potential pitfalls of misused reflective assessment tools. They warned that reflective assessment should not be simply added on to a curriculum; rather, it should be an integral part of a curriculum that scaffolds the development of the skills being assessed.

This study supports the notion that metacognition and reflective assessment, whether formally developed through schooling or practiced informally in the workplace, is an essential skill of applied science learning and practice. Through reflection, both students and practicing scientists learn and grow by consciously considering their scientific strengths, weaknesses, and areas of interest. Through reflective assessment, integrated within an applied science

curriculum, students will not only be taught skills to succeed academically, but also to take with them into higher education or careers beyond the classroom.

Applied Science

Applied science has been described as a vocational approach to science teaching, providing students with real-world professional and work experience and promoting critical thinking and engagement (Bell & Donnelly, 2002). Under this definition, it is sometimes criticized as an attempt to prepare students for the workforce and thereby constrain the ambitions of children from working-class backgrounds or those of lower academic achievement. As discussed by these researchers, what it means to *apply* science might require some conceptual attention, or may even be culturally or socially conditioned.

In order to compare student outcomes between an applied science course and a traditional science curriculum, Bell, Donnelly, Homer, and Pell (2009) studied a new secondary science course, General Certificate of Secondary Education (GCSE) Applied Science that was implemented in the United Kingdom in 2001. Their study examined student outcomes through analysis and interpretation of data available through the National Pupil Database, which tracks individual pupils throughout their schooling. This study focused on data from the second cohort of about 18,000 students (2003-2005) and was compared and contrasted with data collected from students who where enrolled in the traditional science course, known as Double Award Science. All schools studied offered both the Applied Science and Double Award Science courses.

The study compared student performance in the two courses using a value-added approach. They found that, overall, the Applied Science course positively impacted students that were achieving up to Level 4 at Key Stage 3 (KS3). At Level 5, however, the two courses were comparable, and above Level 5 students in the Applied Science course performed less well than

their peers in the Double Award Science course. See Figure 1 for further description of Key Stages and Levels delineated by the United Kingdom Department of Education.

Bell et al. (2009) asserted the point that, although the Applied Science courses were in principle held to the same status as the traditional science courses, vocationally related courses had historically held lower status within the British educational system. This perceived status difference was noted in how school staff appeared to target students who they felt would most benefit from the applied science coursework, with its emphasis on practical relevance. Staff judgments varied from school to school, but the researchers noted that, in the majority of cases, schools were targeting students for Applied Science who performed at a lower level than those entered for the traditional Double Award Science.

School Year	Approximate Pupil Age	Expected Level	Highest Level Achievable by Test		
Year 2	7	2	3		
Year 6	11	4	5		
Year 9	14	5 or 6	8		

Level	1	2	3	4	5	6	7	8
Key Stage	Key	y Stag	ge 1 Key	/ Stag	ge 2			
					Key	y Sta	ge 3	

Figure 5. Key Stages and Levels of Education, United Kingdom. Accessed 2012, "Secondary Schools 2006 (KS3)." *National Curriculum Online*. Qualifications & Curriculum Authority (n.d.).

In the discussion of the results, Bell et al. (2009) described how teachers observed an improved attitude, interest, and a strong engagement with the coursework, particularly among students who might have been expected, on the basis of past experience, to become disaffected in science lessons. The researchers acknowledged that the Applied Science course had created a real opportunity for reform in relation to a group of students who might otherwise have been turned off by science.

This study was limited to a broad survey based on national student achievement data and teacher surveys collected through the National Pupil Database. The analysis gave some indication of the size of variation but did not explicitly address differences in school diversity in the administration and teaching of this relatively new Applied Science course. Consequently, it cannot tell us whether increases in student test scores reflect real increases in understanding, student motivation, and engagement, or whether the learning outcomes associated with the Applied Science course were educationally valuable. However, this study suggested that Applied Science courses may positively contribute to student engagement in learning and academic outcomes, particularly with students for whom traditional science courses were ineffective.

Some researchers have studied industry examples of applied science professions in order to consider how secondary level science curriculum might best prepare students for future scientific work beyond the classroom. Gott, Duggan, and Johnson (1999) used a small biotechnology company located in England as the subject of a study that considered the work of practicing applied scientists and the implications for science education. A performance model based on prior research by Gott and Duggan (1995) guided this study (Figure 6). The researchers used interviews and reviewed company documentation, such as training procedures

and manuals, in order to quantify the conceptual and procedural understandings and skills required in the job performance of applied scientists. For the purposes of the study, a skill refers to simple mechanical aspects of activities, such as knowing how to use equipment. Procedural understanding is defined as "the thinking behind the doing of science" (p. 99), knowledge in its own right that is equivalent to conceptual understanding. This information was then compared with typical secondary school science curriculum in order to identify ways to make science education more efficient in developing science skills that are needed in the workforce.



Figure 6. A performance model based on Gott and Duggan (1995).

The researchers emphasized the problems associated with trying to define what it is that applied scientists actually do in the workplace. This study identified the extensive prior research and background understandings required in order to thoroughly and accurately identify the sort of science that is useful in a particular scientist's line of work. Through this work, Gott et al. (1999) confirmed their hypothesis that procedural understanding is a key issue in science-based employment. Their findings showed that both employers and employees readily identified the conceptual science element of their work but tended to describe procedural understanding in terms of 'common sense' or 'procedures' that they did not regard as 'science.' This procedural understanding includes most problem solving and troubleshooting functions within the company, which the researchers argued is the heart of their model – "it is indeed science in action" (p. 106). The findings of this study are in line with research by others that also found that procedural knowledge is central to the performance of scientific work and that this knowledge is generally learned on the job, rather than in a school setting (Aikenhead, 2004; Bell, Blair, Crawford, & Lederman, 2003).

Gott et al. (1999) considered the criticisms of the general science curriculum and its focus on student competence that has led to students completing procedures or tasks without gaining the understanding that underpins the performance. The researchers suggested that without adequate understanding students might be successful with procedures but limited in their ability to transfer their procedural knowledge to subsequent tasks. Through authentic inquiry and project-based applied science tasks in science classrooms, students may be encouraged to consider "the thinking behind the doing of science," thereby increasing their future success in academic and workplace scientific pursuits beyond the conceptual and factual knowledge required to complete most end of course exams.

Conclusion

This selected literature review highlights current understandings and the research surrounding student engagement and learning in secondary applied science in response to the

question: How can student interest and engagement be cultivated and maintained through applied science instruction? This research informs applied science curriculum and instruction and has demonstrated through pilot projects in the United Kingdom that applied science can promote student engagement and learning through personal connections, interest, and resulting positive student emotions. Applied science can encourage learning through positive student experiences with science and can support students who might be less likely to succeed in a traditional science course (Bell & Donnelly, 2002; Bell et al., 2009).

The research also described how courses that focus on scientific literacy have been perceived by teachers to markedly increase student interest and engagement. Teachers pointed specifically to students' increased engagement as a result of students' willingness to express their concerns and opinions, discuss experiences and current events, and independently initiate scientific discussions both in and outside of lessons. (Millar, 2006). Increased student interest and engagement has been correlated with improved academic achievement, increased student sense of belonging in school and other social institutions, and higher school completion rates (Finn, 1989; Finn & Rock, 1997; Marks, 2000; Willms, 2003). Scientific literacy can be pursued through applied science instruction not as the goal in and of itself, but what scientific literacy enables the learner to do – participate in discussion of issues, continue learning science after school and outside of the classroom, experience curiosity and wonder about the natural world (Millar, 2006).

Applied science, through the use of integrated reflective assessment, can be an important avenue to provide access to science, especially for lower achieving students. However, this metacognitive process needs to be carefully scaffolded to provide access to all students without alienating lower achieving students (Campione, 1987; Chi et al., 1989; White & Frederiksen,

1998). Additionally, a scientific literacy instructional approach requires significant language and reasoning skills on the part of students. This more open style of classroom discourse can also create classroom management complications that need to be considered, such as less controlled student-to-student communication, use of classroom space and time, and increased planning and management needs. (Millar, 2006)

This literature review has highlighted some of the difficulties encountered as researchers attempted to translate applied science from the workplace to the general education classroom. Outside researchers struggled to deconstruct and understand the procedural understandings used by applied scientists, while practicing applied scientists often failed to identify the basic scientific principles that support their daily activities, such as problem solving and critically considering evidence (Gott et al., 1999). This led me to infer that what applied scientists consider *science* in the workplace may be conditioned by workers' early educational experiences when they first formed their personal definitions of *science*. This suggests a broader definition of *science* and its usefulness may be necessary in science classrooms, one that focuses more on the "why" and "how" rather that the "what" of science (Aikenhead, 2004; Bell et al., 2003; Gott, 1995; Gott et al., 1999).

New national science education standards have been proposed. As stated by the Committee on Conceptual Framework for the New K-12 Science Education Standards, "learning science involves learning a system of thought, discourse, and practice—all in an interconnected and social context—to accomplish the goal of working with and understanding scientific ideas" (National Research Council, 2012, p. 193). Practicing applied scientists as teachers, guest presenters, and mentors may be able to encourage student procedural knowledge and the "thinking behind the doing" that has been shown to be of such value in the applied sciences.

These experiences may also provide students with a deeper, more meaningful conceptual understanding of what it means to "do" science. For this reason, more and more schools are attempting to draw practicing scientists into schools, whether as guest presenters, mentors, or teachers to bridge the school science – practicing science gap.

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Culturally Relevant Classrooms: Promoting Academic Success for Black Males

Nikki Dunbar

Abstract

From the beginning of their admission into the education system, Black students in the United States have been disproportionately failing to meet academic standards in comparison to their white counterparts. This gap in achievement is pervasive across socioeconomic classes and has decreased only slightly in the past thirty years. Black males are particularly at risk for a variety of reasons, including the possibility that white female teachers, who comprise the majority of educators in the United States, are ill-equipped to provide a culturally responsive education. This review of empirical literature gathered data from studies exploring how the achievement gap is affecting the success, both academically and socially, of Black males. Findings contributed to answering the following question: What strategies can white educators use to promote the academic achievement of Black males? Results indicate that positive racial-ethnic identity reinforcement, trusting relationships with teachers, and cultural relevance are crucial indicators of a classroom where students may succeed. Strategies are organized into two categories: a) strategies for promoting success internally by supporting a healthy racial-ethnic identity within Black males and b) strategies teachers can employ to develop culturally responsive environments as an external approach.

Culturally Relevant Classrooms: Promoting Academic Success for Black Males

Since the inception of public education in the United States, Black students have received a lesser education than their white counterparts. Plagued by an erratic history of slavery, segregation, violence, and inequality, education for Black students has faced consistent adversity. The achievement gap between white students and Black students has been starkly illustrated in the past years through test scores, grade point averages, drop out rates, and all other standard academic achievement measures (Schott Foundation, 2006). Additionally, the recent growth of a standardized climate of education has magnified the visibility of disproportionate achievement between ethnic groups. This disparity in academic achievement spans socioeconomic class and reaches a variety of geographic populations.

There is debate attempting to explain why the disparity exists. Many researchers believe in a home-school dissonance, asserting that Black families don't value education and academia like the families of their white counterparts. One theme found in the research suggests that being academically motivated or successful might threaten the identity of Black students, who may find that doing well in school could be interpreted as "acting white" (Wright, 2011). This threat could jeopardize not only how a students' peers interpret him, but the health of his racial ethnic identity. Another prominent theme found in the research is the incongruence between school culture and home culture with regards to expectations of behavior. Research has asserted that the expectations educators have of their Black students usually reflect the values of white, middleclass, dominant culture, which are often in opposition to the cultural standards found in the homes of Black students (Wright, 2011; Carter 2008). This cultural discontinuity not only prevents students from seeing themselves in the curriculum and in the school culture, but also causes them to be disproportionately disciplined due to confusion of behavior expectations

(Payne, 2009; Sampson, 2010). Home-school dissonance is sometimes blamed for causing poor access to social and political capital that often prevent Black families from accessing educational opportunities which seem to be readily available to white families. Some have proposed that the achievement gap is due to racism and discrimination in schools, which they say has cultivated low self-esteem and poor self-efficacy in Black students (Sealy-Ruiz, 2011). Still, some blame the academic disparity on disproportionate numbers of Black males who are placed in special education courses (Payne, 2009).

Since the 1970's, action groups and government agencies have attempted to pass legislation in hopes of shrinking the achievement gap. The Bush administration's No Child Left Behind act has aimed at equalizing education and enforcing high standards for all students. Under Title 1 requirements, additional funding, programming, and subsidies have been thrown at underachieving schools, many of which serve large populations of Black students (Rust, 2011). The past 30 years of legislation has yielded some progress in closing the gap, but unfortunately, any measurable advancement has been negligible (Sampson, 2010).

While a variety of widely researched factors no doubt contribute to the achievement gap, considerably less research has been conducted about what white teachers can do in the classroom to help close the achievement gap, specifically for Black males, who fall furthest behind in all measured criteria (Schott Foundation, 2006). In 2005, as reflected on the grade 8 reading portion of the National Assessment of Educational Progress, the achievement gap between Black and white males stood at 33%.

Possibly the strategy determined to be most effective for promoting academic achievement in Black males is having a culturally synchronized teacher in the classroom (Roberts, 2010; Sampson, 2011). That is, Black students may learn best from Black teachers. In

Washington State, more than 90% of the teachers and principals are white (Office of Superintendent of Public Instruction, 2002). Considering the number and distribution of Black teachers in this country compared with the number of underachieving Black students, placing a culturally synchronized teacher in the classroom in unrealistic. Educators and schools have a legal responsibility to educate all of the nation's children, which include large numbers of Black males. This reality forces us to ask the question: What strategies can white educators employ in the classroom to promote the achievement of Black males?

While I will use the term "Black" to refer specifically to members from the African American community whose ancestors were involuntary immigrants to the United States, some researchers have chosen to use the term "African American." In the event that the researcher has chosen the phrase "African American," I will honor their work by using the term in discussion of their findings.

My personal interest in this topic originated from my work as an undergraduate student of Comparative Ethnic Studies. As a college student, I was impassioned by the Black experience in the United States, both by the struggles against inequality, discrimination, and violence and by the unique cultural space and community Black Americans have created. Later, as a pre-service teacher, I taught ninth grade at a diverse urban high school where Black students made up 36% of the student population. Early in the fall of this student teaching practicum, I became particularly interested in the social norms of my Black male students. Specifically, how they related to authority, and how these social characteristics may have contributed to their academic success or struggle. I also began to observe other teachers in my building, and analyze how my identity as a middle-class white female may have contributed to the underachievement or academic success of the Black males in my classroom. My work in this research was inspired by

the hope to meet the needs of all of my students, so they may reach their full potential and realize their dreams.

Based on these experiences and others, I chose the following literature to explore why Black males are struggling to achieve, and how educators can better serve the needs of this population. This review of the literature was guided by the question: How can white female educators promote academic success for Black males?

Limitations:

Overwhelming in the research was the students' awareness of the achievement gap and their place in it. Students were also adamant about their desire to be treated not differently, but to be treated equally (Sampson, 2010). This collection avoids detailing at length the problem of the achievement gap, since the disparity is well documented and accepted across disciplines. I have also omitted any discussion of the impact participation in school athletics may have on academic achievement, as it involves a broader cultural complexity than this literature review is designed to encompass.

Literature Review

This review of the literature attempts to explore what strategies are effectively promoting achievement for Black males. Here, I will describe two primary ways to promote academic achievement for Black males that emerged in my review of the literature: enriching the internal social-emotional health and identity of Black students, and teacher-directed change in the classroom and school environment. First, I will present research suggesting the need for a healthy racial-ethnic identity including exploration of role-modeling and the three crucial characteristics present in a healthy Black male's identity. Then, I will present research suggesting teacher directed changes at the classroom level including the use of culturally-

relevant curriculum, modifying teacher disposition, accommodating expressive characteristics common in Black students, and teacher perceptions and expectations.

Identity: Three Crucial Characteristics

In order to identify how educators might promote academic achievement for Black males, it may be helpful to understand how the identity of Black males may affect their school experience. In their study of the gendered identity of African American adolescents, Oyserman, Gant, and Ager (1995) found identity to serve different purposes for males and females experiencing adolescence. While females seemed to focus on school work, family, and community, males were more focused on action, survival and struggle. The presence of the following three components in an African American male identity may improve school persistence and success: a) feeling connected to ones heritage and culture, b) having an awareness of societal racism and stereotypes toward African American males, and c) seeing themselves as academically or professionally successful as members of a racial group. The presence of these three characteristics is referred to as the African American Identity Schema, which will provide an organizational framework for the presentation of research in this first section of the literature review.

Disrupting cultural discontinuity. Incongruence between the dominant Eurocentric culture found in schools and the culture of Black families and homes often causes Black students to experience cultural discontinuity (D. Carter, 2008; N. Carter, 2008; Payne, 2009; Sampson, 2011). Researchers have termed this discontinuity "home-school dissonance", which occurs when the real or perceived differences between home or self and what is expected at school begin to threaten the adequacy or integrity of a student (Kumar, 2005). For example, Black males may express themselves or communicate with one another using their voice in a manner or at a

volume that is considered inappropriate for school culture, but is modeled for them as acceptable communication within the home culture (Tyler et al., 2009). In this manner, students are reflecting a component of positive identity by engaging in cultural behaviors with others from their group, and connecting with their heritage (Oyserman et al., 1995). In the instance of cultural-discontinuity, instead of modifying school norms to accommodate individual needs, management structures in many schools attempt to correct the cultural behavior models of students to comply with the dominant-culture expectations of the school (Kumar, 2005; Tyler et al., 2009).

In their study of African American students at urban majority minority schools, Tyler et al. (2009) determined that students who self-reported having experienced home-school dissonance were more likely to experience maladaptive school-based behaviors. For example, students who experienced home-school dissonance were more likely to engage in performance approach goal orientation, or "looking smart" in front of their classmates and teachers, and were less likely to engage in mastery goal orientation, or deep cognitive processing and meaningful learning. Students who experienced home-school dissonance also reported lower English and math scores.

Low academic achievement may be related to this incongruence between mainstream American culture and the culture of Black families (Tyler et al., 2009). However, could it be true that identifying with the mainstream American culture does not positively effect the academic achievement of Black male students? A recent study set out to investigate the positive effects that experiencing "biculturalism" may have on the academic achievement of African American high school students (Rust, 2011). In this study, researchers defined biculturalism as a sense of belonging to two different cultures without losing connection with the original cultural identity;

the ability to differentiate between both; and interaction with both cultures without favoritism or ranking of the two cultures. In the study, researchers set out to determine what positive effect biculturalism may have on academic achievement of African American adolescents beyond the influence of cultural identity (Rust, 2011). The study examined the relationship between biculturalism, cultural identity, global self-esteem, and academic self esteem, and the relationship of these four factors to the academic achievement of African American students. Prior to beginning their study, researchers developed a series of hypotheses predicting anticipated findings (Rust, 2011). The results were surprising. While some hypotheses were confirmed, study findings supported none of the hypotheses regarding biculturalism. Consistent with previous research however, study findings did indicate that a positive cultural identity is linked to higher global self-esteem and sense of belonging characterized by biculturalism represents two of the positive identity components described by students' recognition of themselves as successful members of their racial group (Oyserman et al., 1995).

Findings from the Rust study (2011) indicate that the problem of home-school dissonance cannot be solved simply by integrating the expectations of mainstream culture into the lives of African American families through biculturalism. This study does indicate that cultural identity may be a key factor in the academic success of African American students.

Promoting a healthy racial ethnic identity. Other research supports the findings of Oyserman et al. (1995) and offers strategies to support community connectedness, awareness of racism, and positive self-efficacy by promoting a healthy racial-ethnic identity in young Black males (D. Carter, 2008; Payne, 2009; Sealy-Ruiz, 2011; Wright, 2011). Shared cultural characteristics can be identified in many Black males in American high schools. Most commonly

associated with young Black males is what researchers have termed Urban Youth Culture (UYC), which is sometimes known as hip hop culture (Payne, 2008; Wright, 2011). Black students often hear the message that they cannot succeed or that to succeed in school is in conflict with this Black cultural identity, or urban youth identity (Wright, 2011). Recognizing UYC as both valuable to and congruent with academic achievement is an important strategy in promoting academic success as well as self-efficacy for young Black males. Researchers have termed this the "Black counter-narrative," a message which communicates to students a positive and capable narrative of Black cultural norms and combats the negative stereotypes perpetuated by the media and the larger community (Sealy-Ruiz, 2011). The Black counter-narrative supports all three components of a positive identity in Black males (Oyserman et al., 1995). To support the development of healthy racial-ethnic identity and to communicate the Black counter-narrative, schools might consider being intentional and consistent in their message to Black students, and support this message with teaching strategies for school success and cultivating academic-oriented behaviors (D.Carter, 2008).

Mentorship groups. Likelihood of school success for Black males increases if their identity includes positive self-efficacy and the perception that they, as Black males, can be successful in school and in an occupation (Oyserman et al., 1995). A very powerful and tangible strategy found by researchers to be successful in promoting academic achievement while honoring and celebrating UYC is students' membership in racially- or ethnically- specific peer mentorship groups (Sealy-Ruiz, 2011; D. Carter, 2008).

Sealy-Ruiz (2010) originally began the year long "Diversity Project" to investigate the persistent academic performance gap that existed between Black and Latino students, and white and Asian students at a high school located in upstate New York. Researchers gathered evidence

from a broad variety of resources including surveys, focus groups, interviews, 50 hours of classroom and hallway observations and school artifacts like yearbooks and school publications. Data gathered was coded using a within case and across case analysis approach. An unexpected theme revealed through the data coding was the common and consistent impact of "Project Avalanche," an all-male, all-Black peer mentorship program. The 12 males identified for this study were divided into three groups of four students each. These focus groups met once per week for three weeks. Questions guiding the research were: a) How has participation in Project Avalanche influenced your life in school and outside of school? b) What perceptions do you believe members of the school community have of Project Avalanche members? Why do you believe they perceive Project Avalanche members in this/these ways and c) What should be the overall mission and focus of groups like Project Avalanche?

Peer mentorship groups like Project Avalanche have often had an academic agenda and through peer-to-peer mentoring and/or mentorship from community members, practice study skills, attend college tours, offer assistance in applying for post-secondary education opportunities and provide peer role-models for younger group members (Sealy-Ruiz, 2011). Mentorship groups achieve teaching and modeling academic-oriented behaviors, and often successfully integrate these behaviors into the Black male identity (D. Carter, 2008; Sealy-Ruiz, 2011; Wright, 2011). According to data gathered through focus groups and interviews, membership in Project Avalanche allowed students to embrace their UYC to help create positive social and academic identities for themselves within school and as future members of society (Sealy-Ruiz, 2011). Membership in Project Avalanche also helped students to view their UYC positively as a representation of their individual and cultural group identity, a component of positive identity for Black males (Oyserman et al., 1995). One participant specifically identified his competitive interaction with peers in the group and described how he found positive peerpressure to encourage his own effort toward academic success (Sealy-Ruiz, 2011).

The research conducted by Sealy-Ruiz provided findings to support the positive effects Project Avalanche and other peer-mentorship groups may have on the development of positive identity and subsequent self-efficacy of Black male students. However, little is provided to determine if these students were actually achieving. The researchers did not provide a comprehensive list of questions asked during focus groups, which caused difficulty in interpreting the results. Additionally, the research site was regularly ranked in the *Newsweek* list of America's Top High Schools, where per pupil spending is almost \$20,000. Research conducted in a demographic more representative of schools located in Black communities may have yielded more genuine results.

Membership in Project Avalanche helped students who had been negatively associated with UYC to combat stereotypes using socially and academically positive associations with Project Avalanche (Sealy-Ruiz, 2011). The direct association of their Project Avalanche identity with UYC allowed the members to consider their own association with UYC positively and to consider that affiliation a strength.

Students who create positive associations with their UYC and maintain a healthy racialethnic identity while achieving academically may be more likely to associate "acting Black" with school success, as opposed to "acting white" (Wright, 2011). In the Wright study (2011) conducted at an urban pilot high school, researchers explored how academically and socially successful Black male students interpreted and used their identity in their school context. The students who participated in this study came from mixed socioeconomic backgrounds and familial composition. All had grandparents who were born in the United States, implying that

they could be considered part of Black American culture as opposed to a more recently immigrated family whose cultural identity may be vastly different. All participants were identified by guidance counselors as having had positive relationships with peers and with school officials, were regular participants in extracurricular activities, and had earned grade point averages of 3.0 or higher. The student body at the research site was predominately Black and Latino and 61% of the students received either free or reduced lunch. Success Academy was a pilot program with an emphasis on academic success and teachers at the school were described as being highly qualified, holding high expectations for their students, and fostering of a nurturing school environment where every child is known by his or her name. To determine the health of participants' racial-ethnic identity, the researchers used semi-structured focus groups and interviews designed to encourage the participants to speak freely. Participants also completed a self-administered questionnaire based on the Multigroup Ethnic Identity Measure, answering a series of questions to elicit responses about general areas of ethnic formation. The researchers finished with follow-up conversations to clarify statements made in previous interviews and in response to questionnaire.

Findings reflected the participants' beliefs that it is possible to be both "cool" and "successful" and that being cool was a combination of working hard, getting good grades, being popular with ones peers, and dressing and speaking in a particular style (Wright, 2011). Participants agreed that at Success Academy, if you did not work hard and get good grades, you were not cool. Scores from the questionnaire suggested that each of the participants had positive racial-ethnic identities. The health of their identities was determined by their propensity and comfort in expressing their UYC through dress, language and mannerisms. It also included their awareness of "acting white" and "acting Black." Like students in the mentorship group Project

Avalanche, students at Success Academy were held to high expectations by like-minded peers from similar cultural backgrounds (Sealy-Ruiz, 2008; Wright, 2011). This characteristic demonstrated that the influence to achieve from culturally or ethnically synchronized peers positively contributes to a healthy racial-ethnic identity, which contributes to academic success (D. Carter, 2008; Sealy-Ruiz, 2008; Wright, 2011).

Like the research site in the Sealy-Ruiz study, the Success Academy was not indicative of a typical neighborhood school found in an urban or Black community. Little was revealed about the school and its context. For example, the researchers did not reveal where the students came from or if there was an application process for enrollment. Students were selected for the study by their administrators, and only five students were selected making the sample very small. It seems the study results would have been more comprehensive if the selection process were more varied and if more students were included.

The constructively competitive qualities of both Project Avalanche and Success Academy provided students with the opportunity to relate to a cultural group identity, one of the three characteristics of positive identity (Oyserman et al., 1995). Developing a healthy racial-ethnic group identity allows Black male students to identify themselves as part of a *racial caste group*, offering them the resources and environment to interpret and make sense of instances when they experience discrimination (D. Carter, 2008).

Cultivating a Critical Race Consciousness

While some schools may feel apprehensive about teaching their students the realities of racism and racial inequalities in society, research has shown that developing a complicated view of their role in society has promoted academic effort and contributed positively to the academic achievement of Black males (D. Carter, 2008; Oyserman et al., 1995). Oyserman et al. (1995)

identified awareness of stereotypes and limitations to one's present and future social and economic opportunities as one of the three characteristics of positive African American Identity Schema. Researchers have found that an awareness of central and peripheral racist attitudes can evoke in students the desire to "prove them wrong" (D. Carter 2008).

A 2008 study (D. Carter) sought to develop a better understanding of how students perceived racism and how a students' racial identity affected academic achievement. Researchers gathered data using an inventory questionnaire called the Multidimensional Inventory of Black Identity scale. This survey qualitatively measured students' perceptions about racism and societal beliefs about their race. Researchers used this data to construct semi-structured interviews which were conducted individually with each participant. Interview data from two academically highachieving male participants (grade point averages of 2.8 and 3.9) revealed awareness of societal racism, specifically the negative stereotypes reflecting Black males as prison inmates. The participants perceived these stereotypes as barriers which might make achievement difficult for them. However, they also revealed that they had come to frame these obstacles as motivation to succeed academically; as a means to prove the stereotypes wrong. The students had persuaded themselves to recognize schooling as a means of actually staying out of prison. Many participants in the study also described the significant impact of current and historical racial oppression on their self-definitions and their Black identity. Participants in the study often suggested that they were not discouraged by the stereotypes, but were motivated to confront the stereotypes.

Their understanding of their membership in an oppressed group did not lead to the development of a victim mentality, but allowed students to see the power structures and the socially constructed racial hierarchies at work in society, and their role in those power structure
(D. Carter, 2008). This awareness of racism characterizes one component of positive identity (Oyserman et al., 1995). Study participants also demonstrated an awareness of opportunities that were available to them, but that they would have to work very hard, harder than their white counterparts, to access.

Findings from a 2010 study (Roberts) exploring the behavior of Black teachers as they interact with their Black students revealed similar findings, and uncovered a more sophisticated role teachers can have in the pedagogy of political transparency. In the study of eight classroom teachers who were identified by parents and administrators as being exceptionally successful in promoting African American student achievement, researchers discovered a variation on the political transparency pedagogy. These teachers described addressing the realities of racism using "color talk," which takes place when a teacher from a subdominant or oppressed group informs students from the same group about the challenges and issues specific to their shared culture group. When working with students from the same cultural group, these teachers are described as "culturally synchronized." Culturally synchronized teachers in this study further complicated the idea of political transparency by encouraging code switching, suggesting that students temporarily alter their physical or symbolic representations of African American identity when appropriate. For example, to circumvent discriminatory hiring practices, a student might alter their name on a job application to reflect a more European-American identity. A commitment to helping students learn the tools to navigate the racist underpinnings of American society in order to succeed was a primary objective for these teachers, who were identified by two groups independently as being exceptionally successful in helping African American students to succeed.

While honest representations of inequalities in American society and aggressive confrontation of stereotypes proved successful in many classrooms, Black teachers teaching Black students how to navigate power structures and be successful might emerge quite differently in a classroom where a white teacher is trying to do the same. While culturally synchronized Black teachers may provide much needed empathy and role modeling for their Black students, what can white teachers do in the classroom to promote the success of African American male students?

Culturally Relevant Curriculum and Pedagogy

Black students have expressed not wanting to be treated differently by their teachers, but wanting to be treated fairly. Like all children, they want to feel that their teacher believes in them and is committed to their success (Sampson, 2011). This begs the question, how do black students differ from their dominant culture counterparts and what are their specific needs?

Based on the achievement gap illustrated by standardized test scores, graduation and dropout rates, and college and high school GPAs, a 2008 study set out to explore what sociocultural researchers have termed "verve" (N. Carter, 2008). Verve is described verve as "the propensity for energetic, intense, stylistic body language and expression." Arguing that culture is the most defining factor of learning style development, researchers in this study sought to determine any connections that existed between verve levels and academic achievement. Researchers chose a large urban middle school in Texas where the majority of students were Hispanic American, and only 16.4% were African American. However, when the sample of 211 students was chosen, only European Americans and African Americans were represented. Students answered an 18 item survey originally developed by Boykin called The Child Activity Questionnaire. Results from the questionnaire indicated increased levels of verve in African

American students when compared with the results of their European American counterparts. Researchers also accessed student reading and math scores from the state standardized test. According to test results, students with high verve levels scored lower on the standardized tests than did students with low verve levels. In addition, students with higher verve levels scored lower on the math portion than they scored on the reading portion of the state test.

Researchers theorized a reason for higher performance on the reading portion in relation to the math portion might be due to a culturally related learning style misalignment (N. Carter, 2008). Researchers determined that reading is typically associated with dialogue, interaction, creativity, and other characteristics which make it a preferred learning discipline for students with verve, whose expressive nature more closely aligns with characteristics of reading. Researchers also posit that unlike reading, math is an exact science and is typically taught with little interaction or creativity. This means that students needing less stimulation, or students with less verve, may do better in math than students with high verve. From these results, researchers determined that students with high levels of verve, referring to African American students, would benefit from interactive activity and creative projects involving music and/or movement in all content areas, including math, a subject that often does not predispose itself to such learning activities.

In the above study, researchers may have oversimplified reasons why students were performing at lower levels in math than in reading. However, it seems that providing more creative and stimulating classroom activities may be beneficial for all students.

Perhaps the most obvious and tangible strategy for promoting the academic success of any underachiever is to provide relevant curriculum and relevant teaching approaches tailored to the needs of the students in the classroom (D. Carter, 2008; Sampson, 2011; Payne, 2008). For

Black students, the same argument has been made for culturally responsive teacher disposition and the use of culturally relevant curriculum.

Teacher disposition typically reflects the Eurocentric cultural norms of school and is often incongruent with the cultural values of Black families (N. Carter, 2008; Sampson, 2011). The disposition of many teachers has even been described as racist or discriminatory (Payne, 2009). A recent study explored how street-life oriented Black male students interpret teacher's perceptions of them, and how prepared these same students felt to locate academic or economic opportunities after high school. Students interviewed expressed their respect for those who attend college or secure quality employment after high school, and overwhelmingly recognized the importance of education in support of a successful future. Findings indicate that for the majority of these students, interactions with teachers and school officials were negative, as were most school experiences in general. Several boys in the study reported not feeling encouraged by their teachers, and some reported being discouraged from trying to succeed in school at all. Study participants expressed feeling ill-equipped for post-high school opportunities by their high school experiences, stating that unsupportive teachers were largely to blame.

The Payne study (2009) asserts that while street-life oriented Black males perceive school and education as advantageous to their futures, they feel unable to access any of these opportunities due in large part to their negative interpretation of teachers' commitment to their learning.

Teacher disposition can positively or negatively impact the delivery of content and how the content is received by students (Sampson, 2011). A mixed-methods study conducted in a racially diverse high school in Colorado demonstrated increased engagement among African American students who were exposed to both a culturally relevant curriculum and modified

teacher disposition. Inspired by Critical Race Theory, researchers in this study developed two very important questions to guide their research. The first measured the preferences of students: Do African American students prefer culturally relevant or non-culturally relevant lessons in school? The second question measured relevance: How do culturally relevant lessons relate to the lives of African American students?

Non-culturally relevant lessons were developed directly from the district curriculum guide, while culturally relevant lessons were developed based on existing literature exploring positive student-teacher relationships, socio-political discourse, home to school connections, and racial identity development (Sampson, 2011). While each set of lessons embodied radically different approaches and content, both included a multi-instructional approach that was experiential, included movement and collaborative group work, utilized technology, and integrated student-led discussions.

Findings from this study revealed that African American students enjoyed the culturally relevant lessons most, implying that they were most engaged with these lessons (Sampson, 2011). Using qualitative data in the form of student responses to a questionnaire, researchers identified curricular and pedagogical themes across desirable characteristics of lessons: a) provocative topics such as racially demeaning terminology can be enriching and stimulating; and b) teacher interaction, energy, sense of humor and interest in the students is imperative in promoting student learning. Qualitative data also revealed fascinating findings about student reaction to specific lessons, like "The N word" a lesson which asked students to think critically about the racially disparaging language used within the African American community. Lessons like "The N word" complicated and challenged student thinking around racial identity, community, and political transparency.

While the stimulating nature of these lessons inspired students to self-report higher retention of information and higher engagement, researchers could provide no evidence that students actually learned, as their study did not measure this data (Sampson, 2011). However, if students are more engaged in school than they were previously, there may be better chances of students staying in school and achieving.

Conclusion

Strategies to Promote Positive Identity

Students who experience cultural discontinuity within the dominant-culture environments of public schools are likely to perform lower than their white counterparts in the subjects of math and language arts (D. Carter, 2008; N. Carter, 2008; Sampson, 2011; Schott Foundation, 2006). However, teaching Black students to adapt to the cultural norms of mainstream schools will not promote their achievement (Tyler et al., 2009). Schools with a strong dominant-culture influence might consider integrating some of the common cultural norms of the Black community into their classrooms (D. Carter, 2008; N. Carter, 2008; Payne, 2009; Kumar, 2005; Rust, 2011). There are a variety of strategies teachers and schools might consider in this venture, many built on the concept of creating a healthy racial-ethnic identity in Black students, just as they do for dominant-culture students. Mentorship groups, led by students or by Black role-model figures, might provide students with much needed modeling experiences as they navigate academia and the pursuit of post-secondary opportunities (Sealy-Ruiz, 2008).

Black males need to see themselves mirrored in the community as successful members of the racial group (D. Carter, 2008, N. Carter, 2008; Payne, 2009; Oyserman et al., 1995; Sealy-Ruiz, 2011; Sampson, 2011). As was demonstrated in the research, many Black males are aware of the societal stereotypes they are expected to fulfill (D. Carter, 2008; Payne, 2009; Wright,

2011). Schools can provide these students with inspiration, examples, and support to write their own Black counter-narrative to contravene these stereotypes.

Instructional Strategies for Teachers

Promoting a healthy-racial ethnic identity can be greatly impacted by the curriculum, teacher disposition, and instructional strategies at work inside the classroom (D. Carter, 2008; N. Carter, 2008; Roberts, 2010; Sampson, 2011). In order to prepare teachers to meet the needs of Black students, teacher education programs can include culturally-responsive strategies for classroom management, questioning and discussion, instructional language, curriculum, and content design. School districts may also consider integrating culturally responsive teaching workshops into the professional development of their staff, and collaborating with cultural competency professionals to develop curriculum. Programming specifically designed to train teachers and curriculum planners in the development of culturally relevant curriculum could greatly impact the authenticity and frequency of its use in the classroom.

Examples in Practice

One method of integrating culturally relevant curriculum that has gained attention in recent years is "Hip Hop Pedagogy", which was demonstrated by a summer enrichment program called "In Da Tradition," attended by students and their teachers who were seeking professional enrichment (Sirc, 2009). While practicing the analytical devices needed to perform in college-level writing courses, teacher and student participants worked side-by-side to deconstruct urban youth culture and discovered complex interrelationships between content and customs, including the identification of American literary history in hip-hop mythology. The emphasis on college readiness communicated to Black students that there is a place for them in post-secondary education. Much like the mentorship groups in Sealy-Ruiz's study, In Da Tradition provided

students with culturally synchronized role models in the form of guest speakers, demonstrators, performers, and teachers. Through a medium they are likely to be familiar with and attracted to, researchers aimed to "demystify" the rigor of college coursework. In Da Tradition designed experiential learning activities to challenge students and their teachers to use academic questioning, investigate research questions, and engage in collaborative inquiry, all of which are learning standards being addressed in public schools. One student's report of his learning closely resembled a sampling of state learning standards, including how to research and support arguments and identifying elements of a genre. In Da Tradition also provides an example of using music, dance and movement in the classroom, which may benefit students who exhibit high levels of verve (N. Carter, 2008). As In Da Tradition demonstrates, hip hop culture is a powerful bridge to academic culture, providing a medium for delivering curriculum and drawing complex relationships and dichotomies within history, communication, and culture.

While the integration of culturally relevant curriculum could be adequately addressed through curriculum development training and enrichment workshops like the one described above, the acquisition of a culturally responsive teacher disposition seems more elusive, particularly for non-Black teachers. Though there is no shortage of caring and passionate teachers who want bright futures for their students, their caring is sometimes not realized by Black males (Payne, 2009; Sealy-Ruiz, 2011; Wright, 2011).

In their article, "The Teacher as Warm Demander," Bondy and Ross (2008) describe the traits of educators in high-poverty and urban school environments who have successfully communicated compassion and dedication to their African American students. These teachers pair unrelenting high expectations with a warm kindness. Integrating the "warm demander" persona is described through three thematic actions: building relationships, learning about

students' cultures, and communicating high expectations for success. While integrating high expectations into the classroom culture is vital, it is the *insistence* and refusal to accept anything less than the very best that characterizes the impact of the warm demander. The warm demander persona is effective for engaging all students, not only Black males or those experiencing poverty (Bondy & Ross, 2008).

Though Roberts discussed the strategy called "color talk", which is used by teachers who have honest conversation about racism with students from their same cultural group, what strategies exist to help white teachers integrate political transparency into their classroom? More research is needed to explore strategies which may help white teachers to communicate political transparency to Black male students. The warm demander persona may offer white teachers a bridge to integrating political transparency into the classroom. Integrating the warm demander persona may allow white teachers who form trusting relationships with their students to promote effort and achievement by being honest with their Black male students about the societal barriers which may obstruct them from realizing success (D. Carter, 2008; Payne, 2009; Sampson, 2011; Wright, 2011).

The warm demander persona is a valuable strategy for white teachers who want to communicate commitment and care to their Black students, and to all of their students (Bondy & Ross, 2008). Becoming a warm demander and building trusting relationships with students is a pivotal first step white teachers can take toward having honest conversations with students about discrimination (D. Carter, 2008; Wright, 2011). These conversations are instrumental to students' understanding of the unique challenges they will face, and the actions they can take to achieve in spite of adversity. Additionally, professional development opportunities like In Da Tradition can provide much needed support for teachers who want to integrate culturally relevant

content and culturally responsive teaching into their classrooms and their school communities (N. Carter, 2008; Sirc, 2009). While integrating the culture of just one group into the classroom could be interpreted as biased or inappropriate, the research presented here has demonstrated that all students may benefit from the inclusion of curriculum that is relevant to youth culture (Sampson, 2011). Culturally responsive practices in the classroom promote a positive and healthy racial-ethnic identity, which is instrumental to the academic achievement of Black males (D. Carter, 2008; N. Carter, 2008; Payne, 2009; Sealy-Ruiz, 2011; Wright, 2011). Also instrumental in promoting achievement is providing a safe and nurturing environment for growth, one that does not rely on acclimating Black students and their families to dominantculture expectations. Research suggests that schools instead genuinely and meaningfully embrace the culture of the Black communities around them and integrate themes of Black culture into the classroom (Rust, 2011). The strategies of integrating the warm demander persona and the learning experiences used by In Da Tradition exemplify the recommendations suggested by the researchers presented here (D. Carter, 2008; N. Carter, 2008; Payne, 2009; Roberts, 2010; Sampson, 2011; Sealy-Ruiz, 2011; Tyler et al., 2009).

The advent of an aggressively standardized climate in education and the slow and negligible decrease in the achievement gap means that action is urgent: Black male students need our targeted support in the classroom (Schott Foundation, 2006). Evidence suggests that integrating culturally responsive content and an unconditionally caring teacher disposition may increase engagement and attendance, resulting in a higher likelihood of academic achievement (Bondy & Ross, 1995; D. Carter, 2008; Sampson, 2011; Wright, 2011). Demanding culturally responsive practices in the classroom should be a priority for educators and administrators, because the voices that represent the need are often the softest.

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Teaching Toward a Better World

Beyond Imagined Communities: Understanding Student Identity Negotiation(s) in the Diaspora

Elizabeth Gordon

Abstract

This literature review explores the tensions and complexities found within student negotiations of identity. Understanding and exploring the creation and navigation of ethnic identity, academic identity, and ideas of citizenship is important as it emphasizes the identity processes undertaken by immigrant student populations. The ethnographic studies reviewed focus on secondary students from diaspora communities across the United States of America. The literature review incorporates student voice, as the intent of this short paper is focused toward understanding the inherent complexities and differences of immigrant students. This review proposes that identity is never fixed and is constantly adjusted and accommodated throughout a student's academic life depending on the ways students view themselves, how others view them, and how they are treated. The ways in which students adopt, adapt, affirm, and refuse identities impact the manners in which they then exist in the classroom. This paper suggests that all forms of identity negotiation should be acknowledged as valid, and should be supported in the school community, while allowing the agency of identity to rest on the shoulders of each student.

Beyond Imagined Communities:

Understanding Student Identity Negotiation(s) in the Diaspora

The world seems to be shrinking. Now more than ever is it easy to live glocally. Planes, trains, automobiles, calling cards and the World Wide Web enable quick communication, easier travel, and virtual communities. Local and global are no longer mutually exclusive terms; they have collapsed upon themselves. Borders of identity are no longer confined by national lines, and the lives of American students are no exception. Student identities are now constructed in increasingly complex ways. It is imperative to understand the processes and perspectives created and negotiated by students in order to best support academic achievement and development.

American student populations are becoming increasingly comprised by children of immigrants, now nearing a quarter of the United States' youth population. By 2040, it is projected that half of American youth will be from immigrant families (Patton, Coll, & Marks, 2009). Globalization and global unrest has led to the migration, emigration, and displacement of people in what is termed diasporas, where identities must shift to accommodate new experiences and environments while still maintaining close ties with their homeland and home culture. *Diaspora* refers to immigrant communities that, "attempt to maintain real and/or imagined connections and commitments to their homeland and that recognize themselves and act as a collective community" (Bhatia, 2010, p. 68). Immigrant youth living in diaspora communities are marked by unique tensions between homeland and hostland, both real and imagined. Student identities are "transformed by participating in the real and imagined cultural practices of schooling, peers, and various forms of popular culture in their new host nations" (Bhatia, 2010, p. 66).

For diaspora students, identity negotiation processes are undoubtedly complicated. The tension between the imagined home, homeland, and hostland requires flexible modes of belonging. Adding to these strains is the demands of a foreign school system, one that often requires adherence to norms of the school environment. To adopt what is considered "successful" student behavior to achieve in class environment that does not acknowledge multiple ways of being could damage the fragile identities of these students. For many students of diasporas, Western education and pedagogy is new and unlike the cultural and national traditions of education from the homelands (McBrien, 2005; Miller, 2009; Oikonomidoy, 2009; Stritikus & Nguyen, 2007). Academic identities must shift to accommodate.

It is necessary to outline concepts of diaspora studies. Implicit in the term is tensions between "here and back home" (Sarker, 2002), "roots and routes" (Gilroy, 1995), "origin and belonging," and other such dualities of identity. The diaspora is marked as a place of negotiation between the binaries of "here and there," or as Homi Bhabha terms it, the "interstices" (1994). Originally, the term diaspora referred to the dispersal of Jewish communities in the sixth century and is still marked by the upper-case "D," "Diaspora." Now it has come to refer to the processes of scattering and settling peoples outside of their assumed homelands. Diaspora students are often referred to as "transnational students," a term that is used almost synonymously but with a different theoretical emphasis. The students may be born abroad, and thus immigrant students or they may be the children of diaspora parents. The term itself does not automatically exclude assimilation, but immigrant communities that assimilate into national culture are not often considered diasporas. William Safran defines diasporas (as cited in Clifford, 1994, p. 304-305) as expatriate minority communities that: (1) that are scattered from an original "center" to at least two "peripheral" places"; (2) that maintain a "memory, vision, or myth about their original homeland"; (3) that "believe they are not- and perhaps cannot be- fully accepted by their host country"; (4) that see the ancestral home as a place of eventual return, when the time is right; (5) that are committed to the maintenance or restoration of this homeland; and, (6) of which the group's consciousness and solidarity are "importantly defined" by this continuing relationship with the homeland.

Students from diaspora communities may be marked by a continuing connection and identification with a, perhaps, romanticized homeland and alienation/minoritization from their host country. The students in the reviewed studies demonstrate various levels of adherence to or discordance with this definition. For the purposes of this paper, student dependence upon real or imagined homelands for identity negotiation qualifies as diasporic.

The United States is home to the most diaspora communities in the world. Created by global unrest, postcolonial realities, refugee resettlement, and the pursuit of greater economic opportunities, diaspora communities display an immense range in educational background, cultural capital (both in the homeland and in the United States), socio-economic status, and history. Although one can generalize a Yemeni diaspora, for example, this term only may refer to the strong identifications with and solidarity to an envisioned community rather than a homogenous way of being. For students, this sense of belonging to both here and there is negotiated in multiple ways. It is a process that influences not only their sense of self, but their ways of belonging in the home, the community and the school.

These studies seek to support, repudiate, or complicate previously canonized theories surrounding immigrant identity. Vital for comprehension is a discussion of John Ogbu's

typology of voluntary and involuntary minorities (Ogbu, 1983; Ogbu & Simons, 1998). Ogbu proposes that the school performances of minority groups depend upon two main factors. The first is the history of how a minority group joined United States society and the ensuing treatment by white Americans. The second concerns the group's reactions to that treatment and how it affects their ideas surrounding \ schooling (Ogbu & Simons, 1998, p.158). Ogbu argues that minority students have been discriminated against in every aspect of the school system, including school policy (segregation, unequal funding, etc.), classroom environment (marginalization, lack of voice, etc.), teacher interactions (low expectations, stereotyping, tracking, etc.), and the results of schooling (lack of job opportunities, unequal hiring policies and wages, etc.). Ogbu depends upon immigrant typology to explain the academic performances of minority students.

In United States society, Ogbu typifies minorities into three main groupings depending upon their differing histories: autonomous, voluntary/immigrant, and involuntary minorities. For Ogbu, the last two are the most important as there is no nonwhite autonomous minority in the United States. Voluntary minorities refer to groups that have generally chosen to move to the United States for expected opportunities. Involuntary minorities refer to groups that have unwillingly joined American society through conquest, colonization, or enslavement (p.165). A separate category is that of the "refugees, migrant/guest workers, undocumented workers, and binationals," this minority type did not necessarily chose to join the United States, nor make plans to settle permanently, but they share many of the behavior and attitudes of voluntary minorities. This category is generally combined with the voluntary minorities under the term, "immigrant." As a generalization, voluntary minorities view education as a necessary step toward economic and social prosperity. It is not viewed as threatening to their identity.

Involuntary minorities may associate institutions, such as schools, as symbolic of white cultural domination and oppression. Involuntary minority children may demonstrate this cultural attitude by adopting a "resistant identity" to majority norms expected for success in the public school system. To adopt "white ways," such as standardized English, may be viewed as detrimental to one's culture and community. It is conceived as giving in to the white oppressor and an abandonment of one's identity. The requirements for school success are "interpreted as white society's requirements designed to deprive minorities of their identities" (Ogbu & Simons, 1998, p.178). Whereas, immigrants may adopt majority norms without viewing it as a threat to their identity. Standardized English may be perceived as an academic tool rather than a way of being. Ogbu explains for discrepancies in his theories, such as immigrant adopting resistant attitudes to schooling, by explaining that voluntary minority groups often choose (or are forced) into identifying with nonvoluntary minorities. This identification may result from living and working in proximity, as a result of housing and job discrimination, or by the actions of others such as peer identification or a teacher's ignorant reliance upon stereotypes. Ogbu proposes that academic achievement, defined as traditional success in schools such as grades, test scores, and future economic/educational prospects, is largely dependent upon a student's voluntary or involuntary alignment.

It must be noted that Ogbu's theories present inherent flaws. Ogbu depends on explaining youth achievement through identification with a group and its history, thus ignoring other complicating factors such as language proficiency, socio-economic status, gender norms, and social and cultural capital. Ogbu relies on categorizing minorities into a single typological group oversimplifying the experiences and identities of minority communities and individuals. Ogbu's categorizations deny Bhabha's concept of the interstice, the hybrid between-space where

cultures, nationalities, norms, and expectations overlap, the space where difference s are negotiated. Ogbu's focus on oppositional behavior as self-defeating also denies the possible potential for positive social and political change through active resistance (Solorzano & Delgado-Bernal, 2001). Although Ogbu's theory fails to adequately explain the complexity of student experiences, attitudes, and potential (Gibson, 1997), his theories are still helpful in framing the discussion of the identity processes of immigrant youth. Centered in Ogbu's theories is the assumption that identity is dependent upon real or imagined histories and influences school achievement, especially as determined by behavior and attitudes toward schooling.

Supporting identity negotiations is crucial in developing healthy self-esteem, as selfworth facilitates academic achievement (Gibson, 1997; Phinney, Horenczyk, Liebkind, & Vedder, 2001). Whereas, unsupported or challenged identities may result in lower academic achievement (Matute-Bianchi, 1986). A strong identity has also been linked to the ability to recognize and combat racism (Asher, 2008; McGinnis, Goodstein-Stolzenberg, & Saliani, 2007). It is therefore necessary to understand identity and the support each student in the processes of identity negotiation. Furthermore, school-wide support for student identities is necessary as diaspora students are often victims of discrimination, stereotyping, and violence (Asher, 2008; Bhatia, 2010; Bigelow, 2008; Lee, 1994; McGinnis et al., 2007; Ogbu & Simons, 1998; Strikus & Nguyen, 2007; Suarez-Orozco, 1987; Rong & Fitchett, 2008). As the diaspora definition states, immigrant students are minorities and are not represented in majority society. If one is a diaspora student, there is a potential for powerlessness.

Nestled among the wide-ranging research surrounding diaspora and immigrant youth, three main focuses may be noted: ethnic identifications, ideas surrounding the purpose and power of education, and definitions of civic involvement and citizenship. An investigation of

each serves to complicate our previous notions of immigrant experiences as well as to deepen our incipient conceptualizations of student identities, emphasizing the importance of approaching each student as a unique individual.

Literature Review

Ethnic Identification

Ethnic identity refers to a strong sense of self and belonging into a particular ethnic group or community, it also may refer to a person's self-label or group affiliation. It is generally defined as, "embracing various aspects, including self-identification, feelings of belongingness and commitment to a group, a sense of shared values, and attitudes towards one's own ethnic group" (Phinney et. al, 2001). The term identification refers to a psychological attachment, realized or not, to the qualities, values, and characteristics of other people or a group. Studies have reported a strong correlation between personal well-being, self esteem, and constructions of ethnic identity found across all persons of color, especially among adolescents (Smith & Silva, 2011). In a large scale study of ethnic identity involving 12,386 adolescents, it was found that all students, regardless of race, gender, socio-economic status, benefit from ethnic identification (Martinez & Duke, 1997). The stronger the ethnic identification, the higher the reported self-esteem, purpose in life and overall self-confidence. Students with strong ethnic identification often perform better in school (Gibson, 1997; Matute-Bianchi, 1986). Furthermore, high ethnic identification may help ethnic minorities and women combat the "negative effects of social denigration and stereotyping" (Martinez & Duke, 1997). Ethnic identification processes are an important factor in a student's academic identity.

Self-identification. Processes of self-identification are helpful in order to understand a student's chosen identity. More than a label, a student's self-identification may

reveal negotiations surrounding belonging, perceptions about others' views of their ethnicity and identity, as well as their own conceptualization on their status in the United States. For example, an American student that identifies as "Mexicano" rather than Mexican American may do so because they identify more with Mexican culture than because they are denied rights due to lack of citizenship (Matute-Bianchi, 1986). A student's self-identification may demonstrate a political objective or active resistance (Lee, 1994; Matute-Bianchi, 1986). A student may also choose a label simply because their friends do.

Rumbaut (1994) observed several correlations between students' experiences and ways in which they self-identified. Students, who were born in the United States, were naturalized citizens, or those who preferred speaking English with friends were much more likely to selfdescribe as "American." Foreign born students, non-U.S. citizens, or those with a preference for parental language were much more likely to associate with a national-origin identity such as Lao, or Filipino (p.789). Hyphenated identities, such as Mexican-American or Cuban-American, represented a middle position between the country of origin and that of an American national. Social economic status was shown to have a strong correlation with self-identification. The higher the social and economic capital of the parents in the homeland, the more likely the student was likely to self-identify with the country of origin. Conversely, students who felt embarrassed or ashamed of their parents were much more likely to identify as American. Experience with discrimination was found to be an indicator of chosen self-identification. Those who were discriminated against are less likely to identify as American, and more likely to identify with a home country. If self-identification is a vocalization of perceptions of belonging, it seems reasonable that those who feel rejected would in turn reject identification with the oppressive country.

Rumbaut's findings correspond with the observations of Lee (1994) in her seminal study examining the processes and associations surrounding the self-identification of Asian American students in a large Philadelphia high school. In the 1988-89 school year, Lee conducted a large ethnographic study on an Asian American student population comprised of immigrants from Cambodia, China, Hong Kong, Korea, Laos, Taiwan, and Vietnam. Lee quickly discovered that students had varying ways of self-identifying, either as Korean, Asian, Asian new wave, or Asian American. Korean students viewed themselves as superior to other students of Asian-descent. The marker, "Korean" served as a delineator between themselves and those they considered lesser. The Korean students considered themselves middle class and had higher economic and social capital than the other students of Asian-descent. Similar to the observation of Rumbaut (1994), the chosen moniker may reflect an assumed "higher status" due to the economic prosperity of their parents. Korean students viewed education as vital to future success.

The Asian-identified students were comprised of American-born Chinese, immigrants from Hong Kong and Taiwan, and Southeast Asian refugees from a variety of ethnicities and socio-economic backgrounds. Many of the students, as first generation immigrants, expressed dismay at the conflicts between home identity, considered "real", and what was expected of them by their American peers and teachers. They identified as "Asian" in mixed race groups, but identified by their particular ethnicity when in all Asian groups. The Asian-identified students found unity through the belief that all Asians shared common experiences in America. They were found by Lee to be generally unaware or accepting of discrimination in school. They generally had a positive attitude toward education and their future prospects.

The Asian new wavers identified as such for the music genre. Identified by clothing choices and hair styles, they were said to "like to party" (p. 422). Their group was made up of

Southeast Asian refugees from poor and working-class families. Unlike the Korean and Asian identified students, Asian new wavers did not view school as necessary for success. They actively fought the stereotype that Asians were "good students and nerds", as these labels were viewed as barriers for social acceptances among non-Asians (p. 422). New wavers viewed themselves as "more American" than other students of Asian-descent, and actively fought stereotypes through performances of their identities. Lee noted that identification with the new waver group was likely due to negative experiences with adult authority figures in the United States. Discrimination from hostile mall security guards was cited as an example. The Asian new wavers adopted a resistant identity to school that was reflected in their ambivalence to the education's purpose. Lee believed this was an attempt to be seen as "cool" in order to ingratiate themselves with the high status white students.

The last identification group in the study was "Asian American." These students were diverse in ethnicity, social-economic status as well as in the number of years living in the United States (4-12 years). The students who identified as Asian American were academically motivated by the desire to fight racism. One student, "Xuan" explained her choice of identification as a way of establishing herself in the United States:

I have experiences that are similar to other Asians that live in America: that my culture is not all Asian and it's not all American. It's something entirely different. And it's not like some people say, that it's a mixture. It's like a whole different thing. When I say I'm Asian American, I feel like I establish a root for myself here (p. 427).

Xuan's identity was drawn from her location in the interstice. She was neither American nor Asian, but both. Her culture is not described as a hybrid, but rather as a new experience. Xuan is Asian American because it describes her unique state of identity, and envelops all the tensions

and negotiations as implicit. By her choice of label, Xuan demands a place for herself in the United States, she is not a visitor, but rather she belongs.

It is important to note that strong ethnic identification does not predict academic success. Nor does the choice of self-identification determine a student's possible level of self-esteem or future. As Wang and Zamboanga (2007) noted in their study of Mexican-origin college students, strong correlations between ethnic identity and high self-esteem exist regardless of student preferred label. In essence, it matters not what term students call themselves but whether they feel a sense of belonging to that community

Identifications with other communities of color. As implied by Ogbu, majority cultural norms and behaviors are associated with academic success. To minority communities of the diaspora, this translates as adopting "white" culture in the school system as a tool for academic success. In the reviewed studies, a constant message was expressed to the students by the attitudes and statements by their families, the student bodies, and teachers: stick to your own culture or "be white" (Lee, 2004). Association and identification with other communities of color was heavily discouraged. Asher (2008) considers this a result of divide and rule politics, a desire by diaspora communities to be seen as "good ethnics in contrast to other communities of color" (p. 16). In an attempt to place one community in favorable standing at the detriment of others, this method of performing one's "good ethnic" identity is often observed in the United States secondary schools.

The Korean students of Lee (1994) were instructed by their parents to avoid socializing with other Asian students as they were said to be bad influences and "poor and unsophisticated." Korean-identified students considered themselves superior to the other Asians, who they referred to as "welfare sponges" (p. 416) and rarely socialized with them. Lee attributed their attitude as a

means of ingratiating themselves to the "American," considered synonymous with "white," students. Lee was informed by the Korean-identified students that their parents instructed them to emulate the middle-class white students at school as a tool for academic and social success. The students were to demonstrate "American" values at school, but to be Korean at home and in the community. To associate with the other Asian-identified students would hinder their academic and social success. Ngo (2008) recorded similar attitudes among her observed students. One Lao student remarked that her friendships with Hmong students caused her Lao identity to be questioned, "I think my friends are getting mad at me 'cause I'm hanging out with too many Hmong people…. I think that they think I'm becoming one of them" (p. 8). Her identity as Lao was called into question by the policing efforts of her friends. Her parents worried that she would "turn out bad" and "forget her race" (p. 8). Hmong were thus identified as "bad ethnic[s]," an identity to be avoided.

The idea of superiority and "bad" is not unique between ethnicities, it is also found within. Matute-Bianchi (1986) observed in her study of students of Mexican descent that many students viewed those identified as "Chicano" and "Cholo" as those who had "lost their culture" (p. 239). Although many of the students at the studied school identified as Chicano, other students found it an offensive label rather than an identity. This was a label to be avoided as it had connotations of low academic achievement and resistant behavior. The students expressed the need to not be viewed as Chicano or Cholo for it would damage the possibility of doing well in school. To identify or associate with Chicanos or Cholos was to risk censor of school officials and teachers.

There exists a dichotomy between immigrant perceptions of majority culture and involuntary minorities. Majority cultural norms are desired as tools for academic success

whereas involuntary minority culture is seen as detrimental and a threat to the ethnic identity of students. African American culture is particularly demonized by the communities of the studies' students.

In one study, Indian American students were criticized if they attempted to even dress similar to African Americans. Baggy pants were an especially contentious issue, one student's parents warned her that her "grades are gonna match theirs and go down" (Asher, 2008, p. 16). Clothing was seen as a performance of identity, and baggy pants wearers were seen as low academic achievers. In another reported instance, a young Indian immigrant student who liked hip-hop American culture was ridiculed by his Asian friends for "pretending to be Black" (McGinnis et al., 2007, p. 292) . Ngo (2009) observed that Lao male students often incorporated hip-hop style into their identities as a performance of urban masculinity. At odds with the stereotype of Asian American males as effeminate, their choice of dress unsettled both teachers and other students. Ngo finds this particularly interesting as all the students at the large public urban high school were expected to conform to norms of urban dress, to not wear baggy pants was to risk abuse or to have one's sexuality questioned. Yet, Lao male students who dressed urban were met with surprise in the school. The assumed identification with another group was seen as threatening to the performance of "being Asian."

Despite the desires of diaspora communities, students do identify with other groups and cultures. Location and proximity are proposed by Ogbu as the main reason voluntary minorities chose alternate identities. As immigrant communities generally lack economic capital, they tend to settle in low rent areas in close proximity to marginalized involuntary minorities in inner city areas. Students in inner city schools are said to be more likely to adopt panethnic or racial self-identities, such as Chicano or Black, especially if other students define themselves in those terms

(Rumbaut, 2001). As noted by Ngo (2009), it is often to the social advantage of students to conform to cultural norms of the school, whether it is with an involuntary minority or not.

Academic Purpose and Identification

Ogbu bases the differences of achievement levels between voluntary and involuntary minorities on perceptions of education. Voluntary minorities do well in school because they perceive education as a step to social mobility; whereas, those with a resistant identity may view schooling as destructive to their identity. A purpose for one's education is often cited as a strong motivation for academic achievement. There are three main incentives proposed by the studies as determiners of levels of student engagement, persistence, and determination in school. The first is a desire for a better future, whether economically or socially. The second is an awareness of the past. The homeland defines and influences perspectives of the hostland. The third is the amount of trust in the education system and its perceived benefits, or lack thereof. This factor that predominately influences diaspora student experiences is often the school system itself. School culture plays a large role in the ways in which immigrant students form academic identities.

Future prospects. To the majority of the students, education is viewed as a necessary component of a successful future (Lee, 1994; Lee, 2008; Matute-Bianchi, 1986; Mosselson, 2006; Suarez-Orozco, 1987). Success is often defined as a lucrative career or as "having a nice car, a nice house, a nice job" (Matute-Bianchi, 1986, p.242). Aspirations toward college are constant motivators, even when the process and funding of college was often not well known (Oikonomidoy, 2009). Matute-Bianchi (1986) noted in her study of students of Mexican-descent that the most successful students believed in the "American Dream," "It doesn't matter if you are poor because we all have an equal chance to succeed as anybody else. Anybody can succeed if

they want to, even Mexicans!" (p. 244). The "American Dream" is thus tied into immigrant expectations of possibility and social mobility.

Motivation for academic achievement is hardly limited to aspirations for a more stable economic future. Many diaspora students articulated futures that would benefit their envisioned community, rather than their immediate selves. The Asian American students of Lee (2008) desired higher education as a powerful tool to combat racism. The Yemen American student of Sarroub (2001) desired to break gender expectations by attending college, thus serving as a good role model for other Arab American girls. Suarez-Orozco (1987) observed that students' imagined future professions were born from the desire to help others in their communities. Empowerment is framed as a motivator for hard work and economic success.

Oikonomidoy (2009) interviewed seven female Somali refugee students at a large intercity high school. She noted that student attitudes toward school were dependent upon future aspirations as well as influences from past experiences. The students all desired a career in the social services, including medical and teaching professions. The overarching motivation was to help people, especially women, in Africa. The students valued education as a means to return to their homeland. One adolescent articulated, "I can get education and then I can educate them. If I go back, I can help some of them, you know... What you learn here you can teach it there" (p. 33). Each student's response was marked by a desire to help their community, their "own people," demonstrating strong ethnic identification and duty to their country of origin. The past dictated ways in which students defined themselves in the present as well as helped to determine the path of their futures.

Influences of the past. Diaspora students are marked by a continuing connection to their homeland, to their past. Student perspectives toward schooling are developed in comparison

with country of origin. For those escaping extreme poverty or unrest, the United States education system was viewed as full of possibilities, and vital for future job opportunities. For Central American diaspora students, the comparison to the education system of home country, and parents' experiences within it, served as a strong motivator (Suarez-Orozco, 1987). Parental pressures and perceived sacrifices were also a particular motivator for academic success (Lee, 1994; Matute-Bianchi, 1986; Suarez-Orozco, 1987). For Central American immigrant students, education was seen as a path that could enable students to "rescue' family members still in Central America (Suarez-Orozco, 1987). Guilt often played a major role in student ideas toward schooling. Suarez-Orozco (1987) observed that many Central American students articulated a form of "survivor guilt," a feeling of indebtedness to family members left behind was apparent. The family left in the homeland was imagined by the students to have sacrificed themselves in order for the student to emigrate. To succeed in school was to validate these sacrifices made by family and community left behind

The past often defines immigrant students' present and future. Mosselson (2006) proposed, in her study of female Bosnian refugee adolescents, that high academic achievement masked depression and adjustment difficulties. She proposed that education provided a sense of control over transience, and a place where refugees may "transform themselves from the 'foreigner' to the 'A student'" (p. 26). Each of the students expressed a positive attitude toward the benefits of education. It was viewed as necessary for future success as well as achieving permanence, "education goes with you wherever you go. It's possible nothing else does" (p. 26). The refugee students had a strong academic purpose, not only because it provided a sense of control, but a sense of permanence impermeable to change.

As discussed, academic purpose plays a strong role in the determination of students to succeed by serving as a motivator to work hard. This, however, was not the final determining factor on academic achievement as many low achieving students shared these purposes. As Lee notes (1994), "the experiences of the low achievers suggests that positive attitudes and hard work do not necessarily guarantee school success" (p.418). Other factors have negative impacts on student achievement. Unfortunately, very often these negative influences are avoidable and predicated by an unsupportive school culture.

School culture. The public school system is perhaps the most important institution for socializing immigrant youth to American society and culture. It is a site where attitudes and practices are normalized into a perceived American state of being. In United States schools, diaspora students may find a sense of belonging or social marginalization and alienation. They may encounter both negative and "positive" stereotyping and discrimination, or learn to identify and fight racism. School culture is reflected in the ways teachers treat students and the level of presence and voice that students feel they have in a class. A supportive school culture reflects student identities and histories as well as supporting the goals and dreams of all students. Regrettably, many diaspora students do not feel supported in their schools. They are generally relegated to the margins, stereotyped, or exoticized. Rather than supported and welcomed into academic culture, they are left to "figure it out" themselves (Mosselson, 2006). The school culture, and resulting effects on the academic identities of diaspora students, may be further investigated through the lens of representation in the school as well as teacher expectations and interactions.

Curriculum representations of diaspora cultures have been observed as limited at best.

Asher (2008) observed that, at one of the schools studied, no Asian studies were offered and, at the other school, Asian American literature courses and World History were represented by China and Japan. The representations of all Asian cultures as/or by Chinese or Japanese was also observed by Ngo (2008). Despite the absence of any Chinese or Japanese descent students in the school, and the large numbers of Southeast Asian immigrants, the curriculum privileged East Asian culture as the only Asian discourse worthy of teaching . The school unconsciously denied the representation of the culture and history of the student body, thus losing possible sites of inclusion.

Ngo (2008) reported a general absence of representation in the school of South Asian culture, even in the use of specific identifying terms. Demographically, the urban public school was 43% African American, 38% Asian American, and 16% White. Of the Asian Americans, the majority were Hmong, an Asian ethnic group typically identified with Vietnam and Laos. Yet Ngo found that students and staff generally referred to all Asian students as Chinese, despite the fact that no Chinese students were enrolled at the school. The teachers interviewed defended other students' (and teachers') misidentifications as natural and understandable. (Who said this?) "Okay, students who are Hmong obviously know that the Lao kids are Lao. And other Asian kids know. But I think that as far as, if you look at the African kids, they have no idea. No idea who's Hmong and who's Lao and who's Chinese" (p. 8). A student's identity was viewed differently according to whose? point of view, "a Lao student may consider herself Asian American, her parents may consider her Lao, and non-Lao students may consider her as Chinese or Asian." Personal identity negotiations are not necessarily recognized by others, compounding the inherent tensions. The school culture actively denied the right of students to define themselves, as well as dismissing the complexities of ethnicities. For Ngo's subjects, identity was negotiated

both within one's own self as well as among one's peers, family, and community. An identity in the school system negotiates not only the ways an individual sees oneself, but also incorporates the ways the individual is seen through the eyes of others. Identity is thus proposed as neither this nor that, rather existing in the interstices and tensions between.

Matute-Bianchi (1986) noted that teachers also viewed Mexican-descent students in stereotypical ways. The "more Mexican" students were viewed as "polite and respectful, more serious about school, more eager to please, more motivated, and much less sophisticated in ways to undermine school rules and practices" (p. 241) than their "more American" Mexican-descent peers. Matute-Bianchi also noted that the teacher attitudes toward the Mexican-descent student population had changed over the years from, "a distinctly negative one to one that is more positive or at least ambivalent" (p. 241). Previously, immigrant students from Central America were often observed to be discriminated against (Suarez-Orozco, 1987) as demonstrated by placement in lower-level classes, some of which had already been completed in their home countries. The students, through their marginalized status, were on the periphery and ignored by the school system. In contrast, the Asian new wave students of Lee (1994) viewed their teachers as being insensitive. They termed such teachers as "anti-Asian", whereas the teachers viewed them as Asians "who had gone wrong" (p. 425). The Asian new wave students retaliated to their marginalization in the school by adopting an oppositional identity to school culture. As teachers distinguished between subgroups, the performance of one's identity was viewed necessary to be successful or resistant.

The model minority stereotype. A subset of diaspora youth identity research is centered on the "model minority" stereotype and how it is assumed adapted or resisted by youth in American schools. The "model minority" myth is associated with Asian Americans. It refers to

the imagined universal qualities of hard work, intelligence, and success innate to all Asians. Asian Americans students, according to the stereotype, are successful because they work hard and come from cultures that value education (Lee, 1994). In the school system, it may take the form of a teacher expecting her Asian students to be more quiet and studious than students of other ethnicities as well as being naturally gifted at certain academics (Asher, 2008; Lee, 1994; Lee, 1998; Matute-Bianchi, 1986).

Nina Asher (2008) delved deeply into the application and possible reification of this stereotype by interviewing ten Asian American teenagers from Indian immigrant families attending high schools in New York City. Asher noted that some students had internalized the model minority stereotype. One female high school student explained, "we are smart people, we are Indians, and we should do well.... Because that is our persona" (p. 14). Lee (1994) observed similar statements with her Korean-identified students. An 11th grade female proposed. "We are smarter. I mean, I don't think it's a stereotype- Look at our report cards. We are better and we have to show it" (p. 417). If not attempting to embody the model minority, Asher's (2008) students encountered the stereotype in attitudes at their schools. One student stated that everyone expected that he wanted to be a doctor. Another student stated that most Indian American students were quiet and smart. The stereotyped students, although expressing dismay with being expected to fit within the confines of the stereotypes, often applied the model minority label to other Asian Americans. One student observed that "most of the Indian students in this school are quiet, and, most of them are very smart kids" (p. 17). The student, outgoing and gregarious, did not see herself as meeting the stereotype of an Indian American and, accordingly, identified as solely "American." She, nonetheless, affirms the validity of the stereotype by identifying the majority of Indian immigrant students as "smart" and "quiet". Other students (Asher, 2008, Lee,

1994) criticized the stereotype without embodying it or applying it to others. One female student, named "Mei Mei," spoke movingly of her struggle to resist, "they [whites] expect you to be this and that, and when you're not- [*shakes her head*]. And sometimes you tend to be what they expect you to be, and you just lose your identity- just lose being yourself..." (Lee, 1994, p. 419). Conforming to the stereotype is thus identified by the student as dangerous, as a threat to herself.

On the opposite end, Lee (1994) related a conversation with "Ming," a Cambodian refugee whose candidness with his tragic personal history contrasted with his secrecy around his academic struggles. To Lee, Ming's refusal to seek academic support, via tutoring or afterschool programs, was indicative of his desire to be the model minority. He believed that Asians should do well in school, and since he was a low achiever, he must therefore be a bad Asian. To admit difficulty in school would be embarrassing and shame his family. As a result, Ming's continuing low achievement left him alienated and depressed. Teacher expectations of the model minority stereotype may marginalize students and further alienate them from seeking academic help. Expectations found within school culture to conform may result in social and academic alienation, or the adoption and adherence to a false stereotypical identity. School culture can thus deny the agency of the student to self-determine his or her own identity as well as negatively impacting personal and academic growth.

Ideas of Citizenship

Citizenship involves being a citizen, one that participates in the social contract constructed by the society where one lives. Although it implies legal status, citizenship may also involve a sense of belonging in a nation, an idea that one has a place in that nation and in that society. Diaspora youth maintain ties to an imagined homeland, but ideas of citizenship are rarely as binary as belonging to one nation or another. It is not a matter of here or there, but

embracing both. Often referred to as "transnational citizenship," explanations of citizenship may include traditional definitions, as well as a sense belonging to multinational communities, loyalty to the country of origin, and a recognition of multiple spaces and types of global belonging. One of the most demonstrative aspects of active citizenship is civic engagement. This includes the actions that one takes to identify or address areas of public concern. It may be demonstrated through a variety of behaviors including voting, participation in social organizations, and joining online communities. Little has been studied on civic engagement from diaspora youth, perhaps because many of the youth are not considered "citizens" due to legal requirements and ingrained ideas concerning who may be considered such. Articles that do investigate immigrant youth civic engagement are generally relegated to how education can enable students to form deeper connections to the United States (Knight, 2011). Nevertheless, diaspora youth represent parts of our society and are often engaged in addressing social concerns. As diaspora youth are defined by lasting connections to an imagined homeland while living in another, a deeper investigation and understanding of their own ideas of citizenship is warranted.

Particularly insightful into notions of citizenship negotiation are Michelle Knight's (2011) conversations with Kwame, a naturalized citizen, whom moved to America from Ghana when he was 10 years old. Kwame viewed himself as a citizen of both countries, a relationship he did not find mutually exclusive. Kwame explained his connections to both nations in a parable of parenting, love equally shared equally between the two to shape his identity. By focusing on direct transcriptions from Kwame, one gains a sense of the complex negotiations concerning citizenship undertaken by diaspora youth.

Kwame's ideas of citizenship are heavily defined by participation in society and the nation. The preamble of the United States Constitution served as his inspiration:
...And I think you could be a citizen or not a citizen, as long as you live within the borders... of the United States, you are part of 'We the people.' Maybe you can't vote, but you can engage some way to make sure that dream of 'We the people,' 'to perfect this union,' because obviously there must be something about America that brought you here for good or bad. And when you're here, you've got to contribute to making sure that you perfect that union, because nobody's really from America essentially. (Knight, 2011, p.

1276)

His understanding of citizenship relied on location. He understood that one may not be a legal citizen of the country, but one still belongs -- as immigrants founded the political nation. Every person who lives within the borders has an obligation to participate in strengthening the nation. Civic engagement is viewed as a vital part of citizenship.

Kwame considered the internet and online communities a valuable resource to remain engaged with communities on both sides of the Atlantic. The internet allowed him to stay updated on world happenings and to participate in discussions concerning the 2008 presidential elections. He considered Barack Obama's election to be a boost to hopes of minorities across the world, a message he helped spread through discussing the election and the United Sates government system with friends across the globe. Kwame considered himself to be part of the global community; his identity was not confined to national borders. His ideas related to citizenship allowed him a sense of belonging in the United States, Ghana, and the world. Kwame negotiated his multiple identities through a more encompassing definition of "citizenship," one that is predicated heavily on civic engagement.

The potential space of the internet for the identity work of diaspora youth discovered that online sites provide youth an arena for explorations, negotiations, and performances of their

identities (McGinnis et al., 2007). The study focused on three disparate immigrant teens in high school who blogged and used *MySpace*, a social networking site. One was a 15-year-old female, "Julia." who identified strongly as Columbian. In this study, blogs and MySpace are proposed as sites of symbolic identity work, where the researcher may create, write, voice opinions, and explore their identities (p. 288). The online sites allowed the students to maintain close ties with communities in both their host country and homeland through online communication and the performance of ethnic and national identification. The Columbian immigrant Julia's MySpace page was particularly telling. It was decorated with Columbian flags and phrases expressing her pride in her Columbian heritage and identity. Despite Julia's proclamation of being a proud "Colombianita," she still actively participated in the issues related to the United States, such as protests of a Congressional bill reflecting anti-immigrant sentiments. She demonstrated her civic involvement through posting support for "Day without an Immigrant," a national boycott to protest the bill. By doing so, Julia asserted her belonging in the United States, although admittedly, as a marginalized group. Her self-identification as Columbian did not exclude a sense of belonging in the United States. Her efforts to identify, disseminate, and address areas of public concern demonstrated her strong commitment to civic involvement, and the betterment of her adopted country. Online spaces also provided sites of discussion as well as places where racist or stereotypical policies and incidents might be discussed or decried (McGinnis, et al., 2007). Voicing opinions on political and social events of the United States is a form of civic engagement, and although online, cannot be denied as a site of asserting one's place in the politics and societies of their host nation. It serves as a space of demonstration where immigrant youth may display and perform their sense of belonging.

Lee (1994) noted that students in the study that identified as Asian American actively spoke of using education to fight racism. They intended to use tools given to them by an American education to better the country. This is an example of diaspora youth asserting their place in American society by identifying areas of public concern. Citizenship was seized by the Asian American students, as demonstrated by their choice of appellation. Legal status, however, was also viewed as a barrier to ideas of citizenship, conforming more along traditional political definitions of it. One student in Matute-Bianchi's (1986) study did not consider herself "Mexican-American" because, "a Mexican-American is a person born here who has certain privileges, like the vote" (p. 244). For this Mexican-identified student, she could not consider herself American, or even part American because she lacked civic privileges.

Like other areas of identification, the real and imagined past of the community influences ways in which diaspora students define themselves. Citizenship is no exception. Mosselson (2006) noted in her study on female adolescent Bosnian refugees in New York City that there were three main attitudes towards future citizenship, what she termed: multicultural, nostalgic, and nonchalant. These views were coupled with associated perspectives regarding their diaspora communities, described as ethnic enclaves that sought to create a "mini-country" in the United States (p. 23). Adolescents with "multicultural" viewpoints valued the possibility of living anywhere. They knew the country of their youth no longer existed and embraced ideas of transience, distancing themselves from groups that may create emotional ties. Nostalgic youth imagined the hostland as an education only; they intended to return to Bosnia. They did not seek to create ties to the larger diaspora, only those they knew from home and those who intended to return.

Nonchalant teens accepted diaspora friendships and appreciated general community support. They were characterized by accepting life in the United States, but still considered the possibility of returning to the homeland. Mosselson noted that each adolescent girl's construction of identity was based on identification with the homeland and the diaspora community as well as being heavily influenced by the trauma of war. For instance, the "multicultural" aligned students embraced transience as proof of their resilience and avoided ties to the Bosnian diaspora as it brought up painful memories. Identity was proposed as e a coping mechanism for trauma. Overall, the identification processes and ambivalence toward the permanent citizenship in the United States reflects a multiplicity of perspectives found in students of various diasporas.

Conclusion

The definite limits of this review must be mentioned. Using the reference "diaspora students" automatically convolutes certain boundaries delineated by academics. This paper has generally examined studies on first generation immigrants, termed as diaspora. Yet, in certain cases, this review includes experiences of what could be non-diaspora students. As the author of this humble paper is not the researcher, and is bound by the presented text, there are inherent gaps and holes in the collective understandings. Further, what is termed "American-born Chinese students" may refer to a number of immigrant definitions, first, second, or fifth generation students who may or may not retain real or imagined connections with what is considered to be a homeland. The term "immigrant" itself is contiguous, depending entirely upon the author's conceptualization. As a result, this paper sought to include studies that focused on groups that have a definite diaspora presence born from political asylum, refugee status, or mass migration.

The chosen studies represent a far range of experiences and perspectives that reflect the complexity of the immigrant experiences in the United States.

The United States has long conceived of the immigrant in certain definite perimeters that influence its culture in myriad of ways. Ideas of who immigrants are affects the interactions and teaching practices students experience. Teachers have an immense impact on the potential academic achievement of diaspora students while also serving as possible agents of welcoming or marginalization. Asher (2008) argues that the pre-service teachers often have little crosscultural experience and thus tend to essentialize the "other" and deny multiplicities of experiences. Ignorantly guided teaching practices may hinder student achievement for, "... when teachers rely on fixed, narrow concepts of identity and culture, they end up boxing students into preconceived categories." (p. 13). Oikonomidoy (2011) proposes that the education of the immigrant student has largely been neglected by all, including the field of teacher education. Bhatia (2001) contests that teachers often assume that immigrants, "aspire to be North Americans" (p. 75). Altogether, researchers tend to present a bleak picture of teachers. Yet it is one that can be countered through the embrace of Lukose's (2007) proposition that "the nationstate of the host country should not and does not define the horizon of migrant experiences, hopes and aspirations" (p. 410). Diaspora students are uniquely positioned in the crux of differing values, world views, and perspectives. Negotiating between the worlds of their past, present, and future, to confine any student in the captivity of our own limited perceptions is a grave injustice. The imagined community is no more; the nation is not the limit of our world. To support student identity processes is to recognize and embrace the creative, positive, imaginative, and constructive spaces of hybridity.

Identity is rarely fixed, and never absolute. It exists in multiple layers that constantly shift to accommodate and negotiate new experiences and contexts. Identities are determined not only by the individual, but by those around them. The way we see ourselves influences future interactions, modes of belonging, and, ultimately, personal achievement. Diaspora students are not immune to the identity process inherent to humanity, but are marked by a continuing connection to a homeland, either real or imagined. Identity negotiations within the interstice are unique to each individual, and cannot be generalized across any sort of grouping. Rather, the purpose of this study is to complicate notions of immigrant identity and to urge teachers to embrace each student as an individual, rather than a typology. It is beyond the scope of this paper to list the multiplicity of ways a teacher might support diaspora identities, but to support identity negotiations is imperative. All students should be reflected in their school communities, affirming their belonging. Schools should aim to understand the meanings implicit by chosen self-identification as it gives voice to the students and respects their choices. No student should ever be shackled to a stereotype or generalization. All persons should be allowed agency in deciding who they are and who they want to be.

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Impacts of Social and Emotional Learning: Supporting Student Academic Success

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Abstract

Social emotional learning (SEL) provides students with skills that support self-awareness and self-management. SEL programs have been shown to be effective in supporting student academic and life success. The role of schools is changing and the need for social-emotional standards in the classroom is imperative. This literature review examines how current researchers have implemented early intervention strategies to support student emotional and social development. Many factors play a role in the success of SEL programs. The themes of this literature review include: 1) the importance of SEL in the classroom; 2) trends in SEL programs, and; 3) early intervention strategies. Some studies examined the benefits of SEL programming in schools and pointed to the association of these programs with academic success. The studies also explained factors that help to support SEL programs.

Impacts of Social and Emotional Learning:

Supporting Student Academic Success

Many factors determine early academic success and school readiness in kindergarten students. Students arrive at school with varying levels of preparedness. The role of schools is changing and the need for them to address social-emotional standards in the classroom is becoming increasingly apparent. Teaching these skills will support student performance while helping students to interact successfully. The No Child Left Behind Act of 2002 was a landmark indicator toward increasing school accountability. In 2011, the Washington state legislature initiated a house bill stating that the basic public education should not only include academic skills, but also social emotional learning skills. The bill emphasizes appropriate learning standards, research-based curriculum, classroom-based assessments, and professional development for educators.

My personal interest in this topic began in my fall student teaching and grew from my years of experience teaching preschool. During my fall student teaching time, I observed that most of the emphasis at the beginning of kindergarten was placed on academic skill development. The school year started with a minimal introduction to the classroom expectations and school rules. For example, students were taught how to walk in a line and use the bathroom independently while little focus was placed on peer or adult relationships. It seemed that students were thrust into a world of academic expectation, but were not given the tools to be successful. Early on, I noticed that students seemed unable to handle basic peer conflicts or deal with emotions. I consistently intervened in these situations though I often felt that they were capable of handling most situations independently. I realized very quickly that many students had not attended preschool programs that modeled strategies nor had they been taught the basic skills,

such as conflict resolution and problem solving. This knowledge weighed heavily on me as a teacher and I searched for ways to help each student integrate successfully into the classroom learning community.

Through my research, I realized that without early SEL interventions students are more at risk for early school failure (Merrell, 2011). School failure for these students may have a long-term impact on their families and society. Providing interventions and preventative measures early in a student's academic career may take important steps toward closing the gap for students at risk.

For the purpose of this literature review social and emotional learning will be referred to as SEL. It will be defined as the process through which children acquire knowledge, attitudes, and skills associated with the core areas of social and emotional competency (Merrell, 2011). This includes self-awareness and self-management that support school and life success. These skills encourage student abilities to recognize strengths, needs, emotions, and personal values. Students then develop skills in self-efficacy, which leads to impulse control and stress management. SEL also supports the ability to be socially aware and to develop interpersonal skills to establish and maintain positive relationships. Skills that help students to develop interpersonal skills can be further defined as perspective taking, respect for others, cooperative work, and conflict management. Another important impact of SEL is on student decision-making skills, and responsible behaviors in academic and community contexts. This will support students in their ability to reflectively problem solve and assume social and ethical responsibility.

Social and emotional learning programs are defined as the classroom instruction and school-wide activities and initiatives that integrate learning into the school curriculum. These programs provide systematic instruction that supports the teaching of social and emotional skills.

Instruction is modeled, practiced, and applied so that students may apply learning as part of their daily behavior. SEL programs teach children these skills to prevent specific behaviors such as violence, bullying, and school failure while also promoting positive behaviors in class, school, and community activities. Safe and caring learning environments foster student participation, engagement, and connection to learning and school.

Often references to social emotional learning refer to the concept of the "whole child." A "whole child" classroom is characterized by students who enter school healthy and engage in healthy practices in an environment that is physically and emotionally safe. The integrated curriculum is designed to support the "whole child" by supporting of their abilities to handle transitions, manage their emotions, and develop meaningful relationships with others (Biggar & Pizzolongo, 2004). Students are actively engaged in learning and are connected to their school and broader community with support from qualified, caring adults. The environment is designed to challenge students academically and prepare them for success in a global environment.

Research on the topic of kindergarten readiness not only focused on academic preparedness of students, but also considered emotional and social competence required for future academic success. Inconsistencies in the research were often based on conflicting family beliefs related to school readiness. In contrast, kindergarten teachers often felt that although academic skills were important it was extremely beneficial for students to be emotionally and socially confident.

This literature review highlights the current research on best practices to specifically improve kindergarten student social emotional development. Through examining this research, I found that many of studies addressed the relevance and benefits of including SEL programs into

the school curriculum. The trends support my initial assumption that these programs do positively affect student development and overall achievement.

My research guided me toward focusing on the importance of starting the school year by providing students with tools derived from these programs. This foundational work would then prepare students for the academic rigors and expectations of school. Research points out that the predictors are unique to each student and contextual factors should be considered when trying to develop intervention strategies. These assessments determine emotional intelligence when they enter school. Assessment tools identify student competencies or strengths that they naturally possess and link them to intervention planning to help identify areas of strength to which to build (Merrell, 2011).

Building a child's confidence in interpersonal relationships not only support learning, but also provides them with the skills to respond to other students in a positive and meaningful manner. This may support the emotional and social competencies, skills, and characteristics that create a sense of personal accomplishment; contribute to satisfying relationships with family members, peers, and adults; enhance one's ability to deal with adversity and stress; and promote ones' personal and academic development (Merrell, 2011). Students who have a strong sense of community in the classroom will be more likely to like school, trust and respect their teachers, and enjoy challenging learning activities.

Many studies address the correlation between SEL programs in schools and students academic success. Trying to understand this correlation led me to pose this question: what factors and programs support social emotional learning to improve early academic success? This literature review explores how current researchers implement early intervention strategies to support student emotional and social development in school. The research examines key factors

that influence the successful implementation of these programs. The themes that I develop from my research include the importance of SEL in the classroom, SEL links to preschool attendance, and SEL programs. Much of the research that I found supports my theory that SEL programs are important to future academic success.

The first section examines studies that make a connection between SEL and academic success. A limitation in these studies is the full examination of how contextual factors affect SEL program effectiveness. The second section focuses on research that is looking at the correlation between preschool attendance and SEL competencies in kindergarten. I included these articles to support my concept that early intervention and preschool attendance provides students with the social emotional skills needed to be prepared to enter school. The third section identifies some examples of different models for the implementation of SEL. I examined two studies that looked at the effectiveness of SEL program models in schools. I chose the "Strong Start" study because it specifically focused on kindergarten.

Literature Review

The topic of emotional social development has been explored by psychologists, teachers, administrators, guidance counselors, parent educators and mental health practitioners. Many of the studies examined the benefits of SEL programming in schools and pointed to the strong correlation that these programs have on student academic success. Though the studies supported SEL programming in schools, they also highlighted the inherent implementation difficulties. The studies introduced in this literature review examined a few of these different SEL intervention programs in schools and their implications on student academic success.

Another important aspect of the research that I will discuss is children's attendance at preschool and the contributing contextual factors that might have an influence on a child's

emotional social wellbeing. In my in-depth exploration of this correlation, I will introduce articles that support the theory that early SEL intervention in preschool will provide children with necessary kindergarten readiness skills. The studies showed a direct link between home and school, though early intervention strategies were still encouraged.

Factors of Social and Emotional Learning

Schools have a mission to increase academic success and prepare students to become citizens of the world. Elias et al. (2000) reviewed current literature on SEL programs in order to demonstrate how SEL can support this mission, but often encounters roadblocks. Elias et al. (2000) pointed out that through such programming students would learn to recognize and manage emotions, care about others, make good decisions, behave ethically and responsibly, develop positive relationships, and avoid negative behaviors. For example by including SEL programs into the curriculum, schools will be better able to prepare their students for future success. Elias et al. (2000) emphasized that research recognized the correlation between SEL programs and school success, but the programs that foster this in children are often fragmented. Schools are social environments and learning is a social process. Students benefit from interactions and collaborations with their peers and teachers. They also benefit from continued support of their families and community. Elias et al. (2000) suggested that all of these connections are important to facilitate the academic process and SEL development.

Elias et al. (2000) analyzed some of the direct implications and challenges of SEL programming. An example of this challenge is when an SEL program is implemented, but not supported with theoretical or empirically based evidence. There are diverse ways of approaching this problem. Elias et al. (2000) examined how parents and teachers can work together to support these programs. Concerns were raised about the importance of SEL programs, and about how the

real energy in the classroom should be spent on teaching traditional academic subjects. The research presents the idea that a higher number of students are coming to school with significantly more social and behavioral problems. Elias et al. (2000) suggested that this is caused by difficult home situations, exposure to daily negative influences, such as pervasive media presentations, and reports of violence. A contrast is that there is ample evidence to support the relationship between SEL and several of our national goals and standards. Elias et al. (2000) argued that it is critical that these programs be implemented to avoid student's disaffection, dropout, and other destructive behaviors.

The study by Linares et al. (2005) took a different approach and reviewed one universal prevention program offered in a public elementary school. The intervention program was called *The Unique Minds School Program* (UMSP) designed to promote cognitive social emotional skills. This study illustrated the strengths of using a multi-year study to examine the incremental benefits of interventions. The research method used was a quasi-experimental design to examine the effects compared to a comparable public school. Multiple observations were used in a Grade four classroom and the observations were gathered at three points during two consecutive academic years. The researchers chose Grade four students as the studies participants because they were naïve to the intervention at the time of the baseline assessment. The students were recruited and evaluated in the fall and the spring of the first evaluation year. The same procedure was repeated in the second year.

The studies participants were 119 students, 57 in intervention school and 62 in the comparison school. Eight percent of these students were classified as special education. The student's ages at the baseline assessment ranged from 8.9 to 11.0 years. The students chosen came from mostly working class families of a diverse multiethnic background who lived in

stable, low-risk neighborhoods in New York City. The sample consisted of 37% Caucasian, 19% Hispanic, 19% Asian American, 16% Arabic and 9% Other.

The participating schools were located within 20 blocks of each other and in the middle range of the district's academic standing. The participating intervention and comparison schools were alike in regard to the eligibility for free lunch, school suspensions, and reading test scores, though the comparison school did have a higher standardized math score. Students in the intervention school received the program as part of their general education. At the baseline UMSP was being offered in four grades, (K, 1, 4, 5) and was finishing its second year of implementation. The comparison school was only invited to participate in the assessment.

The intervention model UMSP used a manual based classroom curriculum. The expectation of the study was that students would participate in weekly thirty-minute lessons that were taught by their teacher. Grade specific lesson plans were provided, but the same themes for the units were used across all grades. The themes included uniqueness, problem solving, personal responsibility, feelings, character, and kindness. Two additional themes for self-management and mindful body connections were covered in grades 4-5. Each lesson was organized in sequence of background, motivate, teach, wrap-up, and assess understanding.

The procedure for this study used a random student sample of four to six in special education to eight to thirteen in general education per classroom were selected for the baseline assessment, resulting in a participation rate of 36 and 30% for intervention and comparison schools (Linares et al., 2005). Years one and two used a multi-method, multi-agent assessment evaluation. The assessments were based on classroom observations, questionnaires, semi-structured interviews, and school records. The study used trained observers blind to the intervention philosophy and methodology to collect classroom observations about the social

climate throughout the year. Data was also gathered from administered measures of student problem solving, collected teacher ratings about student behavior in the classroom, report card grades, and test scores from archival records.

The results of the study indicated that, when implemented in an urban public school, the UMSP would be a feasible and promising universal intervention program. Findings suggested that there were consistent gains in a broad range of student's cognitive social emotional competencies. Linares et al. (2005) noted a contrast between students who received the intervention and the ones who did not. Students who received the intervention reported a higher level of self-efficacy beliefs about learning and demonstrated higher pro-social problem solving skills to hypothetical classroom scenarios. Another example of the program's success was that teachers described these students as more attentive, socially emotionally competent, compliant, and non-disruptive. Intervention students also received higher grades on their math report cards in the second year of the program. The data showed that there was a steady increase in self-efficacy and problem solving across the two years and this suggested that the duration of a program increased its usefulness.

An article by Norris (2003) examined the concept of applying and integrating a successful SEL program. The article discussed how a school staff implemented SEL and how the approach moved the school closer to creating an inclusive school community. The 1992 study took place in a reconfigured K-5 building that was converted into a 4-5 intermediate school in response to a school desegregation mandate. The school's student population went from 42% minority to 56% between June and September. The student population was very diverse, but the study found that the largest diversity was in student behavior. The study relates the experiences

of the school staff as they used SEL strategies to change the climate and culture of their highly diverse school population (Norris, 2003).

Norris (2003) further examined a comprehensive approach to SEL for a synthesis of all classroom and school-wide programs. This helped the educators and students to make a concerted effort toward achieving the program goals (Norris, 2003). The emphasis of the programs was based upon the concept that effective schools and teachers have been aware of the benefits of SEL programs in schools. By recognizing that schools are social and emotional places and that humans are social and emotional beings, emphasized the importance of this effort. Norris (2003) suggested that effective classroom management plans support the classroom community and provided students with a safe environment to work. Building a sense of community in schools is an important part of the creative learning environment.

Preschool Implications for Social Emotional Development

Many researchers are interested in explaining the relationship between student's attendance to preschool and the success of SEL programs in kindergarten. The study by Burchinal et al. (2008) began by looking at aspects of student success in kindergarten, on whether or not a student attended a pre-school program. Burchinal et al. (2008) evaluated the importance of attendance to PK education programs and analyzed whether these gains were able to be maintained in the first year of kindergarten. The study examined 240 randomly selected pre-kindergarten programs in six states with mature programs that served large numbers of students. Specific aspects of classroom quality and over 700 students' academic achievement in both PK and kindergarten year were evaluated. Two observational measures of classroom quality were used, the *Early Childhood Environmental Rating Scales-Revised* and the *Classroom Assessment Scoring System*. During the fall and spring of the PK and K years, direct assessments

of the children's language, pre-literacy, and math skills were conducted and extensive classroom observations were made. Teachers also completed fall and spring questionnaires, including ratings of students' social and academic skills, parent teacher relationships, and teacher-child relationships.

Burchinal et al. (2008) confirmed teaching young children should be intentional, directed, and focused interaction in the context of a supportive, sensitive relationship. Student' academic gains were related to the extent to which positive interactions with the teacher and promotion of language use in the classroom. Burchinal et al. (2008) suggested that teachers provide scaffolding, coherent instruction, and informative feedback to students. The study provided a solid rationale of why it is important to develop a "whole child" centered classroom. Burchinal et al. (2008) considers the instructional quality of PK programs and teachers to be a predictor of long-term success student.

The implementations of early interventions were found to be an obstacle in the research. Findings indicated that programs to support parent education may be needed and this is not always realistic. Basic outreach programs would need to be created to support students at risk. The study highlighted the fact that, in most school situations, first contact with students and parents may not occur until the first day of school. The study suggested providing parents with educational expectations and supporting teachers with detailed histories of student development. A critique of this study is that it did not have a comparison group, so the data cannot be used to determine whether students actually gained from attending preschool programs.

Bagdi & Vacca (2005) pointed out that the early childhood years are significant in overall growth and development. The article highlighted the importance of educational practices that included the principles of promotion, prevention, and intervention (Bagdi & Vacca, 2005). Early

experiences are a template for learning and may provide a good indicator for how well students will do later in school. These experiences have an important impact on how children will manage their daily events in their environment. The primary focus of the research is to discuss the importance of attending to the social emotional well-being of very young children as a key strategy for making sure that all children begin school ready to learn. The research reviewed many different theories to explain young children's minds.

The research emphasized the correlation between what children learn at home and in their community is often carried with them as they enter school. The results found that for many children, there is a mismatch between acceptable and unacceptable behaviors in the home and school (Bagdi & Vacca, 2005). In some cases, families are successfully able to teach appropriate behavior, but due to other factors such as high activity or attention problems, these children will also need additional support systems when they enter school. Bagdi & Vacca (2005) recommended an integrated curriculum to evaluate how different contextual factors affect each child differently. Having an understanding of these factors will help to build the collaborative relationships between home and school; this will then support the child toward developing the behaviors that will support them in a variety of settings. Being aware of the relevance of positive adult relationships on children's emotional social development will serve as a fundamental aspect for understanding children's well-being. It is also essential that educators consider risk factors that might affect a child's emotional well-being.

In a study by Diamond et al. (2000), they examined similar factors in determining a child's readiness for school. The study allowed researchers to use national data that had recently become available to examine, in combination with a variety of other factors that are related to young children's early education experiences. The second National Household Education Survey

(NHES), conducted in 1993 by the National Center for Education Statistics (NCES; 1994), provided the data for this research. The 1993 survey included a focus on school readiness in families with at least one child, three to eight years of age. Families were asked about their preschool-age child's early education program experience, including home and community activities. Families were also asked to elaborate on their ideas regarding kindergarten readiness and information about their child's development.

For this study, researchers provided basic demographic and economic information for each of the families in the data set. Groupings of households nationwide were selected; households within each grouping were chosen using random-digit-dialing methods. The data for this study was collected with computer-assisted telephone interviewing procedures. The study presented a deliberate oversampling of African American and Hispanic families to estimate important characteristics of the non-Caucasian population. Diamond et al. (2000) identified families with four to six year old children who had not entered kindergarten. This yielded a nationally representative subsample of 2,509 households. The School Readiness interview consisted of 168 items that included questions related to parents' school readiness beliefs, their child's experience in early childhood programs, and the family's participation in home and community activities. Researchers also looked at the basic demographic information from the data collected. Parents were asked seven school readiness questions that focused on behavioral and pre-academic tasks. They were then asked to rate each belief on a five-point Likert-type scale from one (not important) to five (extremely important).

The Developmental Profile included 18 items that asked parents about their child's specific developmental abilities and their responses indicated whether their child performed each skill. Respondents were asked to indicate the frequency with which their child engaged in each

of nine specific activities at home during the previous week. Responses were coded into three categories, with scores in parentheses: none (0), 1-2 times (1), and 3 or more times (2); higher scores reflected higher levels of participation. Data on household income were collected by asking parents to estimate total household income for the previous year. Parent education was a variable that designated the highest level of education attained by one of the child's parents or nonparent guardians. Parents were asked whether they planned to send their child to kindergarten when the child was old enough or whether they would delay his or her entry. Race-ethnicity was also recorded.

The key findings of this study indicated that, overall, parents thought that a variety of academic and behavioral skills were important for children's success in kindergarten. There was a contrast between what teachers and parents emphasized were more important for school success. Teachers felt that emotional social skills were critical to initial school success, while parents felt that this was included in the general curriculum. A strong example of this is shown in the parent responses related to whether children were capable of performing a variety of important kindergarten readiness skills. Despite these results, large minorities of parents across all four racial groups stated that they were worried about their children's academic readiness. The research indicated that more than 10% of Caucasian/non-Hispanic parents and almost 25% of parents from other racial/ethnic groups were concerned about their kindergarten readiness. The data suggested that parents of Caucasian/non-Hispanic children were significantly less worried about their children's kindergarten readiness.

A critique of this article is that it over generalized the ethnic and cultural differences of its participants, since the results were also based on parents' level of education. The survey also might have inadvertently affected statistical data due to the fact that it had a limited number of

items tapping each readiness dimension. The survey had a strong social desirability component inherent in the interview questions that could have affected the surveys outcomes.

The study clearly presented the divide between what parents and teachers believe should be emphasized as important for children in their readiness to learn. Findings indicated different perspectives concerning what school readiness might be for parents based on their ethnic, cultural, and educational background. These factors also influenced parent decisions on whether or not their child was academically ready for school.

It is imperative for teacher to consider the contextual factors that might impact their student's emotional and social development when they enter school. Wright et al. (2000) examined the impact of contextual factors on a student's school readiness. The study consisted of eleven principals and thirty kindergarten teachers at the targeted schools. Eight principals (four male, four females) and 22 teachers (all females) with representation from all eleven schools agreed to be interviewed. The participation rate was 73% for principals and teachers. All entering kindergarten children were required to take the Pre-Kindergarten Assessment mandated by the Utah State Legislature. Scores from 885 kindergarten children who attended the 11 targeted low-income schools were included in this study.

This study targeted schools in three different zip code areas. The three targeted neighborhoods were characterized by many common factors: high rates of unemployment as well as a general lack of affordable housing. The increasing numbers of teenage mothers and few health care providers were noted along with large pockets of minority populations. The schools had high numbers of children receiving free and reduced lunches, low SAT scores, and high rates of mobility among students. Quantitative and qualitative data collection methods were used to gather data on the children, their abilities, and their needs. A quantitative approach was used to

analyze readiness skill levels of kindergarten children. These levels were based on developmental skills compiled from the Pre-Kindergarten Assessment given to all children in Utah prior to entering kindergarten. The Utah State Office of Education provided assessment results, grouped by school. A qualitative approach was used to gather information from educators about their expectations of the readiness skills necessary for school success. Personal interviews that lasted approximately 15–30 minutes were conducted with kindergarten teachers and principals at the eleven low-income Salt Lake City schools.

The findings indicate that, though teachers felt that students needed to be exposed to basics print concepts, they also felt that it was more important for students to have confidence in emotional social development. Researchers also found that children without these skills were atrisk for lower academic success later in school.

The implications around how to actually provide early intervention are somewhat limited. The study considered many different contextual factors and presented the concept that schools might have to initiate programs to help support parent education. The research suggests that basic outreach programs would support students at-risk. In most school situations, initial contact with students and parents was not a possibility until the first day of school.

This study was completed in inner city schools and provided an overview of what teachers and administrators determined were important in school readiness. The study could be used as a resource for determining other factors that might influence what teachers' value as important in kindergarten skill development. Since teachers often place value on skills that are not or are difficult to assess in normal standardized kindergarten assessments.

Elements of Successful Social and Emotional Learning Programs

Current research pointed out the challenges that schools are facing in the 21st-century in their ability to serve culturally diverse students with varied abilities and learning motivations. Multiple studies have been completed to gauge the effects of SEL programs in schools. Research has shown that these programs are effective in supporting students' emotional social development over time. Research by Durlack et al. (2011) considered the effects of multiple studies in a meta-analysis of 273 school based, universal SEL programs involving 270 kindergarten through high school students. This study was conducted to show the effects of SEL programs on students. The research supported evidence that including SEL programs into the standard curriculum helped to support academic success and overall engagement.

The *Collaborative for Academic, Social, and Emotional Learning (CASEL)* was formed to establish high-quality and evidence based SEL as an essential part of preschool through high school education. According to the *(CASEL,* 2003) these universal programs have focused on enhancing protective factors by teaching students an array of social-emotional competencies. They include problem-solving strategies, self-efficacious cognitions about learning, affect regulation, stress management, and ways to be a collaborative, caring member of the classroom. In recent years, *CASEL* found that these programs were enhanced by an emphasis on learning that takes place in the context of relationships. Similar negative risk factors were responsible for the poor ability to adapt to different outcomes. Social learning environments in classrooms reinforce students' level of involvement and positive participation. Students who feel connected emotionally to peers and teachers with positive values and learning expectations are more likely to develop achievement orientations for academic success.

Teaching Toward a Better World

Few studies have been done specifically in kindergarten classrooms that evaluate the feasibility of implementing a SEL programs. A study by Kramer, et al. (2009) delved into the logistical factors of one specific SEL program called *Strong Start*. The study examined the emotional and social competence effects of *Strong Start* on kindergarten students using a time-series design. The study involved four kindergarten teachers, 67 students, and 67 parents or caregivers. The setting for this study was a suburban Utah elementary school with a student population of 759: 80% Caucasian, 14% Hispanic, and 6% from other ethnic groups. The kindergarten teachers had previously agreed to use the Strong Start social and emotional curriculum. For this study, they used pre and post-assessments that focused on measurable aspects of social and emotional competence, specifically measured were internalized behaviors and peer-related social behaviors.

Implementation of the curriculum in a kindergarten classroom did show favorable results for the desired outcomes and provided students with a way to talk about issues using a common language. Students seemed better at making friends and dealing with conflict as it arose. Teachers also reported that the curriculum was easy to implement and indicated that they were interested in continuing to use these classroom strategies. Parents also indicated a positive response in their child's overall pro-social behavior. Kramer et al. (2009) stated that social behaviors depend on a child's ability to recognize and manage their own and others emotions. Emphasis was placed on prevention and early intervention strategies that supported internalizing behaviors in the classroom that might have potential negative effects on their learning.

The study did have limitations and the results should be interpreted carefully. One of these limitations is the fact that because teachers taught the *Strong Start* curriculum the outcomes may have been biased. More research is definitely needed to further understand the limitations of

teaching this type of curriculum. Possible a wider scale study and more diverse representation of students would create different outcomes.

Conclusion

Although SEL programs will not solve all of the problems that schools face today, there is a strong connection that exists between academic achievement and children's social emotional development. In my review I found an emphasis placed on the importance of SEL programming in the kindergarten classroom to support later school success. Because of this strong correlation, student's social emotional competence may be interwoven with academic achievement to support student success. The research encouraged schools to implement SEL programs and to assess these skills early in kindergarten. When assessments were completed, intervention strategies could be established to support student learning. The research suggests using multiple intervention strategies and introduced many different options for SEL programs. The findings also emphasized the importance of consistent programming throughout a student's academic career.

These findings will profoundly inform my pedagogical practices, because kindergarten is one of the most important times for students to develop the social emotional skills that they need for future academic success. Three main themes that arose supported my initial question. These are: the links of SEL and students' academic success, the benefits of students attending preschool programs that implement SEL programming, and SEL programs as core aspects of the school curriculum. By including SEL programs into my own curriculum, I will be able to support students academically and help them to gain problem solving skills as they progress through school. The studies supported my assumption that preschool does have an influence on school readiness. Understanding this connection will help to guide me in developing strategies and

interventions for individual students. This connection also supports my conclusion that preschool programs can be imperative for students who are already classified at at-risk.

The studies recommended many different strategies for supporting student's emotional and social development. One of the key recommendations was that SEL programs be implemented throughout the entire school. The research encouraged schools to implement a program that would support and help guide students in developing skills in SEL. Programs should be consistent across classrooms and integrated into the daily curriculum. Norris (2003) suggested that teachers use well-organized management plans to help establish a classroom community. Having a management plan in place may provide students with the feeling that they are situated in a positive learning environment. Options for effective management plans that support SEL include elements, such as class gatherings or morning meetings. The meetings may incorporate role play to brainstorm and illustrate possible solutions for classroom problems. By connecting SEL strategies to academic content, student are provided with opportunities for the repeated practice and reinforcement necessary to make these behaviors more generative in nature (Norris, 2003).

Specifically in kindergarten, SEL skills were encouraged to support student abilities to talk about their issues using a common language. When students were provided with appropriate language, they were able to make friends and handle conflict when it arose. Norris (2003) suggested that, to have an effective SEL program, students should be taught to use active listening strategies, I-messages, and other communication approaches. Norris (2003) stated that these skills would sustain classroom interactions that are clear, positive, and supportive. Students were more actively involved and participated with positive behaviors with this type of support.

Scaffolding social and emotional skills throughout the school year provided students with positive value and learning expectations that are closely related to academic success.

There is still so much more to be learned concerning how to implement successful SEL programs in schools. Of particular interest is the idea of looking at long-term SEL programs and identifying competencies that teachers may find valuable. I believe it would also be beneficial to examine how teacher preparation programs are supporting new teachers. Further examination should also be completed to determine how school administrations are currently supporting teachers and staff with the implementation of SEL programs. Another area that I would like to explore is the influence of multiculturalism in the classroom since the diversity is growing in public schools. This correlates with the concern about the growing achievement gap between genders, different socioeconomic status, racial, and ethnic groups. An important focus for further study would be to further examine how SEL factors into potentially helping to close this achievement gap.

Schools are increasingly willing to explore the development of SEL programs, but may continue to be worried about the empirical data that supports these programs. SEL programs are becoming part of the mainstream and data is showing a strong case for implementing these programs. And, as mentioned previously, present Washington state legislation supports the integration of SEL into the general curriculum. As an educator, I can see the value that these programs may have in the long-term not only on individual students but on the school community as a whole. Promotion of these programs may help to build a solid foundation for school climates that support positive and respectful environments. By providing students with these skills early in their academic careers, we will be giving them the tools to become active and responsible citizens in our society.

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Secondary Science and Nonmainstream Students: Science Teaching through De-centering Pedagogy and Practices

Justin Hinchcliffe

Abstract

Recent science education movements have made significant pedagogical and curricular changes in the mainstream science classroom's approach, yet there continues to be disparities in nonmainstream students' success and sustained interest in science. This literature review addresses the question: How can de-centering dominant science culture and practices in schools support science education for nonmainstream students? Reoccurring themes in the literature supporting nonmainstream science have been observed a) use of students' funds of knowledge b) supporting hybrid spaces and language in science classrooms c) and student-centered pedagogical and curricular practices that support student voice and agency. The reviewed literature has suggested that an intentional de-centering of the current science classroom is necessary for nonmainstream student science education success. The findings from this review suggest that teachers should create science classrooms that support connecting these practices and pedagogy to help support nonmainstream students' science education. Secondary Science and Nonmainstream Students:

Science Teaching through De-centering Pedagogy and Practices

Advancements in science teaching are needed if we, as a society, desire to promote an equitable and socially just educational system that supports all students. Data from the National Assessment of Educational Progress (NAEP) shows that science scores on a national average are reflective of a system that has consistently failed certain groups of students in comparison to others. In 2009 Hispanic, Black, Native American, low socio-economic status (SES), and students from parents with little educational history were underperforming in comparison to white and mid/high SES students. The non-white, low SES students in both grades 8 and 12 scored between 18% - 22% lower than their mainstream counterparts (U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress, 2009). The continuous nature of this achievement gap, over the last 30 years (Lee & Luykx, 2006), suggests that science education has not been equitable to all the students which it serves. One recognized issue in science education is how schools' access and assessments consistently align with mainstream students, while failing to meet needs of nonmainstream students. These disparities reflect a need for change in how secondary science approaches student learning, curriculum, and teaching methods.

Nonmainstream students have been defined as those who come from racial/ethnic, cultural, linguistic, and/or socioeconomic backgrounds which are not inherently supported within the "mainstream" or dominant culture (Lee & Luykx, 2006; Meyer & Crawford, 2011). Nonmainstream students are also identified as a group because of the unlikelihood they have encountered in home or social discourse; ways of talking, thinking, and interacting that are continuous with the skills and expectations of secondary science education. Having not
experienced these skills translates into disadvantages, by circumstance or design, which students from nonmainstream backgrounds are faced within the majority of science classrooms. Nonmainstream as a defining term embraces the many different peoples observed and recognized in this review, many of whom originate from very different social, cultural and historical backgrounds. Though the term does not help to identify individuals, these groups have been documented sharing common disparities, or "collective problems" (Ogbu & Simons, 1998). Nonmainstream is not defined by racial or ethnic differences alone. The history of parental education and the voluntary/involuntary nature of the student's culture play critical roles in how a student relates to the content and dialogue advocated in Western dominant science education (Ogbu & Simons, 1998).

Our mainstream society, economy, and educational system have demanded that the population understand scientific concepts, in particular the ability to engage in scientific reasoning and discourse (Lee & Luykx, 2006). Growing societal demands create a real generational problem for nonmainstream students, whose needs have not been addressed by the Western dominant/mainstream culture of science education for decades. The climb from early secondary science to careers in science, technology, and engineering has shown a progressive decline at each step in participation by nonmainstream students (Lewis, Menzies, Najera & Page, 2009). The lack of reflection of the nonmainstream citizenry in science is problematic and raises the question: Is science education reflective of the people it serves? These disparities in nonmainstream populations' representation in science, technology, engineering, and mathematics are a culmination of many factors. This review, however, will focus on the role secondary science education can play in helping to change these outcomes by applying research based concepts in secondary classroom education.

As a student teacher I witnessed nonmainstream students struggle with engaging and learning science. The students from nonmainstream backgrounds were often unsuccessful when curriculum, classroom practices, and teacher cultural perspectives did not recognize nonmainstream students' needs. The ineffectiveness of the science class was clearly observed after the use of mainstream science teaching techniques: teacher centered instruction, culturally irrelevant contexts, and projects lacking student voice. I often asked myself, how can I reach these students? What can I change to facilitate nonmainstream students in learning science? After asking these questions I changed my approach and the focus in the classroom discourse and curriculum. I de-emphasized my role and provided a context for student centered exploration. By incorporating cultural resources and students' scientific concepts, a more dynamic discourse and retention of content was observed in formative and summative assessments. These observations have greatly influenced my search for ways science teaching can change to help all students learn and question their worlds.

This review bases its inquiry of current literature on the question: How can de-centering dominant science culture and practices in schools support science education for nonmainstream students? De-centering in this context refers to the disempowering of the dominant norms and Western dominant science culture from the focal point of the science classroom. De-centering therefore brings new pedagogy or practices into view where room now exists. This question will be the guide to the review of the current literature that looks into teaching pedagogy and curricular practices that may help nonmainstream students' mobility between Western dominant science that students have from experiential funds. Additionally, the review will examine studies about critical science agency and student voice as evidence of effective practices. After reviewing the literature under these pretenses, three reoccurring topics emerged:

1) students' "funds of knowledge" is a source into scientific concepts and experiences; 2) changing the classroom dynamics and discourse: pedagogy, science curriculum, and learning activities can support nonmainstream students; and 3) the use of *spaces* where student and school discourses share value and connections promote valuable communication between the two. This review contrasts and compares these topics in hope to make connections and identify discrepancies within the current literature. This review aims to present effective approaches that meet the needs of nonmainstream students and may remedy problems currently in our science classrooms.

Literature Review

The Student: Science Brought to School

For the last 30 years there has been a movement to support students' conceptual understandings by creating support and connections to their home life. The idea of bringing in non-school based applications of science has shown promising implications for how nonmainstream students view science. There has been a push for teacher understandings to go beyond knowing the subject matter and curriculum, and to become professionals at identifying and integrating their students' lives from outside of the classroom. This concept has been shown to rely upon educators becoming fluent in the students' funds of knowledge (Moll, Amanti, Neff & Gonzalez, 1992; Velez Ibanez & Greenberg, 1992). *Funds of knowledge* have been defined by Moll et al. (1992) as "historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (p. 133). When working with students who have non-Western scientific identities it becomes necessary to identify and understand how they define science, especially how it is reflected in their sociocultural experiences.

Velez-Ibanez and Greenberg (1992) conducted a case study of Mexican-Americans to examine the concept of funds of knowledge. Their study based its inquiry from questions such as, how were funds of knowledge historically formed, how can they vary, how are they changed from one context to another, how does one learn them, how are they transmitted, and how are funds of knowledge socially transmitted? Velez-Ibanez and Greenberg looked at the history of the region, the effects it has had on the Mexican American residents, the creation of household clusters as support networks created by industrial and resource changes, and the funds of knowledge that are created and supported by communal and social structures. The case study observed the Serrano family and examined how the participants and structure of the family contributed funds of knowledge, stemming from various experiences in the family's history. Findings demonstrated the importance of dense exchange between family members had on the characteristics of the household funds. Many of these funds were rooted in activities and events that supported the information and skills used for subsistence. Skills such as mechanical, creative, historical, computational, and design mastery are expressed and contribute to the knowledge that members use in a broad range of contexts. Connections from the Serrano family's experiences helped the researchers define the cultural relationships between children and their learning contexts within their own and other family clusters. They pointed out the different ways children can experience learning and the zones of comfort that are formed from such experiences. These zones of comfort were created from the children having more than one domain to be successful, such as with relatives or other members of the community. Within these domains the children's self-esteem was not endangered, because errors were not dealt with punitively. This socio-cultural characteristic demonstrates how the transmission of funds of knowledge was typically in experimentally safe zones. Velez-Ibanez and Greenberg expressed

caution in the differences that might exist between schools and these zones of comfort found in the socially and culturally accepted learning pedagogy of the family dynamics.

Velez-Ibanez and Greenberg (1992) related their finding to how schools, teachers, and classrooms could incorporate funds of knowledge. However, the educational claims by Velez-Ibanez and Greenberg overstepped the limits of their study and further school based inquiry into funds of knowledge needed to be researched to support such claims. What Velez-Ibanez and Greenberg (1992) had found were cooperative learning systems had been developed over time and had specific relationships to important education factors within their lives. These social structures were seen by other researchers as possible artifacts and agency to draw on in the classroom.

The concept of using students' funds of knowledge in classroom learning was developed by Moll et al. (1992). Moll et al. looked directly at how educators may find and implement students' funds of knowledge in classrooms. The researchers questioned if by capitalizing on household and other types of community resources, can teachers organize and de-center classroom instruction in a way that exceeds the quality and rote-like instruction that children normally receive? Much like Velez-Ibanez and Greenberg (1992), this study examined sixth grade students in a border area of Tucson. This study used ethnographic observations, openended interviews, life histories, and case studies to learn the complexity of household functions within their socio-historical contexts. The study explored teacher-researcher collaborations in conducting household research and specifically how teachers can make use of the cultural information from family communications, in their classrooms.

Teacher and researchers together made house visits and conducted interviews to become more familiar with students' lives and the funds that were important to the student. Information

from the homes, families and students were gathered in ongoing visits from the research teams. Based on the information compiled, teachers created a learning module that embraced concepts that were important to the students. The learning module that was examined in the study was based on candy, a cultural resource that had been observed in the interviews. The teacher used a KWL chart to find what the students knew, what they wanted to know, and what they had learned when the module was done. As the students became a research team, the teacher guided the class as a mediator and helped them refine their questions and research. The teacher used a community member as an expert on the topic of candy to instruct a portion of the module. This incorporation of community was important in the studies use of resources and funds, showing expertise and knowledge from outside the classroom. The class module used curriculum in one week that covered math, science, health, consumer education, cross-cultural practices, and advertising.

The study's findings suggested that teachers' examination and intentional elicitation of ideas, from families and students, helped create educational connections that were strengthened by funds of knowledge. The bridges into the students' worlds seemed to enhance the instructional diversity and experiences of the instruction. Moll et al. (1992) findings, however, did not provide student data that supported what was learned during the module. Further examination into whether the module and its interdisciplinary use of funds of knowledge strengthened students' concepts could be more adequately approached.

The role of students' funds of knowledge has recently extended beyond Mexican American studies. Researchers are now examining how students' funds of knowledge can be used in nonmainstream students' science education. Basu and Calabrese Barton (2007) investigated the funds of knowledge of sixth graders attending an after school science program.

The researchers investigated the connections between the funds of knowledge that a student brings to science learning and the development of their sustained interest in science. The study was designed to understand the views that students held toward science, and how low income urban students' engagement in science was linked to their interest and experiences. Using an after school program, focused on invention and exploration, the researchers embedded themselves in the culture of the program and the students' activities. The researchers worked for two semesters with the students and collected data in three forms; reflection notes and participant observations; interviews; and student work. This data was transcribed and later coded to develop themes connecting the students' life histories and funds of knowledge with their scientific experiences.

The researchers observed three themes that cut across the student cases. First, they found a strong connection between the students' authentic opportunity to develop skills toward their future visions of themselves and sustained interests in science. An example was shown in a case where a student worked on scientific concepts in support of his ambitions to become a graphic novelist. The student's connection to science was supported by his desire to explain how physical interactions can be realistically represented in his art. The second theme recognized a connection with the science learning environment and the way it supported cultivating relationships that reflected community values with the sustained interest in science. A model of this was when a student's classroom environment resembled the household value of working together, from his mother. This particular student's interest peaked when he was able to help create conditions for this and other values from home to exist in his science endeavors. Third, in supporting sustained interest in science, it was important that students' purpose of learning science possessed a sense of usefulness. Agency and usefulness were emphatically connected to

whether or not students' funds of knowledge were activated, which had a significant impact on their science interest. Usefulness was defined by the students in many ways: applicable to everyday things students cared about; allowing students to have control over their lives; helped to justify activities not valued in the dominant academic sphere; and helped people solve personal and social problems. These themes showed a clear need for the representation of the students in the process of actively sustaining interest in science. Culture, community, and usefulness/agency are all concepts that reflect funds of knowledge actively expressed.

This study provided an example of funds of knowledge and de-centering techniques in a science learning community. The selection of the participants by the school, based on grade level reading and math scores, does not show how these techniques may work with students that are not defined as achieving students. What happens if students self-select to participate in science education, further de-centering the power while using funds of knowledge?

Seiler (2001) addressed the concept of student funds of knowledge in science by focusing on a similar question as Basu and Calabrese-Barton (2005), but broadened the participation to students whom enrolled themselves in the activities. Seiler was interested in how the lives of inner city African American males can be rich sources for science, and how student involvement in curriculum development could be used to reverse the power structure of school science. From these interests Seiler asked: how could a science community form that would allow science to emerge and respond to students' lives? The school's student population was comprised mainly of nonmainstream students, student population of 97% African American students, in which 87% came from low income families. Approximately 43% of the students were graduating in four years and only 9% of the students scored at or above the Basic level on the SAT-9 tests. These figures presented a reason to inquire into how science education played a role in the failure of the

nonmainstream students' academic success. Seiler extended a student invitation to a lunch group that would discuss science which was important to the participants. The science lunch group consisted of eight male students from the high school that accepted a general invitation given by the author. This group met at lunch and discussed topics from personal to scientific issues and concepts. Seiler (2001) used critical ethnography research methodology to specifically allow for "student experiences to challenge norms and practices in education" (p.1003). Seiler began her study by first eliciting what the students enjoyed outside of school asking the group: is there science in that? The students generated a list of questions that had scientific targets that dealt with an array of concepts: biology, chemistry, physics, and physiology. This list was a student driven mapping of funds of knowledge that the students were bringing in to the science lunchroom, such as barbershop work experiences, drum playing, and health issues. By making connections to the funds of knowledge students recognized the importance and validity of science in their everyday lives. Seiler recorded the groups' interactions and transcribed the conversations. The de-centralization of power structures, typically held by mainstream sources, was clear in how the students' scientific discourse was self evolved and student supported. The funds of knowledge that were accessed and applied to scientific inquiry lead to very inter and introspective insights to scientific phenomena. By using student funds of knowledge generated inquiry in science lunch groups, Seiler demonstrated how nonmainstream students' active and sustained participation in science can evolve.

Funds of knowledge expressed in school bring sociocultural meanings into the classroom, which can be very different for each individual student. The studies exposed critical roles that teachers play in de-centering their practices when intentionally integrating students' cultural and social identities into their science classrooms. Becoming cognitive of funds from students' lives

before curricular decision making was shown to help students in classroom participation and science inquiry application (Moll et al. 1992; Seiler 2001). Yet, after these funds are understood the types of pedagogy and curriculum applied in the classroom may also contribute to nonmainstream students' success in science.

The Classroom: Pedagogy and Practices

In a search to meet nonmainstream students' needs, researchers have examined decentering techniques that focus on classroom pedagogy and student relevant curriculum. The first, classroom pedagogy, looks into how teacher and students orchestrate learning in the science classroom. Recent research has investigated science classroom dynamics that promote student agency and power within the science classroom's discourse and decision making. The concept of *liberatory* pedagogy removes the teacher as the master of the science addressed in the classroom. Edwards (2011) presented an argument, which promoted the use of pedagogical devices taken from Freire and others, to meaningfully empower South African students in science. He suggested the incorporation of liberatory pedagogy and sociosicentific issues as a possible solution to engaging and empowering students from marginalized and disenfranchised backgrounds. Edwards and others have asked: how can the teacher support and facilitate such a dynamically different science curriculum?

A pair of researchers, Seiler and Gonsalves (2010), explored how liberatory science classrooms could be supported and facilitated by science teachers. They attempted to empower nonmainstream students in science using the Freirean based concept of liberatory pedagogy. The study was based on the question: what happens when teachers use a critical, student powered approach to science teaching in an inner city classroom? The researchers used liberatory pedagogy to study the effects of purposefully de-centering the classroom into a student-powered

learning community. Seiler and Gonsalves suggested removing the typical teacher-student power dichotomy present in Western dominant science classrooms, to create a scenario for student interest based science learning.

Seiler and Gosalves conducted their research in an African American high school located in West Philadelphia. The school had a poor history with attendance and a dropout rate at nearly 50%. Seiler and Gonsalves chose to research an elective science course so that the study would be student supported from the beginning. The research was conducted using a critical ethnographic approach as to provide a methodological framework that supports documenting and analyzing, as well as act upon the study. The researchers decided to use two student teachers in the one classroom in a co-teaching scenario. The premise of the class was that the students would shape the course curriculum and the direction was supposed to come from the students' interests, expressed at the beginning of the semester. Seiler and Gonsalves predicted that student agency would improve by being in a class that was democratic, dialogical, and participatory. The coteachers' words "We can learn whatever you want in science" (p. 90) advertised an environment that was ready to invite student discourse.

A critical ethnographic framework was used to document and analyze the study's findings. The teachers began by eliciting ideas from the students in an attempt to understand what students wanted to learn. Next, they created lessons and attempted to maintain a student directed class. This attempt by the teachers quickly found hard times as they were unable to appropriately or comfortably enact their roles as de-centralized facilitators. The study revealed only a few pedagogically embracive moments during the semester, amongst many that failed to meet the students' needs and expectations of the classroom. The co-teachers, during the majority of the semester, had a difficult time genuinely implementing the students' curriculum proposals

in classroom discourse and activities. They described their need to control curricular paths and feeling uncomfortable without having lessons planned in advance of each day. The discontinuousness of the class' direction with student requests created a culture of distrust that seemed to be exacerbated by the mainstream culture the teachers represented. The teachers and the class showed signs of success when they were seen as facilitators to the scientific investigations. In these lessons students' funds were recognized and their role in the classroom direction was present. Students' answers to open-ended questions exhibited an enhanced understanding in the content, which included a greater use of academic language and terminology. In student interviews it was clear where the frustration came from during segments of the semester. A student, Juwan, pointed out explicitly that the teachers had, for their own comfort, decided the science pathway in the class. This example comes back to the connection of how students' voice and funds of knowledge play important roles in nonmainstream student involvement. The results suggest a need for classroom transparency and integrity when implementing de-centering pedagogy in the classroom. The study suggested that teachers who use a liberatory system in their classroom establish a facilitator role. The researchers' use of student teachers may have lead to some of the inadequacies the students reported. Further studies using experienced educators may lead to more conclusive results of how liberatory pedagogy affects nonmainstream students' success in science.

De-centering of classroom power democratically has been examined by education researchers as a pedagogical tool to aid the development of all members of the classroom (Dewey, 1997). Basu and Calabrese-Barton (2010) investigated democratic pedagogy as a means to incorporate social justice in science teaching. Their multi-year research project investigated how democratic science pedagogy can take shape in science classrooms while also influencing

student engagement in science education. The study's questioned, how do students and teachers envision and operationalize democratic science pedagogy in their classrooms? The study took place in a School for Social Change in a northeastern city in the United States. The school was a grade 6-12 institution set in a largely Caribbean immigrant neighborhood of an urban center. This school was one of four that had been made out of what used to be a single campus, which had closed due to poor graduation rates. The School for Social Change created a specific mission to look at school as a democracy which empowers students to make social change while preparing for college.

The study used six teachers and twenty one students as the participants of the study. Participation included interviews, focus groups, collection of artifacts, and classroom observations. Interestingly, the study began with both the students and the teachers jointly participating in a professional development workshop that engaged the participants in comprehensive conversations about the literature on democratic pedagogy. The teachers and students used these examples, which allowed them to develop definitions of the concepts to be used in their classroom. Focus groups were created based on the interactions and discourse of the workshop. These groups allowed students and teachers to define a democratic science classroom in their own words, apart from each other, yet with both parties in mind. The groups came up with three recommendations they believed would enhance democratic practices in their classroom. The groups came back and met to share the ideas of democratic concepts. Each individual was also interviewed separately to voice their definition of democracy. All of these interviews and interactions were recorded and evaluated as the sources of data to determine how a democratically based science classroom model takes shape in the minds of its participants.

Teaching Toward a Better World

Results from the study found differing interpretations of what a democratically active science classroom would have to properly function for its participants. Students had described three common concepts in democratic science pedagogy: freedom and choice; community and caring; and leadership. The teachers, on the other hand, had main themes emerge that consisted of: organization and structure; criticality; rigorous content; and choice. Each group's discussion led to a clarification of all these major themes. Both the teachers and the students saw an importance in student developed curriculum as an important part of the pedagogical strategies. The two groups also suggested students and teachers should have a voice in how assessments were constructed. Students did not attempt to negotiate a removal of assessments; instead they focused on the best strategies to help them pay attention and study. Teachers also saw the democratic science pedagogy as associated with elevated student engagement and connected with learning. Differences in how community can be expressed were found during interviews and group transcripts. Students saw the community as needing to be caring, friendly and peaceful. Where, on the other hand, teachers saw the need for organization, structure, and systems.

This study did not show the democratic pedagogy in practice. What the study had provided, however, were examples of teachers' and students' concepts and needs in a democratic science classroom. They demonstrated and articulated enthusiasm for a science classroom that would be reframed in a democratic context, which focused on practices that would help science learning. The study suggests that bringing students' funds of knowledge and democratically supported voice into the science classroom may enhance motivation, desire to learn, and energy towards being engaged in science content if teacher and students better understand each others'

needs. Further studies are needed to see how this pedagogical framework could be implemented into curricular concepts and classroom interactions.

The second aspect of science classrooms that researchers have popularly examined is the use of different curricular strategies. One such strategy examined in nonmainstream student research is Project Based Science (PBS). PBS curriculum allows students to incorporate projects that align science standards with projects based on student interest. Kanter and Konstantopoulos (2010) asked the question: Can project based science (PBS) curriculum improve underrepresented students achievement, science attitude, and career plans? The students examined came from large Midwest urban schools. The study used nine grade 6-8 science teachers that had a total student population of 301, of which, 197, were from an ethnic or racial minority group underrepresented in science. In this study the research team supported the teachers by giving them all three hours a week of training for ten weeks, focusing on content knowledge and pedagogical content knowledge of the PBS curriculum. This training was in hopes to even the playing field and discourage inaccuracy in the results by uninformed teaching. The teachers then implemented the PBS curriculum in their classrooms for 10-12 weeks and data was collected from the classrooms. Researchers commented on the shortness of the study and justified it by referring to PBS as such a significant departure from the status quo of urban schools that impact could be seen in a relatively short period. This justification seems to fit possible time constraints on the research more than their rational demonstrates a proper reasoning. The data collected used a rubric-based evaluation of students work and a survey of students' opinions of science and future goals and interests relating to science.

The results showed that the students' scores were positively affected using the PBS curriculum. The findings exhibited improvement from the pre-assessment scores in student

understanding of scientific concepts such as calorimetry and body systems, yet the students did not average high scores based on the rubric scoring. The results showed that students' attitude towards science and career plans fell in the course of this study. These results introduce an interesting concept; assessment scores do not necessarily translate into students' future interests in science. The PBS curriculum used advanced the knowledge, but this attempt failed to create a sustained interest in science. The study used a clear and planned PBS strategy, but the strategy may have lacked engaging nonmainstream students' funds of knowledge to support meaningful and rich connections to science.

A different PBS study was done by Moje, Collazo, Carillo, and Marx (2000), which consciously considered the language, literacy and Discourse demands represented in a specific project PBS curriculum and its enactment. They specifically questioned "whether written curriculum, and the teachers enactment of it, scaffolded students in engaging in many different Discourses required for deep learning in project based pedagogy?"(p. 470) The use of Discourse with the upper-case "D" distinguishes it from simply a stretch of language and embedded in a particular way of knowing. Discourse signifies a combination of acts such as: saying, writing, doing, being, and valuing which helps educators to recognize a fuller and more complete form of expression by students (Moje, Ciechanowski, Kramer, Ellis, Carillo & Collazo, 2004). The researchers were particularly interested in how project-based science interfaced with students' different literacy and language practices. The subjects of the study were in a 7th grade science classroom at a two-way bilingual immersion school. All, but one student, were Latino, and 27 demonstrated some level of English proficiency and five were recent English learners. This case study followed two different curriculum projects over two semesters. The projects were based on air quality and water quality and used local issues to incorporate students' funds of knowledge.

Examples from the interviews and video/ audio recordings showed that the project-based units used a number of ideas that called upon students' experiences and gave rise to opportunities for student Discourse to be used. The findings from the study suggested that PBS learning can engage students in multiple discourses and the promotion of students' ideas showed promise in the science classroom. Though the curriculum had ample ways to aid students' inquiry, there were times that competing Discourses discouraged learning. The connections between science Discourse and student Discourse were, at times, not successfully made when ideas were initially framed in a scientific and technical Discourse. The dichotomy between the two Discourses at times kept concepts from forming in certain parts of the projects. The word "quality" alone was found to be embedded in multiple and competing Discourses. When students worked on a project based on air and water quality, researchers recognized the existence of competing Discourses in PBS. The teacher also continually negotiated between the Discourses of his own experiences. The curriculum was found to draw upon students' funds of knowledge in meaningful ways that did help create purpose and relevancy to the tasks and investigations. Though the funds of knowledge were shown to be used, there was a lack of scaffolding in the assignments that helped students take up the science and connect it to experiences relevant to their social or cultural worlds. The question of how Western dominant science Discourses and student science Discourse can find connection, is important to finding de-centering practices that effectively empower students in science.

This last article brings to light an important aspect of the literature; most of the studies thus far have been science and school Discourse or student Discourse dominant. Few times in the literature have the two been represented equally while presenting genuine attempts to facilitate communication between them. From the concept of connectivity or pathways there is a growing

amount of literature that has specifically looked at how educators can facilitate the connections between Discourses by supporting spaces that embrace equivalency in value and representation of both in the classroom.

Science and Nonmainstream Students: Hybridity

The concept of hybrid spaces or *third space* is based on the cooperation of two types of spaces that often exist isolated and in contradiction to one another. Nonmainstream students bring with them a very different Discourse, *first space*, than what is recognized by the Western science classroom Discourse, *second space* (Gutierrez et al., 1999; Moje et. al, 2004). In order not to illegitimatize either of the Discourses it has been purposed that science classrooms strive to create hybrid spaces or a third space, in which students can find connectivity that allows them to migrate between the two Discourses in a useful hybridity. The hybridity can also exist in the actual linguistic and discursive uses in the classroom discourse (Brown, 2004; Gutierrez et al., 1999). These *spaces* are not easily defined, yet have been recognized by nonmainstream student studies during the use of funds of knowledge in science classrooms.

In a sixth grade science class Calabrese-Barton & Tan (2009) attempted to apply a pedagogical framework that supported hybrid space during a nutritional unit. The authors' questions for supporting their endeavor were: 1) what funds of knowledge did students bring to sixth grade science and how did they leverage these funds in support of deeper engagement? and 2) in what ways did the incorporation of students funds of knowledge impact or transform the discourse of a sixth grade learning community? The nutrition unit was democratically formed by five students of the nonmainstream dominant class.

The researchers used a conjecture driven approach of design experiments methodology. They justified this approach by suggesting that it would be focused on addressing specific

problems of practice while also being accountable for developing and testing principles of learning and teaching, that should be able to be applied broadly. The researchers used previous lesson from the class' teacher and deciphered parts that lead to more student interactions. Four girls from the class had been invited to participate in a brainstorming of lessons on a nutrition unit. The girls selected represented students of high and low interests in science and of high and low past performances in the class. The students, teacher and researchers worked in hour long planning conversations to discuss ideas of how to incorporate cultural knowledge and experiences in the unit. After each lesson the researchers video-taped and transcribed focus group interviews with the student advisors. The researchers after the unit coded using concepts of nontraditional funds and Discourses originally reported by Moje et al. (2004). Clabrese-Barton and Tan (2009) finally looked across all the lessons to detect patterns in how hybrid space were created in an attempt to understand what hybrid space really looks like.

This study found that through the creation of this unit, by a democratic and bottom up approach, there were clear and transformational hybrid spaces that supported funds of knowledge and Discourses. These funds and Discourses which the students possessed were implicitly connected with the school science funds and Discourse. Varied ideas and connections from funds of knowledge and discourse which were brought to the classroom included: studenting; solidarity; pop culture; talents and interests; and family histories. The students were able to access the school science funds and discourse in a more functional form and reached for these threads on their own. This has been documented as not happening in classrooms where the students had not been creators of their curriculum. The study found that both academic achievement and inclusion were both promoted by expanding the enculturation process to incorporate reciprocity. Students had a dramatic increase in their classroom volunteered

information, which allowed the students to position themselves as experts and contributors to the science learning process. They witnessed an increase in students taking a stance on scientific ideas and voicing them openly in class discussion, argumentations, and solidarity discourse. Scientific stances were a key finding, which supported the hybrid spaces. The researchers suggested that these stances are a relatively rare scene in a classroom that is not engaging in hybrid spaces. The study concluded that the physical, political, and pedagogical factors had played an important role creation of the students' hybrid spaces.

Student Discourse and use of funds of knowledge are key elements in the creation of hybridity in the classroom. Moje et al. (2004) looked into the intersections and junctures between everyday first spaces, school funds of knowledge, and Discourse finding symbiosis in a "third space" to aid Latino students in science learning. This study focused on 30 students in a prominently Latino middle school in Detroit. They used the guiding questions of: what are the different discourse and funds of knowledge that might shape these students reading, writing, and talking about text in their science classroom; and how and when do students bring these Discourses and knowledges to bear on school science learning? The study was ethnographic and used field notes, interviews, participant observations, surveys and audio recordings conducted in various settings at the school and in the communities. The data was analyzed using constant comparative analysis. Data was coded into common patterns then put into four major codes, which were then used for axial coding.

Using the data from the study Moje et al. (2004) were able to present analysis of the funds the students had access to, in and out of school. The categories of these funds students worked in and out of were family, community, peer groups, and pop culture. By examining the contexts and communications from the students, the authors recognized many different instances

of students using their home based funds in scientific reasoning and relationship building. Examples of home funds, from cooking to parental work histories, were accessed to support scientific concepts. The authors used examples of student funds that could have been brought forward in meaningful ways in the classroom. They point out how encouraging the observation of connectivity by the student could facilitate creating third space and help student cognition of first space relevance in science Discourse. They point out how students' categorization and labeling may serve as a tool for building and navigating third spaces. Community environmental activism and use of social issues are also implicated as funds that could be intersected by the science classroom and scaffold third space interactions. The connection to activism could play a role in the use of PBS and hybrid space incorporation in science classes.

Beyond the funds that are brought from outside of school, the study suggests possibilities of how academic discourses from other subjects may also instigate connection to social and home funds to help create connections. These access points are shown to often be discreet, vague, and often hidden in inter-peer dialogue and quiet utterances during class. Many moments when students revealed funds, they were not formally or enthusiastically revealed to the class for fear of not having scientific value. The study suggests that this information about students ought to be invited, since students typically do not volunteer their funds openly without teacher encouragement. Because of the diversity of classrooms and their nonmainstream student participants, the researchers recognized the need for teachers to develop deep understandings of the individuals in their classrooms. Connections to liberatory and democratic de-centering pedagogies may be made here, in an attempt to help students discomfort expressing funds in normative classroom dynamics.

The second finding from the study revealed that students may be creating these third spaces on their own in daily interactions with science. The authors show how students strategically brought funds to bear on school texts and discussions. They implemented their uses in ways that helped them understand the academic knowledge while holding onto the funds' cultural or social relevance. In this second finding, students also revealed how they would find ways to use discursive practices to examine and define scientific discursive practice. The use of everyday language to help create meaningful connection and dissection of scientific concepts and literacy are fundamentally third space and reflect the places that science and its communicative nature can be examined to meet nonmainstream students needs.

The concept of hybridity may be critical to de-centralizing and creating science dialogue that can help nonmainstream students make scientific connections. The use of active language that supports connections and third space could help support nonmainstream students ability to maneuver in science. Gutierrez, Lopez, Alvarez, and Chiu (1999) looked at hybrid language practices and their importance to students creating meaningful connections. The authors suggest hybridity as a resource for creating and promoting literacy learning. The central question to this study was: could zones of development be created, in which all participants learn by jointly participating in activities in which they share material, sociocultural, linguistic, and cognitive resources? The study used participants from a group of Latino, African American and Tongan students in an after school computer club in Los Angeles. The program was assembled by undergrads and aides in a conscious effort to promote the cognitive and social development along with fostering collaboration among cross-generational and diverse participants. The researchers argued that hybrid literacy practices are not just code switching, yet a more strategic, systematic and sense making process. This process is activated when the participants are striving

to achieve a more mutual understanding. An emphasis on how the learners negotiate their roles while they participate in these hybridity activities is vocalized in the study.

The study used activities in multipurpose writing that utilized mixed genres, such as letters and narratives, and mixed discourses, like types often found in problem-solving, academic language, and narrative. The researchers used a computer program that allowed the students to communicate with a sex neutral ambiguous entity named "El Maga" in cyberspace. This character was created and manipulated by the researchers to communicate and test concepts with the children. The children and El Maga would continuously engage in problem-solving dialogue in which they posed questions to one another in attempt to achieve their own individual and shared goals. These email conversations would stimulate different use of discourse and hybrid languages depending on the way the students decided to interact with El Maga.

Findings from the study showed a combination of hybrid language practices that helped stimulate participation between children and El Maga. When looking at individual cases, the research found that in conversations the participants used hybridity in order to manipulate context, emotion, and literacy learning and development. Through examining hybridity in practice, the study was able to recognize hybridity as a resource for literacy learning where competing, alternative, shared discourses and roles mediated literacy for both experts and novices. From these findings, the researchers suggested that hybrid literacy activities can become the medial context tools necessary for both social and cognitive development.

This study shows how language can be important in the ways hybridity is accessed and appropriately available. This concept of discursive identities, and their importance in nonmainstream students' science identity, is influential (Brown, 2004). Studies that focus on

third spaces, have a lot to gain by incorporating the discourse and discursive hybridity amongst the student-peer-teacher communication.

Conclusion

This literature review was directed by the question, how can de-centering the dominant science culture and practices in schools create pathways which improve science education for nonmainstream students? The studies that were examined in this review address this question using student funds of knowledge, de-centering pedagogy and curricular practices to help nonmainstream students. The studies present many ideas that often interlinked and supported each others' concepts and endeavors to promote social justice, student voice, and equitable science.

The research that focused on students' funds of knowledge in science classrooms suggested student voice and cultural contexts to help strengthen science learning and active engagement. Promoting student voice and funds of knowledge has been recognized as an important component of science classrooms that support nonmainstream students (Basu & Calabrese Barton, 2007; Seiler, 2001). Drawing on students funds of knowledge encourages students to make connections between their cultural and social lives (Moll et al., 1992; Seiler, 2001). Examples of effectively engaging funds of knowledge were shown in small learning communities, such as the science lunch group (Seiler, 2001) and an after school science program (Basu & Calabrese Barton, 2007). These examples focused on how students' funds of knowledge could promote science through student driven discussion on concepts and learning goals. The conversations and topics supported by the students' funds assisted in engaging scientific discourse and scientific thinking skills (Seiler, 2001). Agency and sustained science interest are consistent with the environments that supported the students' future goals and desires found in

funds of knowledge. Studies have not provided examples of full classroom dynamics, most used small learning groups. Further work with large classrooms and typical school learning environments may prove helpful in understanding the how to integrate student contexts into whole class instruction.

There appears to be a natural and necessary change in classroom pedagogy when decentering dominant science culture in the classroom. Liberatory and democratic classroom pedagogies were addressed in research that focused on nonmainstream student voice in science (Edwards, 2011; Basu & Clabrese-Barton, 2010; Seiler & Gonsalves 2010). These studies examinations of classroom pedagogy and curricular practices showed both promise and problems that may arise in using these de-centering methodologies. Both democratic and liberatory classrooms looked to recognize and substantiate the power students may need within the classroom. The studies examined both the conflict and misunderstandings that can exist between teacher and students in classroom curricular governance (Basu & Calabrese-Barton, 2010; Seiler & Gosalves, 2010). The findings from Seiler and Gonsalves (2010) were particularly interesting in how they were able to show the conflicts teachers had towards relinquishing power to their students in content direction. Teachers in both studies have shown dissonance and problematic personal definitions related to de-centering of dominant science culture. The Basu and Calabrese-Barton (2010) study provided a pertinent example of how these two voices, teacher and student, do not always match when discussing classrooms that embody a democratic classroom structure. Teachers who hope to de-center the normative power in their classroom may need to examine both the students and their own definitions of democratic and/or liberatory classroom and curriculum, before implementing classroom changes.

The curricular approaches examined attempted to de-center the dominant science power in the classroom. The relative successes of the techniques were dependent on integration of students' funds as well as the nature in which science was framed. PBS studies (Kanter & Konstantopoulos, 2010) demonstrated that projects can be effective in teaching science concepts, however, using PBS without the use of students' funds of knowledge was not successful at elevating nonmainstream students' sustained interests in science. Moje et. al (2000) provided an example of student lives being actively used in PBS curriculum. The study's findings suggested that students retained more scientific interests when student voice and funds of knowledge were encouraged in the project work done in PBS curriculum.

The examination of supporting hybrid learning spaces, Discourses, and discursive needs in the science classrooms, de-centers the current dialogue in typical science classrooms. Calabrese-Barton and Tan (2008) and Moje et. al (2004) findings and suggestions recommend de-centering of dominant science far beyond how the classroom are typically taught. Their findings suggest that the discussion about nonmainstream students ought to examine the Discourses which exist in the classroom. Their studies suggest the use of dialogue between the student's science Discourse and the Western dominant science Discourse. Helping students create connections between school Discourse and home Discourse, placing constructive value on both, is a concept that may support profound lasting communication skills and agency within scientific contexts. The notion of hybrid language to evolve content literacy also plays a role in the concept of hybridity (Gutierrez et al., 1999). The language brought by nonmainstream students into the classroom can be used positively in creating supportive connections to Western dominant science language and literacy. The de-centering of power through language hybridity supports the same concepts of Moje et al. (2004), by supporting the relevance of student

language and the useful connections made to dominant science and academic language. Teachers becoming skilled and comfortable in allowing hybrid writing and language to support science concepts may promote de-centering of dominant languages power and further help nonmainstream students in science.

This review revealed possible deficiencies in the research literature, which focuses on nonmainstream students in science education. There are a growing number of concepts in science education, such as socioscientific issues (Edwards, 2011), that should have their educational potential examined within nonmainstream student populations. More science classroom pedagogy research would help with understanding how liberatory and democratic practices affect student agency and students' scientific voice. It is inspiring that recent literature continues to recognize nonmainstream science students current issues surrounding science. However, more is research is necessary to properly understand how these concepts may successfully provide an equitable science education.

Literature linking studies to rural or SES specific communities are needed to embrace the all groups of nonmainstream student populations in the research. Many of the studies focused on urban environments, which left out the voice and particular needs of the rural student in science. There has been substantial evidence that SES is a dominant factor in disparities in science education success, and the poor and rural communities ought to be examined as well as urban. The literature also had a focus on earlier secondary grades in their research, grades 6-9. The upper secondary grades seem non-represented in the studies dealing with nonmainstream students science education. Roles of hybridity and literacy may be different for older students and more complex science curriculum. Information and research based pedagogy and practices are needed for nonmainstream students of all backgrounds and ages.

Reflecting back on the conflicts found in my science classroom experience with nonmainstream students, I can envision ample opportunities to incorporate concepts and practices outlined by the de-centering research. Funds of knowledge and hybrid spaces may not always be easy to access, but I know recognize the importance they play in providing proper support to students learning science. These concepts will no doubt play a major role in my future classroom construction and lesson planning, especially as nonmainstream students become greater in classroom percentages. Science culture means that there are negotiated and accepted rules, and classroom cultures ought to be influenced by the society that inhabits each classroom. The practice of facilitating the malleable connections of house hold and cultural funds to dominant discourse is a skill I hope to incorporate into my science classroom. Science is reflective of those who practice it, and equitable science practice will hopefully lead to a more equitable society.

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Strategies to Support Student Development of Metacognitive Skills

Lisa M. Johnson

Abstract

This paper reviews research on metacognition, which is usually defined as 'thinking about one's own thinking' or the learner's knowledge, awareness, and control of the processes by which they learn. Recent academic research on metacognition is examined in order to identify effective strategies and pedagogical practices for supporting student development of metacognitive skills. The studies focus on elementary school students and were drawn from different areas of the world. Three main pedagogical practices supporting metacognition emerged from the research: teacher awareness of metacognitive knowledge and control skills, teacher awareness of general versus situated metacognition, and timing of metacognition (before, during, and after instructional activity). The research results revealed eight specific metacognitive strategies and tools that support learning: concept maps, classroom discussion, diaries, and annotated drawings; predicting, graphing, and written reflection of rote memory tasks; teaching a curriculumembedded conflict resolution program; employing comprehension monitoring training; and employing cross-age peer tutoring for developing and applying reading strategies. These findings suggest that these strategies and pedagogical practices could have a significant impact on students. Possibilities for further research are discussed.

Strategies to Support Student Development of Metacognitive Skills

Students often have limited opportunities to understand or make sense of subject matter because many curricula have emphasized memory rather than understanding. In this type of learning environment, teachers merely impart knowledge on their students rather than the students constructing their own understanding of content. Understanding requires that students become actively involved with their own learning (Georghiades, 2004 a). Students must learn to recognize when they understand and when they need more information. Metacognitive strategies brings the process of learning to a conscious level, allowing children to become more aware of their own thought processes and help them to gain control over their own learning.

The purpose of this review of literature is to explore research that looks at strategies that can be implemented by elementary school teachers to support student development of metacognitive skills. The term *metacognition* was introduced by Flavell (1979). Metacognition is learner's knowledge of their own cognition. Metacognition is often referred in the literature as 'thinking about one's own thinking.' It is usually related to learners' knowledge, awareness, and control of the processes by which they learn. Metacognition is characterized by the ability to recognize, evaluate, and, where needed, reconstruct existing ideas.

Even though *cognition* and *metacognition* are closely related, there are significant differences that must be considered. In an attempt to make such a distinction clear, Flavell (1979) suggested that cognitive strategies 'facilitate' learning and task completion, whereas metacognitive strategies 'monitor' the process. For Forrest-Pressley and Waller (1984), cognition is referring to the actual processes and strategies used by the learner, whereas metacognition is referring to what a person knows about their cognitions and to the ability to control these cognitions. Metacognition requires critical thinking whereas cognition can take

place in the absence of critical thinking (Georghiades, 2004 a). For example, it is a common experience for learners to engage in the learning process in passive ways, reproducing information without scrutinizing it and following instructions or applying formulae without knowing what the purpose of their efforts are. No matter how superficial such learning behavior is, these learners successfully activate and engage in cognitive functions in order to carry out their tasks. Metacognition, on the contrary, requires judgment that is essential in comparing, assessing and evaluating the content or the processes of one's own learning. According to Georghiades (2004 a) metacognition involves:

The critical revisiting of the learning process in the sense of noting important points of the procedures followed, acknowledging mistakes made on the way, identifying relationships and tracing connections between initial understanding and learning outcome. This judgment-laden reflective feedback will later enable the metacognitive learner to take informed action for resolving the situation (p. 371).

During my fall student teaching, I felt that my facilitation of student metacognition was not very strong or effective. Most of my students were unable to identify or communicate what they did or did not understand. Teachers' conceptions of thinking shape the way they try to promote students' thinking (Ritchhart, 2002, as cited in Ritchhart, Turner, & Hadar, 2009). Teachers with well-elaborated conceptions of thinking, comprised of specific thinking strategies, are more able to support and scaffold thinking in their students than those teachers who have more general and global conceptions. As a teacher, I desire to provide a learning environment in which students' learn specific learning strategies and students' thinking is visible to the students. I want my students to assume ownership of their own learning and become aware of their own thinking as they read, write, and solve problems. The findings from this literature review will

inform my practice as an elementary school teacher and aid in my conception of thinking. I will integrate the metacognitive thinking strategies contained in this review into my instruction.

Metacognition can encapsulate a variety of strategies and approaches. This review of the literature is segmented into four main sections that will provide insight into my research question. These four main sections are: teacher awareness of metacognitive knowledge and control skills, teacher awareness of general vs. situated metacognition, timing of metacognition: before, during and after, and metacognitive strategies and tools. Within the metacognitive strategies and tools section, I present the following strategies and tools: using metacognition to make rote memorization tasks more meaningful, conflict resolution, comprehension monitoring and monitoring accuracy, cross-age peer tutoring, concept maps, and combining metacognitive tools: concept maps, classroom discussion, keeping a diary, and annotated drawing.

The empirical, peer reviewed studies were gathered in November and December 2010 using searches through the Educational Resources Information Center (ERIC). Initial keywords included "metacognition" and "elementary education." Whenever possible, I focused on studies that used metacognitive strategies in their methodology. I drew studies from different areas of the world including the United States, Turkey, Israel, Cyprus, Switzerland, Belgium, and Australia. The studies focused on metacognitive strategies for elementary school students.

Integrative Review

This review of the literature will examine strategies for supporting student development of metacognitive skills from multiple perspectives. The first three sections will provide a general background of pedagogical practices for developing metacognition. In the first section, I will consider a study that investigated the effects of metacognitive knowledge and control skills on mathematics achievement. In the second section, I will present two studies that explored general

and situated metacognition and their varying effects on student learning. In the third section, I will examine a study that compared three kinds of metacognitive instruction (before, during, and after) in relation to a learning activity. In the last section, I will consider six studies that present specific metacognitive strategies and tools.

Teacher Awareness of Metacognitive Knowledge and Control Skills

Ozsoy (2011) conducted a study that examined the relationship between *metacognitive knowledge* and *control skills*, and mathematics achievement. The participants of this study included 242 fifth-grade students from six public primary schools in Zonguldak-Eregli, Turkey. The researcher used the Metacogntive Skills and Knowledge Assessment (MSA) to measure the metacognitive knowledge and control skills of the students. The MSA assesses seven metacognitive knowledge control skills including: *declarative, procedural*, and *conditional knowledge*; and *prediction, planning, monitoring*, and *evaluation skills*. The researcher developed and used the Mathematics Achievement Test (MAT) to determine mathematical achievement levels of students.

Ozsoy (2011) defines metacognitive knowledge as the knowledge, awareness, and deeper understanding of one's own cognitive processes and products. In designing and conducting research on metacognition, Ozsoy describes metacognitive knowledge as consisting of person, task, and strategy knowledge. Metacognitive knowledge can be divided into three areas: declarative, procedural, and conditional knowledge. Declarative knowledge refers to knowledge about one's general processing abilities. The knowledge about how to successfully solve problems is called procedural knowledge. Conditional knowledge means knowledge about when to employ specific strategies. The ability to use metacognitive knowledge strategically in order to attain cognitive objectives and to regulate and control cognitive processes is called
metacognitive control or regulation. There are four metacognitive control skills: prediction, planning, monitoring, and evaluation skills. Prediction skill enables students to predict the difficulty of a task and use that prediction to regulate their engagement related to the outcome. The selection of appropriate strategies and allocation of resources are components of prediction skill. Monitoring refers to one's awareness of comprehension and task performance. Evaluation refers to the ability to appraise products and regulatory processes of learning. Evaluation allows students to evaluate their performance on a task, compare their performances with each other, and use the result of the comparison to locate the error in the solution process.

Ozsoy (2011) found that there is a significant relationship between the seven metacognitive knowledge and control skills and mathematics achievement. Among them, procedural knowledge, prediction skill, and evaluation skill had the highest scores. Declarative knowledge and planning had the lowest scores. Significant relationships were found between the following metacognitive knowledge and control skills: evaluation skill and conditional knowledge, conditional knowledge and prediction skill, and evaluation and prediction skills. A regression analysis found a high-level positive and reasonable relation was found between mathematics achievement and metacognitive knowledge and control skills. It is seen that metacognition is the most important predictor of success in mathematics. Multiple linear regression analyses found that prediction, evaluation, monitoring, and procedural knowledge were four significant predictors of students' mathematics achievement.

Teacher Awareness of General vs. Situated Metacognition

Within the field of metacognition, there is a debate between embedding metacognitive instruction within specific areas of the curriculum and teaching isolated metacognitive thinking skills as separate topics. Georghiades (2004 b) made the distinction between *general* and

situated metacognition. General metacognitive instruction is explicitly teaching general thinking skills without a context during a special time that is allocated for this purpose. The aim of general metacognition is to improve general thinking skills across contexts and enhance the ability to transfer thinking skills in different contexts. Situated metacognitive instruction is practiced within the context of normal lessons and within the time allocated for the teaching of curriculum subject matter. This type of metacognitive instruction is specific and blended with normal classroom activities. The aims of situated metacognition is to facilitate a better understanding of specific subject content, enhance performance in taught content, develop longer durability of content knowledge, and improve the ability to utilize content knowledge in different contexts.

Georghiades (2004 b) conducted a study that assessed the impact of situated metacognitive instruction on the durability of conceptions of science. The participants of this study included 60 fifth grade students from the public primary schools in Cyprus. In the experimental group, metacognitive instruction was incorporated alongside ordinary teaching structures, following the existing science curriculum and implanted at selected points in the teaching sequence. Four different metacognitive activities were used in this research: classroom discussion, keeping a diary, annotated drawing, and concept mapping. The students' written tests addressed the scientific concepts that were taught. Each concept was tested three times by means of exercises with different contextual characteristics: exercises requiring context-free recall of knowledge, exercises placed in contexts that resembled the experiments performed in the classroom, and exercises placed in unfamiliar contexts that referred to real-life problems.

Georghiades (2004 b) found that the test scores in the comparative class decreased over the three testing periods, whereas the experimental class showed an overall increase in

performance. Differences in overall test scores between the two groups were initially small, but increased over time. The results from this study suggest that the children from the experimental group more successfully accommodated the scientific concepts into their long-term memories, supporting the conclusion that situated metacognition has a positive impact on the durability of children's conceptions of science.

There are three limitations to this study (Georghiades, 2004 b). First, when looking at the differences between the means of the two classes, the reader will find that the differences are not significant. Second, it was not explained how the researcher analyzed students' responses on the tests. Third, the sample size was small (60) and all participants were drawn from the same school.

A study conducted by Bosson, Hessels, Hessels-Schlatter, Berger, Kipfer, & Buchel (2010) included both general and situated metacognitive instruction. The participants of this study were 16 children (five girls and eleven boys) in grades three to six from mainstream primary schools in metropolitan Geneva, Switzerland. All children had general learning difficulties. The study was conducted at the Learning Center, which provides cognitive education for children with general learning difficulties in the Department of Special Education at the University of Geneva. The researchers used an intervention model that alternated between teaching clearly defined strategies that can be applied in various *curriculum-unrelated tasks* (general metacognition) and teaching strategies within *curriculum-related tasks* (situated metacognition). The curriculum-unrelated instruments used were "Windows" and "Broken up figures" from the metacognitive intervention program DELV and Instructions from the Instrumental Enrichment program. Curriculum-related tasks contained math problem solving and text comprehension exercises. In this study, curriculum-unrelated tasks preceded

curriculum-related tasks. The researchers allowed the children to change ineffective strategies and to acquire new strategies, independent of school-related subjects in which they have often experienced failure. The corrected or newly acquired strategies could be transferred to math problem solving and reading comprehension, but also new strategies were trained during these sessions.

Bosson et al. (2010) found that for both types of tasks (curriculum-related and curriculum-unrelated), the number of children that showed a good or fair score in general metacognitive strategy use increased from the first to the last session, and the number of children that showed a poor use decreased. The differences in distributions are significant for *planning* in the mathematics sessions and for *control* in both DELV and mathematics. Only one or two children showed a poor score during the last intervention. The distribution of children's metacognitive strategy use across tasks is quite similar for both planning and control. Even though the children showed progress in strategy use and metacognitive knowledge in both types of tasks, it was only in the more concrete strategies that a positive correlation was found between application and quality of reflection.

There were several limitations to this study (Bosson et al., 2010). First, the sample size was very small and consisted of more boys than girls. Second, this study took place outside of a classroom context, therefore, the results of this study may be harder to apply to a classroom setting. For example, the students were individually given a training rather than whole group instruction. Third, the primary aim of the study was to validate the researchers' cognitive and metacognitive intervention at the Learning Center rather than to explore a specific aspect of metacognitive instruction.

Timing of Metacognition: Before, During and After

Michalsky, Mevarech, and Haibi (2009) administered a study that compared three kinds of metacognitive instructional methods and a control group: metacognitive instructions provided before (*beMETA*), during (*duMETA*), and immediately after (*afMETA*) the reading of scientific texts and no metacognitive instruction at all (noMETA). The participants of this study were 108 fourth grade students, 49 boys and 59 girls, who studied in four heterogeneous classes. The students were randomly selected from four Israeli schools. The elementary schools were similar in size, socioeconomic status, and levels of science achievement. The researchers investigated the effects of metacognitive grouping on domain-specific knowledge, general scientific literacy, and metacognitive awareness. The students for all three metacognitive treatments had selfaddressed questions that were printed on their learning sheets. Students used these metacognitive questions in the small group activities. In addition, the teachers modeled the use of the metacognitive questioning when they introduced the new concepts, reviewed the materials, and helped students in small groups. The beMETA group received the set of self-addressed metacognitive questions prior to beginning each text's reading. The duMETA group received the set of self-addressed metacognitive questions only during their reading. The afMETA group received the set of self-addressed metacognitive questions immediately after they completed reading the text. The noMETA group was not exposed to the metacognitive instruction method.

Michalsky et al. (2009) used these self-addressed metacognitive questions for all three treatments: (a) comprehending the phenomenon of the problem described in the test (e.g. "What is the phenomenon all about? What is the problem needing investigation?"), (b) constructing connections between previous and new knowledge (e.g. "What do you already know about the phenomenon? What are the similarities/differences between the problem at hand the problems

you have encountered in the past? Explain your reasoning"), (c) using appropriate inquiry strategies to solve the problem (e.g. "What are the inquiry strategies that are appropriate for solving the problem? What are the main components of the experiment designed to solve the problem? When/ how should you implement a particular strategy? Explain your reasoning"), and (d) reflecting on the processes and the solution (e.g. "Does the solution make sense? Can you design the experiment in another way? How? Explain your reasoning).

The findings of the study (Michalsky et al., 2009) indicate that what effects cognitive learning is not only the kind of metacognitive instruction, but also the phase in which the metacognitive guidance is provided. The researchers found that reading scientific texts embedded with metacognitive instruction was more effective in developing scientific literacy than reading scientific texts without any metacognitive instruction. The findings further showed that students who were provided metacognitive instruction after reading significantly outperformed the other treatment groups on all outcomes assessed in the study: domain-specific scientific knowledge, scientific literacy, and metacognitive awareness.

Metacognitive Strategies and Tools

Using metacognition to make rote memorization tasks more meaningful. Brookhart, Andolina, Zuza, & Furman (2004) conducted a study in order to investigate whether student selfassessment of memorizing the math facts tables would add desirable outcomes besides simple knowledge of math facts. The participants of this study included 41 third grade students at a suburban elementary school in the eastern United States. In two classes, 5-minute timed multiplication facts tests (100 facts from the 0-9 tables) were given once a week for 10 weeks. Each class accompanied the weekly testing with a prediction exercise and a reflection sheet. The students predicted how they would do on the timed test and graphed this on a bar graph. After

they received their results each week, students graphed their actual score next to their predicted score and predicted their next week's score. They used a reflection sheet to write whether they had met their goal from the previous week, what study or problem-solving strategy they used and how well it worked, and what strategy or strategies they planned to use for the next week.

Brookhart et al. (2004) found that student's involvement in their own assessment can add reflection and metacognition to rote memory lessons like learning the multiplication tables. The overall average in class one and class two rose as the 10 weeks progressed and, on average, the predictions were accurate and became more accurate with time. For class one, 70% of the students persisted with stable strategy use and 30% of the students used variable strategies. For class two, 67% of the students persisted with stable strategy use and 33% of the students used variable strategies. For both classes, students who demonstrated some kind of clear pattern of strategy use were distributed across achievement levels. Students whose strategy use was either inconsistent or nonexistent clumped in the very high or very low achievement categories, suggesting that this strategy use pattern was either ineffective or not necessary.

Conflict resolution. Heydenberk & Heydenberk (2005) performed a study that assessed changes in students' metacognition as a result of comprehensive conflict resolution training that infused metacognitive strategies into the curriculum. Comprehensive conflict resolution programs require students to engage in social communication strategies such as active listening, paraphrasing, brainstorming, questioning for clarity, and the development of affective vocabulary. The participants of this study were fourth and fifth grade students from the Philadelphia School District and a neighboring urban school district. This study employed a pretest-posttest comparison group design. The SAAC and the Dispositions Toward Meta-Cognition (DTM) served as criterion measures. The SAAC test was used to verify

implementation of conflict resolution strategies in the classroom (the independent variable of the study). The DTM was used to measure metacognitive skills. The 20-item instrument included 20 questions pertaining to self-checking, strategy choice, and awareness.

Heydenberk & Heydenberk (2005) found that for the SAAC test, significant differences were found in the treatment classrooms. The comparison classroom, which didn't have any conflict resolution training, showed no significant differences in SAAC scores. For the DTM, all treatment classrooms showed significant gains from pretest to posttest. The comparison classrooms showed no significant gains from pretest to posttest. The results of this study indicate that conflict resolution training increases students' use of metacognitive strategies.

One threat to the validity of this study (Heydenberk & Heydenberk, 2005) is that the authors did not explicitly state their sample size. Another threat is that the authors didn't explain exactly how the students were trained in conflict resolution. One strength of this study is its setting. Both school districts in this study are ethnically diverse and serve students who have low socio-economic status. One of the school districts has a high rate of violence. The results of this study have a potentially broader applicability to diverse settings because of the location in which the research was done.

Comprehension monitoring and monitoring accuracy. Huff & Nietfeld (2009) examined the impact of comprehension monitoring training on 118 fifth grade students' monitoring accuracy. The study took place in four elementary classrooms within a large rural elementary school in the southern United States. Comprehension monitoring is being aware of one's comprehension and task performance. Comprehension monitoring enables students to monitor whether texts are making sense and to choose an appropriate strategy to employ when they realize they are not making sense. The students in the study were divided into four

conditions: control, no intervention (NI), comprehension monitoring training (CMT), and comprehension monitoring and monitoring accuracy training (CMT + MAT). Students in three of the four study conditions were given short reading passages of 400-800 words in length followed by five multiple-choice questions for 12 consecutive days. The comprehension questions targeted general reading comprehension skills. Students provided confidence judgments after each item. Students in the control group participated in the twelve practice passages and also completed the Gates-MacGinitie Reading Tests, but did not receive any instructional intervention, nor did they provide confidence judgments on the test. In the no intervention group, students took the Gates-MacGinitie Reading Tests and provided confidence judgments for each item, but did not receive any instructional intervention. In the comprehension monitoring training group, the students received direct instruction on comprehension monitoring strategies during a series of twelve daily lessons each lasting approximately 30-40 minutes. In the comprehension monitoring and monitoring accuracy training group, the students received direct instruction on comprehension monitoring strategies during a series of twelve daily lessons each lasting approximately 30-40 minutes in addition to monitoring accuracy training.

Huff & Nietfeld (2009) found that explicit strategy instruction and self-monitoring training improves monitoring ability. Students who received training in comprehension monitoring and those who received training in comprehension monitoring and monitoring accuracy became more confident in their responses and better calibrated than their peers who received no training. Students who received comprehension monitoring and monitoring accuracy training became overconfident, whereas students who received just comprehension monitoring training and those who received no training did not show any significant changes in

calibration bias. The authors conjectured that some aspect of the monitoring accuracy training may have influenced students in such a manner that led them to overestimate their accuracy. All four condition groups showed significant improvement in reading comprehension from Gates-MacGinitie pre and posttests. However, the two groups receiving strategy instruction did not show significant gains in relation to the two comparison groups. This may be due to the fact that 12 days of intervention was not long enough to show significant results.

Cross-age peer tutoring. Van Keer & Vanderlinde (2010) implemented a study that examined the impact of blending explicit reading strategy instruction and cross-age peer tutoring on third and sixth graders' reading strategy awareness, reading strategy use, and reading comprehension achievement. Cross-age peer tutoring refers to older and more knowledgeable students tutoring younger students. The older students learn by teaching the younger students. The participants of this study included 405 third grade students and 357 sixth grade students from 15 different schools throughout Flanders (Belgium). A quasi-experimental pretest-posttest design was used contrasting an experimental condition to a matched control group. The experimental condition is characterized by explicit strategies instruction, tutor preparation, and practice of the reading strategies in weekly peer tutoring sessions. The experimental interventions were implemented during an entire school year. Seven strategies were selected for explicit instruction in reading strategies: activating prior knowledge, predictive reading, distinguishing main issues from side issues, monitoring and regulating the understanding of words and expressions, monitoring and regulating text comprehension, classifying types of text, and representing texts systematically. Seven 50-minute sessions were scheduled in order to prepare the tutors. In the weekly peer tutoring sessions, sixth grade tutors were paired with thirdgrade tutees. Peer tutoring was organized once (50 minutes) or twice (two times 25 minutes) a

week, depending on the task and scheduling. The students completed two questionnaires: Index of Reading Awareness (IRA) and Reading Strategy Use Scale (RSU). The IRA is a multiplechoice questionnaire proving information about students' awareness and knowledge of different reading strategies. The RSU determines students' use of reading strategies, comprising the subscales of "cognitive" and "metacognitive reading strategy use." Standardized tests were used to measure students' reading comprehension achievement.

Van Keer & Vanderlinde (2010) found that for reading strategy awareness, the results reveal significant intervention effects for third graders' overall strategy awareness and their awareness of the value of regulating the reading process by monitoring progress while reading and recruiting fix-up strategies as needed. Only a significant impact was found on sixth grade tutors' awareness of the importance of evaluating reading tasks, goals, and personal reading skills. For the use of reading strategies, the results indicate that at posttest both third and sixth graders in the experimental condition significantly outperform their peers from the control group. Sixth graders from the experimental condition significantly outperformed the students from the control group with regard to the particular use of metacognitive reading strategies. No significant intervention effects were found on students' reading comprehension achievement. In conclusion, the study found that the experimental intervention succeeded in promoting students' reading strategy awareness and use, but improved reading comprehension was not or not yet achieved.

Concept maps. Ritchhart et al. (2009) conducted a study in which students participated in the creation of concept maps as part of their regular classrooms and under the direction of their teachers at both the beginning (February) and end (November) of the school year. During this time, the teachers focused on getting students to think as part of everyday learning while

making them more aware of their thinking as it was happening. This study took place at Bialik College, a Jewish day school in Melbourne, Australia. The participants in this study included 239 students (39% were girls and 61% were boys): 177 were from grades 3-6 and 62 were from grades 7-11.

Concept maps are a graphic organizing technique designed to help learners explore their knowledge or understanding of topics that are abstract (Ritchhart et al., 2009). Concept maps act as metacognitive tools used to illustrate one's own thinking. In order to create a concept map, the learner first writes their ideas in text boxes that are arranged hierarchally on a page. The learner then links these concepts with arrows or lines to convey meaning between concepts. The learner can make multiple links between concepts. In this study, the researchers used a prompt that was general in an attempt to support and not inhibit students' responses. The prompt asked students: "What is thinking? When you tell someone you are thinking, what kind of things might be actually going on in your head?" The authors provided three further prompts that would encourage additional thinking about thinking and possibly induce new thoughts about thinking that were not as close to the surface as their initial responses. These prompts were given to students' individually once they indicated they had run out of ideas to put down on their maps. These prompts were: 1)"Think of a time when it was difficult or hard for you to think. What kinds of things did you do then? 2) Think about times when you knew you were doing some good thinking. What were you doing then? 3) Think of someone you consider to be a good thinker. What kinds of things does this person do that makes him or her a good thinker?" For the analysis, the authors grouped students into three groups according to curriculum and developmental differences: grades 3 and 4, grades 5 and 6, and grades 7-11. The authors identified ten categories of responses and grouped them into four main response types:

Associative, Emotional, Strategic, and *Meta.* A *Sophistication Score* was computed for each student's concept map. The Sophistication Score focused on the strategic response type, which included: knowledge-based strategies, general strategies, self-regulation, motivation strategies, and thinking strategies. The Sophistication Score rewarded deep thinking over surface thinking.

For the initial concept maps, Ritchhart et al. (2009) found that younger students' maps (grades 3-4) predominately focused on what they think about, when they think, and other general responses (Associative = 71.51%). As the students matured, the number of Associative responses lessened, though this is still the single largest category of responses. The authors also found that older students reported significantly more Strategies than younger students. There was no significant difference between grades in either Emotions or Meta-thinking comments. In the analysis of pre-post changes, the authors found a significant decrease in Associative responses and a significant increase in the category of Strategies reported for all grade levels. In grades 7-11, there was a significant decrease in responses related to Emotions and a significant for grades 3-4 or grades 5-6. For the Sophistication score, the authors found that on average, younger students' maps tend to be less sophisticated than older students' maps. For each grade level separately, as well as for all grades combined, students' post concept maps showed a shift toward a more complex conception of thinking as evidenced by their Sophistication Score.

There were several limitations to this study (Ritchhart et al., 2009). First, the identification of the developmental trajectory that was used for the baseline, the coding of concept maps into the response types, and the evaluation of students' Sophistication Score were subjectively determined by the researches. Second, each teacher's application of the ideas behind building a culture of thinking was unique and the student participants did not receive any

standardized treatment. It is possible that each teacher may have had a different way to get students to think as part of everyday learning and to make students more aware of their thinking as it was happening. Some teachers may have been stronger in promoting thinking than others. This inconsistency may have impacted the data used in this study. Third, when the students made their concept maps, additional prompts were given on an individual level rather than to the whole sample. It is likely that many of the participants did not receive these additional prompts. It is possible that the students who received the additional prompts were given the opportunity to think more deeply than the students who didn't.

Combining metacognitive tools: concept maps, classroom discussion, keeping a diary, and annotated drawing. Georghiades (2006) conducted research that used a variety of metacognitive activities in order to investigate the effect of metacognitive thinking, employed alongside normal classroom activities, in enhancing children's abilities for cross-contextual use of their scientific conceptions. The participants of this study were 60 fifth grade students in public primary schools in Cyprus. In the experimental group, metacognitive instruction was incorporated alongside ordinary teaching structures, following the existing science curriculum and implanted at selected points in the teaching sequence. Four different metacognitive activities were used in this research: classroom discussion, keeping a diary, annotated drawing, and concept mapping. Annotated drawing is an activity in which the learner represents a given arrangement or phenomenon graphically, and then annotates briefly. The students' completed a written post-test and delayed post-test that addressed the scientific concepts that were taught. Each concept was tested three times by means of exercises that assessed the learned material in a context-free mode (*Type A exercises*), in contexts that resembled the ones in which teaching took

place (*Type B exercises*), and in contexts considerably different than the ones in which teaching took place (*Type C exercises*).

Georghiades (2006) found that in Phase 1, although performance of the two groups was very similar in Type A and Type B exercises, there was some difference in favor of the experimental group in Type C exercises. Although this difference is not statistically significant, in the two follow up phases of the research statistically differences are recorded in favor of the experimental group for Type C exercises. The metacognitive activities therefore seem to be related to a positive impact on children's performance in exercises set in unfamiliar contexts.

This study (Georghiades, 2006) has three strengths. First, the author provided details about the test such as how it was constructed and examples of the types of problems it included. A second strength of the study is that its duration was fairly long (8 months). A third strength is that the author used a variety of metacognitive activities. This variety most likely helped the students to maintain an interest in the process and exposed the students to different stimuli. These activities were also simple, easy to carry out activities that blended with the rest of the teaching sequence.

In this integrative review, I critically examined the literature around metacognitive knowledge and control skills, general versus situated metacognition, metacognitive instruction before, during, and after a learning activity, and specific metacognitive strategies and tools. In the next section, I will discuss how the findings of this literature informs pedagogical practices and assists educators in effectively providing support for student development of metacognitive skills.

Conclusion

In this conclusion, I discuss the major findings of the research studies reviewed in the previous section and then discuss research-based strategies and pedagogical practices that can be used by educators to support student development of metacognitive skills. I will end this conclusion by listing the limitations of this literature review and suggest recommendations for future research.

Teachers can support student development of metacognitive skills by being aware of metacognitive knowledge, metacognitive control skills, general metacognition, situated metacognition, and timing of metacognitive activities, before, during, or after the task (Bosson et. al, 2010; Georghiades, 2004 b; Michalsky, 2009; Ozsoy, 2011). Teachers can also employ strategies such as: concept maps, classroom discussion, diaries, and annotated drawings; predicting, graphing, and written reflection of rote memory tasks; teaching a curriculum-embedded conflict resolution program; employing comprehension monitoring training; and employing cross-age peer tutoring for developing and applying reading strategies (Brookhart et. al, 2004; Georghiades, 2006; Heydenberk & Heydenberk, 2005; Huff & Nietfeld, 2009; Ritchhart et. al, 2009; Van Keer & Vanderlinde, 2010).

It is important to use a variety of metacognitive activities (Georghiades, 2006). When just one metacognitive activity is systematically used, students will treat it in a mechanistic way rather than an opportunity for reflection. Classroom discussions, diaries, and annotated drawings are useful metacognitive tools. These metacognitive activities engage pupils in reflective thinking that helps them to represent their understanding in a more conscious and meaningful way. Classroom discussions engage students in the critical revisiting of the learning process by making them more conscious of what and how they learn. This can facilitate comparisons between their knowledge prior to and following teaching and encourage student judgment on the

success or usefulness of the methods used by the teacher. Annotated drawings allow students to rethink what they know about the task, identify which details are important enough to include in their drawing, and engage in decision-making in order to choose appropriate annotations that will enhance their drawing. Diaries give students the opportunity to reflect upon their learning and understanding and report personal thoughts and ideas that might be difficult for some to share with the rest of the class. Diaries can be helpful to both the teacher and learner in identifying concepts that are poorly understood or confusing, as well as feelings about the learning process.

The consideration of metacognitive knowledge and control skills in metacognitive instruction is beneficial for student learning, particularly in the development of mathematical skills (Ozsoy, 2011). Educators should consider the seven metacognitive knowledge and control skills, integrate them into their instruction, especially for mathematics, and explicitly teach students how to develop them. For mathematical content, specific consideration should be placed on the metacognitive knowledge and control skills that were shown to be predictors of mathematics achievement, which were prediction, evaluation, monitoring, and procedural knowledge.

It can be valuable for educators to be aware of the differences between general and situated metacognition and the varying effects they can have on student learning. Situated metacognition can have a long-term impact of students' understanding of content (Georghiades, 2004 b). It is also applicable in everyday teaching without allocating special time or the need for specially devised resources. Situated metacognition can offer approach to teachers who desire to achieve a balance between subject matter knowledge and strategies for effective thinking and learning. General metacognitive instruction allows children to discover new strategies and to develop metacognitive knowledge in a non-threatening situation, which is particularly important

for children with learning difficulties (Bosson et al., 2010). It may also lead to the development of more flexible knowledge in children and promote transfer to other learning situations. Combining general and situated metacognitive instruction gives students the opportunity to apply strategies in different types of tasks, reflect on them, discover generalities, and recognize why and in which situations a certain strategy is useful, which in turn will permit transfer over tasks.

It is important for educators to be aware of the three kinds of metacognitive instruction and consider which phase will best support students' learning of a concept. The usefulness and success of metacognitive instruction depends on how it is activated, when it is activated, and what is activated in the cognitive process. Metacognitive instruction given before, during, or after the learning activity affects cognitive learning differently (Michalsky et al., 2009). Metacognitive instruction before the learning activity supports the leaner's cognitive performance by activation planning strategies. Metacognitive instruction during the learning activity supports cognitive performance by activating self-control strategies. Metacognitive instruction after the learning activity supports cognitive performance by activating introspection strategies.

Concept maps are a rich tool that teachers can use to uncover students' conceptions of thinking in a way that is accessible both to teachers and students. They can also be used to capture changes in students' conceptions about thinking over time (Ritchhart et al., 2009). Concept maps explore students' explicit awareness of the process of thinking and allow teachers to focus attention on students' conceptions of what it means to think rather than their beliefs or theories about thinking or the purpose of thinking. Choosing, placing, linking, and labeling the concepts on a concept map is a very active metacognitive process. Concept maps can uncover students' awareness of thinking strategies they might undertake that can facilitate their learning,

problem-solving, decision-making, and judgment. They are non-threatening and open-ended enough to allow for rich and detailed responses, and manageable for teachers to administer. Concept maps also hold less emphasis on right or wrong answers and can be used as an opening for discussion of thinking with students and the sharing of thinking strategies. The concept map can also provide teachers the opportunity to model to the students that the class will be focusing on thinking throughout the year and that thinking about thinking is a worthwhile and important part of learning. Having students create concept maps as a tool for thinking about metacognition may help to move students from a surface to a deep approach to learning. To the extent that students' engagement in thinking is dependent on their understanding and beliefs about how thinking happens, then the very act of unpacking what it means to think can help students become more metacognitive.

Metacognition can be incorporated in rote memory tasks in order to add desirable outcomes besides simple knowledge, such as math facts. Not only does this metacognitive incorporation collect continuous data to determine students' progress, it also allows students to feel control over the rote memorization tasks (Brookhart et al., 2004). Metacognitive integration also helps students to become highly motivated to observe the progress they are making and strive to reach their goal.

Educators can utilize comprehensive conflict resolution programs in order to develop students' metacognitive strategies. The strategies taught within a comprehensive curriculumembedded conflict resolution program are similar to, or in some cases identical to, strategies used to enhance metacognition (Heydenberk & Heydenberk, 2005). Metacognitive reflection applied in the social domain may transfer to the academic domain. Conflict resolution requires students to routinely examine other perspectives. The evaluation of multiple perspectives increases

metacognitive development by creating an awareness of one's own biases. As students begin to consider the way their actions affects others and seek to find value in other positions they may develop problem solving and metacognitive self-monitoring strategies. Students in a conflict resolution environment may develop a sense of self-responsibility that goes beyond increased reasoning for conflict resolution purposes.

Comprehension monitoring is a component of metacognition. Comprehension monitoring training improves students' ability to make more accurate monitoring judgments (Huff & Nietfeld, 2009). Teachers could employ comprehension monitoring training in order to help their students improve their metacognition around reading. Teaching students how to monitor their own learning and discuss the value of monitoring during learning may assist them in becoming more effective and efficient learners. Having students consider their level of confidence in the accuracy of their responses in assignments and tests, and subsequently comparing their judgments with actual performance, is a valuable metacognitive exercise that teachers can integrate into the instruction and teaching materials. Students can be taught to stop periodically throughout reading selections to perform several self-monitoring checks. They can use such checks to monitor their understanding and to determine whether or not they need to use a fix-up strategy. Brief classroom discussions regarding the utility of self-monitoring and considering confidence could also become a part of regular classroom discourse. In addition to teaching students how to self-monitor and how to determine discrepancies between their confidence judgments and actual performance, focus should also be placed on ensuring that appropriate fix-up strategies are employed.

Teachers may want to consider cross-age peer tutoring as an instructional method for developing and applying reading strategies. From a theoretical point of view, cross-age peer

tutoring can have a positive effect on students' reading strategy use because the process of internalization begins in a social context and then develops within the individual (Vygotsky, 1978, as cited in Keer & Vanderlinde, 2010). Through discussions, peer conferences, peer tutoring, and cooperative activities students implement, evaluate, and modify strategy acquisition and use and discuss strategy application.

There are three limitations to this review of the literature. First, seven out of the ten studies I used for this literature review took place outside of the United States. Second, the samples of all of the studies I used for this review were elementary aged children. I would recommend that future researchers conducted more studies around metacognition within the context of the United States and with secondary grade levels. A third limitation is that the studies I used for this review focused primarily around the areas of science and reading. I would recommend that future researchers conducted more studies around metacognitive strategies for mathematics and social studies. Lastly, I would recommend more research around the use of concept maps, classroom discussion, diaries, and annotated drawings as metacognitive activities.

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Teaching Toward a Better World

What's in a Grade: Exploring Grade Validity

Kyle A. Jutte

Abstract

This paper reviews research studies on the topic of grade validity. These studies look at a variety of grading practices, student and teacher perceptions, grading philosophies, and information about grades presented to students and parents. A principal finding is that teachers are often inconsistent with their grading practices, grading philosophies, and communication with students and parents. A second significant finding is that teachers frequently incorporate non-achievement factors such as effort, participation, and behavior into final grades. This review concludes by summarizing the factors research has identified as threats to grade validity and offering related suggestions for just grading practices.

What's in a Grade: Exploring Grade Validity

Grades hold significance in our society and can have long-lasting social, emotional, and academic consequences for students. There is a perceived correspondence between student achievement and a final grade. This perception gives a great deal of weight to grades, yet not all grading systems equally demonstrate achievement. Stiggins, Frisbie, & Griswold (1989, p. 14) asked "how do we understand and begin to disentangle the complex array of myth, traditions, uncertainty, and procedures that appears to characterize grading practices?" Disentangling the complexity that characterizes grading practices is a process that is paramount to just classroom practices.

The lack of congruency between teachers' practices and measurement theory are remarkably persistent in that they can be traced back through educational contexts for over half a century (Lekholm & Cliffordson, 2008). As far back as 1935, Alexander investigated a personality characteristic – determination and persistence – which was strongly correlated with student success in all school subjects. In 1959, Parsons identified a fusion of cognitive and moral components in final grades among elementary school teachers. By 1991 researchers began referring to grades as a "hodgepodge" due to the growing evidence demonstrating that teachers grading practices diverged from measurement theory, among each other, and even within their own practices (Brookhart, 1991; Tierney, 2011). Teachers' grading practices have been shown to vary by subject area, inclusion of non-achievement factors (such as effort, behavior, and motivation), student characteristics (such as gender and temperament), and socioeconomic background (such as family income or parents level of education) (Frary, 1993; Lekholm, 2008). These non-achievement factors and student characteristics may influence students' grades both directly and indirectly.

This "hodgepodge" nature of grading has continued into present day (Tierney, 2011), yet public school parents in the United States are satisfied with the education their children receive (Randall, 2010). Parents rely primarily on teacher assigned grades when ascertaining the achievement of their children and often, these grades show their children achieving well. These grades do not match up with national or international standardized tests, nor do they match up with college freshmen performance. Stanley & Baines (2001) asserted that a student's final grade serves many inappropriate purposes such as, but not limited to, self-esteem boosters, public relations, rewards, and vehicles to increase college funding for students.

I gained an interest in the topic of grading through my experiences in fall student teaching. I was placed at Shelton High School, which was undergoing a transformation from norm-referenced grading to criterion-referenced grading. I entered my student teaching position unsure of how to feel. I was being asked to help create a new way of grading – one that redefined school work and homework as practice towards the standard's assessments. Students initially resisted the new grading system and parents were confused. Yet, the system proved highly successful and popular. I left Shelton High School with more questions than answers. This experience demonstrated my need to further explore the question: How can teachers fairly and accurately reflect student achievement with grades?

Definitions: Standard, Achievement, Grades, & Types of Grading Systems

The research literature defines a standard as an objective measure that many students are expected to achieve (Randall & Engelhard, 2010). A standard can be school-wide, district-wide, state-wide, or federal. Student achievement is defined as the measure of student learning toward a given standard.

Grading within a secondary context is defined by two primary processes (Dalbert et al., 2007; Randall & Engelhard, 2010; Simons et al., 2010). First, it provides a measurement of student achievement. Second, individual achievement can be compared to a given standard. In other words, grading is the measure of student achievement compared to a given standard. Grading differs from assessment in that grading doesn't necessarily include all the collected assessment results. Grading focuses on the point where students' final grades are being determined by the teacher for the report card.

The research literature generally identifies three approaches to grading: individualreferenced, norm-referenced, and criterion-referenced (Dalbert et al., 2007). In *individualreferenced grading*, a student's achievement is compared to their previous achievement. In *norm-referenced grading*, an individual's achievement is compared to their classmates'. In *criterion-referenced grading*, an individual's achievement is compared to an objective standard.

Review of the Literature

The research studies presented in this paper represent various methodologies such as: an evaluation, a case study, questionnaires, interviews, focus groups, and regional/national grades. This wide selection of research methods may help provide a more balanced view of grading validity. While some of the research presented in this paper comes from the U.S., much of it comes from other countries including: Canada, Germany, and Sweden. All the research included in this paper comes from public, secondary school settings.

The review of the literature will examine grading validity from multiple perspectives. First, the literature review will explore students' opinions on the justice of the three grading approaches. Second, this paper will review teacher grading practices with an emphasis on their inclusion of non-achievement factors such as behavior, participation, and effort. Finally, this

paper will explore the effects of student characteristics, such as gender, on teacher-assigned grades.

Students' Justice Judgments of Grading Systems

Dalbert, Schneidewind, & Saalbach (2007) surveyed students' justice judgments. A justice judgment represents an individual's evaluation of a situation as either more or less just. Justice judgments are influenced by personal experiences and dispositions. One particularly important experience is one's own past achievement. These judgments are always subjective.

The justice judgments were taken from students in German secondary schools (Dalbert et al., 2007). All German secondary schools districts offer three main tracks: Gymnasium, Realschule, and Hauptschule. *Gymnasium* is the highest track; *Realschule* is the intermediate track; and *Hauptschule* is the lowest track. Regardless of track, three core subjects are mandatory in Germany secondary schools: German, mathematics, and one foreign language (usually English).

Dalbert et al. (2007) published two studies that I will be examining. The first study consisted of 350 adolescents attending three Gymnasium track schools out of East Germany. The second study consisted of 225 adolescents attending of two Realschule track (n=81) and two Gymnasium-track (n=144) secondary schools. The data from the second study comes from one East German city and one adjacent countryside district. For both studies, students were administered a questionnaire during lesson time. They were guaranteed anonymity and had parent permission to participate. The questionnaire presented students with four vignettes depicting a grading situation in one sentence. Each vignette was accompanied by three items describing criterion-referenced, norm-referenced, and individual-referenced (this made a total of 12 items). Each item was rated on a 6-point scale ranging from 1 ("totally unjust") to 6 ("totally

just"). In order to measure achievement, students were asked to indicate which grades they had received from each of the core subjects during their last term.

The first study revealed significant differences between the three grading systems (Dalbert et al., 2007). Criterion-referenced grading was considered the most just (M=4.47; SD=0.86), followed by individual-referenced grading (M=3.26; SD=1.21), and rated most unjust was norm-referenced grading (M=2.83; SD=.96). There was not a strong correlation between past achievement and justice judgments. The most significant finding was that high achieving students were more likely to find criterion-referenced grading to be just.

The first study has several limitations. First, it did not show difference across school subjects. Two of the core-subjects, German and the foreign language, had only one vignette, while math had two vignettes. Students' justice judgments of math grading is weighed twice as heavily as German and foreign language. Second, these core subjects were not compared to other subjects such as sports or history. Therefore, students' justice judgments cannot be generalized to other content areas. Finally, the first study only looked at high achieving students (Gymnasium). It is therefore difficult to generalize these findings to Realschule and Hauptschule track students.

The second study revealed results similar to the first study (Dalbert et al., 2007). In the second study, both the intermediate and academic track students considered criterion-referenced grading to be the most just approach (academic-track: M=4.84; SD=1.06; intermediate-track: M=4.56; SD=1.08). The results from the academic track for both norm-referenced and individual-referenced grading are similar to the first study (norm-referenced: M=2.83; SD=1.33; individual-referenced: M=3.42; SD=1.41). The intermediate-track students, however, evaluated both norm-referenced and individual-referenced and individual-referenced and individual-referenced and individual-referenced and individual-referenced students.

(individual-referenced: M=3.96; SD=1.31; norm-referenced: M=3.72; SD=1.25). There was not a correlation found between students' justice judgments and the grades they received. These two studies demonstrate that students' judge criterion-referenced grading to be the most just and equal.

The second study compensated for several of these limitations (Dalbert et al., 2007). The second study consisted of students attending both Realschule and Gymnasium track schools, but failed to include the Hauptschule track. The questionnaire followed the same format as the first study, but corrected the imbalance of vignettes. The second study is still limited by content area, as it does not include sports or history. There are also differences between the German schooling system and the American schooling system, which may complicate the generalization of the results of either study outside of the German school system.

Teacher Grading Practices

Frary, Cross, & Weber (1993) developed a 44-item questionnaire that received 536 teachers replies. The questionnaire consisted of 17 items asking for factual information about testing and grading practices. The remaining 27 items solicited opinions about testing and grading in an academic course using a 4-point agree/disagree scale. All the teachers that were surveyed were secondary teachers of academic subjects from the Virginia public school system.

Frary et al. (1993) found three factors to grading that were generally agreed upon by the teachers. First, tests difficult enough to maximize ranking effectiveness are undesirable (M=2.15; SD=.49). In other words, norm-referenced grading is undesirable. Second, district-wide percentage grading scales are generally desirable and effective (M=2.26; SD=.59). In other words, criterion-referenced grading is desirable. Third, extraneous factors (such as effort or conduct) should influence course grades (M=2.37; SD=.62). The surveys revealed that teachers

commonly contradicted themselves. For example, teachers reported a belief that multiple-choice tests are generally undesirable, yet these same teachers reported heavy use of this type of testing. Teachers also reported a strong belief in criterion-referenced grading, yet admitted that student's grades are sometimes based on their own improvement (individual-referenced). These kinds of contradictions were very common in the practices of teachers studied.

This is an extremely limited study (Frary et al., 1993). The three generally agreed upon factors are based off a questionnaire with weak correlations. For example, the mean ranged from 2.15 to 2.37 with a standard deviation between 0.49 and 0.62. The study is also very old and may no longer represent teacher practices today.

Friedman & Troug (1999) used an evaluation form developed by Friedman & Frisbie in 1995. This evaluation form determined the extent to which written grading policies met with the expectation of assessment specialists. The researchers independently evaluated the grading plans and then met to determine points of disagreement. They evaluated 54 high school teachers employed in the upper Midwest. Eight of the 54 teachers were also included in a focus group, which responded to several grading dimensions developed by Stiggins et al. (1989). They were all from one high school, which serviced about 800 predominately white students.

Friedman & Troug (1999) found that 96% of teachers shared a copy of their grading policy with the students, but only 6% of teachers included a philosophy of grading in their syllabus. 88% of teachers included a copy of the rules for class in their grading policy, while only 53% included the expectations of the general grading policy. Among those that did include expectations, the majority were an explanation of how absences would affect a course grade. Only 77% of teachers included achievement as an important characteristic when assigning

grades. For 88% of the teachers, it was unclear how much information was being gathered for grading, yet most of the focus group teachers felt they gathered too much information.

There were several limitations of the evaluation used by Friedman & Troug (1999). Perhaps the most important is the small sample size (n=54) and the uniqueness of the group of teachers who participated. All of the teachers included in this study were enrolled in the researchers' graduate-level classes in the past. The authors argued that this can lead to a more cordial and honest environment, but it also raises questions of bias and general applicability.

Tierney, Simon, & Charland (2011) examined the grading practices of 77 10th grade mathematics teachers. The study was conducted in several publically funded, English-language schools in Ontario, Canada, between 2006 and 2008. The study employed a survey containing 47 items including Likert-type, checklist, and open-ended questions relating to teachers' demographics, their grading policies, and their awareness and use of grading principles and policies.

The results showed some shocking trends (Tierney et al., 2011). For example, only about 28% of teachers reported considerable awareness of grading principles, measurement theory, or evaluation theory. A similar trend was demonstrated with the implementation of grading principles. Only 23.4% of teachers reported using grading principles, measurement theory, or evaluation theory in calculating their grades. Yet, 94.8% of teachers reported a belief that their grades indicated the degree to which students had achieved the learning expectations. This demonstrated that teachers most often relied on professional judgment when assigning grades and even believed that it was necessary for particular situations. These professional judgments, however, do not always match underlying grading principles.

Simon, Tierney, Forgette-Giroux, & Charland (2010) published a case study of a 10th grade mathematics teacher named Anne. Anne was implementing a new criterion-referenced grading system in the northern region of Ontario, Canada. The data was collected between March and June of 2007. The study looked at how teachers struggle to interpret grading policies and issues faced when implementing a criterion-referenced grading model.

Four themes emerged from Anne's story: a) difficulties matching percentages and rubrics when calculating grades, b) written information given to students on final grades, c) grading principles or guidelines in effort, and d) borderline cases and homework (Simon et al., 2010). The first three themes are different forms of communication difficulties between teachers and students, teachers and teachers, and teachers and administration. The basic finding is that teachers don't always accurately communicate their expectations and grading policies.

Non-Achievement Factors – Effort, Attitude, Motivation, & Behavior

Randall and Engelhard (2010) examined the extent to which teachers consider four factors in grading: ability, classroom achievement, behavior, and effort. Ability, achievement, and behavior are on 3-point scales while effort is on a 2-point scale. This allows for 54 items/hypothetical scenarios within the questionnaire. Three focus groups, each no larger than 5 teachers, were chosen using the snowball technique. Each focus group represented a different grade band (elementary, middle, and high school). Questionnaires were also sent out and received from 516 teachers in a large metropolitan school district in the southeastern United States. 90.2% of respondents were women, but it should be noted that female teachers outnumber male teachers by 9 to 1 in this school district.

The findings show several interesting trends (Randall & Engelhard, 2010). Perhaps the most interesting finding relates borderline cases – cases where students rest on the line between

grades (such as C+/B-, A-/A, etc.). Students who rest on the borderline between grades are more likely to notice effort and behavior as factors in their grades. For example, students with high effort and excellent behavior, yet low academic achievement, were measured with a low ability score of 69% (D+), yet, on average, received grades of 76.8% (C+). This same trend holds true for high achieving students with low effort and excellent behavior. This trend does not hold true for students with inappropriate behavior, however. What this suggests is that behavior weighs more heavily than effort in factoring grades for borderline students. Excellent behavior also has a dramatic impact on students with low effort and low achievement. For example, a student with a failing achievement and low effort, but average or excellent behavior, received, on average a final grade of C-.

The results of this research on borderline students are supported by past research. Friedman and Troug (1999) found that teachers made grading choices for borderline cases using non-achievement factors. Within the focus study, most teachers admitted that they included nonachievement factors such as effort and participation. One teacher's grading policy indicated that if a student was on the borderline between grades, participation would be the determining factor. An analysis of grading policies showed that 9% of grading policies included student's ability, 17% included student's attitude, 32% included behavior, and 43% included attendance. Borderline students are more likely to notice non-achievement factors influencing their grades.

Tierney et al. (2011) questioned teachers about the role of non-achievement characteristics in determining the final grade. It was generally agreed (81.8% – 87.0%) that teachers should not consider student's attitude, motivation, or participation in calculating grades. 32.5% of teachers reported calculating effort into students' grades. One teacher explained, "If a student has struggled but tried very hard, I will raise the mark at times – by a few percent, maybe

5 percent." (Tierney et al, 2011, p. 216-17). It is interesting to note that while 32.5% indicated that they would raise a grade for good effort, only 9.1% indicated that they would lower grades for lack of effort. 49.4% of teachers indicated that they lowered grades for incomplete assignments. This demonstrates that while teachers might not be explicitly aware of lowering grades for lack of effort, they may be doing it implicitly.

McMillan (2001) modified a questionnaire developed by Frary et al. (1993). The questionnaire was completed by 1,483 secondary teachers from seven urban Virginia school districts. Five factors were identified as used to some extent: inclusion of zeros (mean=3.77), ability levels (mean=3.41), student effort (mean=3.23; SD=1.11), quality of homework completed (mean=3.20), and the degree to which a student pays attention and participates in class (mean=3.17). This data suggests a wide range of grading practices among secondary school teachers. For example, the mean for student effort was 3.23, with a standard deviation of 1.11. The frequency distribution for this question revealed that about 38% of the teachers responded with "quite a bit," "extensively," or "completely," while about 22% of the teachers indicated "not at all" or "very little." This question represents differences among teachers in the extent to which they used effort to determine grades. Tierney et al.'s (2011) evaluation of 77 teachers supported McMillan's questionnaire regarding the inclusion of zeros. Their evaluation found that 61.1% of teachers agreed or somewhat agreed that they should include scores of zero for incomplete assignments.

Lekholm & Cliffordson (2009) found that teachers value student motivation when assigning grades. Teachers reported that while they usually focus on academic achievement in calculating students' grades, many were concerned about long-term consequences of overlooking non-achievement factors.

Student Characteristics - Gender, Self-Perception, & Family Background

Lekholm & Cliffordson (2008; 2009) conducted two studies that examine the effects of student characteristics, such as gender on teacher assigned grades. Both studies drew from a questionnaire filled out by 99,070 students who were born in 1987, and who left compulsory school in 2003. The information collected from the questionnaires was compared to student gender, teacher assigned grades, and national test scores in Swedish, English, and mathematics. In the beginning of the 1990s, the Swedish school system switched to a criterion-referenced grading approach, yet became highly decentralized.

The first study revealed that girls achieved higher teacher assigned grades in Swedish and English than national test scores (Lekholm & Cliffordson, 2008). One interpretation of this finding is that girls and boys developed different rationales in school – while girls nurture their general abilities, boys nurture their specific abilities. Family background was strongly correlated to subject achievement, yet parental education did not associate with the common grade for both genders – in fact there was a weak negative correlation. This correlation was stronger for boys (-.54 for boys vs. -.26 for girls). One clear weakness of this study is that it does not consider non-achievement factors such as effort or motivation. This makes it difficult to differentiate between non-achievement factors. Another weakness of this study is the use of national test scores as instruments of measuring student achievement, since they can also measure non-achievement factors.

In their second study, Lekholm & Cliffordson (2009) expanded their study to examine non-achievement factors. They found that student motivation was the single most important characteristic in determining a student grade. Student motivation mediates almost all of the
influence of gender in the common grade dimension, yet differences still existed in the Swedish and English teacher assigned grades. Females are awarded higher grades in these subjects compared to their results on the national test. Females' higher achievement in Swedish and English can also be explained by a greater motivation for learning, more developed social skills, and better self-perception.

Students' self-perception of competence was strongly correlated with subject-specific grades (Lekholm & Cliffordson, 2009). For example, a positive self-perception of competence seems to be a good predictor of achievement. This finding is very questionable, however, because students had multiple previous experiences influencing their self-perception of competence. In addition, classmates' performance may also influence student self-perceptions of competence. Students' self-efficacy or coping strategies may influence grades tremendously, and these strategies are good predictors of student achievement. While not as strong of a correlation, the study discovered several other predictors of student achievement including: parental engagement school work, students' happiness within school, students cooperating with their peers, and students participating in the planning of their education.

Both of these studies had several limitations (Lekholm & Cliffordson, 2008; 2009). First, the national test scores in mathematics had a large amount missing (43.1%) due to an early leak of the test. National test scores in Swedish and English also experienced missing data (17.8% and 21.3% respectively). Roughly 27% of the questionnaires were missing as well. There is also an assumption by the authors that the national tests validly measure student achievement.

Conclusion

The literature review revealed shocking inconsistencies with teacher grading practices. This is troubling given the impact grading can have on a persons' life. For example, grades can

have a dramatic impact on students' self-esteem. This can have a lifelong impact and can begin when students are still young. Grades can also affect an adults educational and career options. This demonstrates the need for more education and clearer grading guidelines for teachers. There are three conclusions from the literature review that must be addressed: summary of the grading approaches, summary of grade validity, and implications for best teaching practices.

Summary of Grading Approaches

Both norm-referenced and criterion-referenced grading systems result in individual students being awarded fairly stable grades, as long as they do not move to a new class or to a new school administrative district (Dalbert et al, 2007). By contrast, individual-referenced grading is more sensitive to changes in individual achievement, and may strengthen students' academic motivation and learning goal orientations. Moreover, individual-referenced grading makes it more likely that students will attribute their learning outcomes to variable factors such as effort. Overall, psychological research indicates that individual-referenced grading best supports students' academic success, yet students want to be graded equally, which requires a standard.

Students have clear opinions about the justice of different grading systems (Dalbert et al, 2007). In the eyes of the students, equality and justice are established by the criterion-referenced grading approach only. This means that students desire an objective and comparable standard that all students are measured against.

Researchers have demonstrated that criterion-referenced grading offers a series of explicit and implicit benefits to students (Bowers, 2011; Dalbert et al., 2007; Randall & Engelhard, 2010; Simon et al., 2010; Tierney et al., 2011). Criterion-referenced grading benefits students in multiple ways. First, it provides a clear objective and grading rubrics. Making the objective and

grading measures explicit and transparent benefits all students. Second, criterion-referenced grading removes non-academic factors from the grading process. This increases the justice and equality of the grading process and closes the learning gap. Third, standards can be reached in multiple ways. Students may prove competency in a standard using various forms of writing, projects, and presentations; or may require other options to demonstrate learning. The benefit is that students are not unfairly graded based off skills that do not relate to the standard. Finally, students are given the opportunity to retake any summative assessment in any way that demonstrates mastery of the skill. This allows students to learn at their own pace and arms them with the metacognitive and critical thinking skills that lead to self-reflection and self-improvement. This process is a powerful learning tool that allows the students to feel mastery over their own learning.

Summary of Grade Validity

There was one finding in particular that was common across all the studies reviewed in this paper. Teacher-assigned grades assess not only academic knowledge, but also student engagement, effort, participation, and behavior (Bowers, 2011; Dalbert et al., 2007; Frary at el., 1993; Friedman & Troug, 1999; Lekholm & Cliffordson, 2008; 2009; Randall & Engelhard, 2010; Simon et al., 2010; Tierney et al., 2011). For example, teachers are told not to include effort when assigning final grades, yet overwhelmingly do so either explicitly (such as including effort on the rubric) or implicitly (such as homework completion and class participation). This means that teachers award grades based on how well students conform to both the academic and social pressures within schools. Rather than academic achievement, grades assess "how well students play the game of being schooled" (Bowers, 2011, p. 156). For example, some students are academically gifted, yet receive low grades because they fail to conform to the rules and expectations of the schooling process. These low grades, in turn, are strongly associated with students dropping out of school. Grading non-achievement factors has been described by teachers as "unpleasant, time consuming, and anxiety provoking," as well as "one of the most frustrating aspects of teaching," yet their inclusion in the grading process is prevalent (Randall & Engelhard, 2010, p. 1376).

What grading factors threaten grade validity? There is a long list of factors that teachers should not use when calculating final grades including: homework, formative assessments, group work, class participation, attitude, motivation, attendance, behavior, ethics, social skills, ability, effort, gender, student self-perception, motivation, parental education, and socioeconomic status (Bowers, 2011; Dalbert et al., 2007; Frary at el., 1993; Friedman & Troug, 1999; Lekholm & Cliffordson, 2008; 2009; Randall & Engelhard, 2010; Simon et al., 2010; Tierney et al., 2011). Valid grades reflect a student's mastery of a standard. In other words, any factor that is not included in the standard should not be included in the final grade.

Implications for Best Teaching Practices

Grades, when assigned based on criterion-referenced standards, provides powerful benefits for teachers, parents, and students (Randall & Engelhard, 2010). When assigned appropriately, grades: (a) enable teachers to compare the knowledge and skills of current students, (b) allow teachers to ascertain accurately the preparedness/readiness of incoming students, and (c) provide parents and students with a clear picture of each student's knowledge and understanding of course content.

Teachers tend to struggle with the idea that good work habits can be encouraged without grading penalties. Teachers struggling with criterion-referenced grading methods have been referred to as the "real world" philosophy teachers (Tierney et al., 2011). There is a flaw with

this philosophy, however. While encouraging students to complete assignments on time may encourage good work habits, it does not orient them toward learning. Grading systems should not encourage students to accumulate points at the expense of learning. Grading systems should only provide evidence of student learning in relation to a standard. Grading should be based on multiple and varied sources of evidence for each standard (Simons et al., 2010).

Criterion-referenced grading requires a backwards design approach. It forces teachers to set the target before building a curriculum. The targets or standards must be clear and well defined. Each standard must have a rubric that allows the teacher to gauge student progress toward the standard. The standards, summative assessments, and grading rubrics need to be transparent – students and parents need this information on day one. For a criterion-reference system to work, students must be aware of the grading process and be allowed to retake assessments to demonstrate movement toward the standard.

There is a need for additional research in this area. In particular, researchers need to explore the short-term and long-term effects on students of grades that include and exclude non-achievement factors. I would also recommend that researchers explore grading validity and justice within the United States.

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The Effects of Empathetic Teaching in Elementary Education

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Abstract

Empathy is the ability to vicariously experience other individuals' emotional states. This paper reviews research that investigated the results and implications of actively teaching empathy. The studies selected include those looking at classrooms from kindergarten through high school located in the United States, New Zealand, Italy and Switzerland. This research has provided evidence that teaching empathy has powerful effects including: promoting a positive classroom culture, aiding in the teaching of multicultural students, raising achievement test scores, and decreasing or eliminating bullying within schools. It is recommended that teaching empathy, beginning as early as elementary school, be implemented by educators across the curriculum to combat bullying.

The Effects of Empathetic Teaching in Elementary Education

The 2009 National School Climate Survey on school-related experiences of students showed the prevalence of violence within schools: nine out of ten students experience harassment. These statistics range from 85% reporting verbal abuse to 60% reporting physical harassment and assault (Kosciw, 2009). These statistics have been associated with lower grades and missed class, as well as depression and self harm. These links go even further: suicide, substance abuse, and prostitution have all been correlated with the chronic stress created by verbal and physical abuse received from peers and adults within the education system (Savin-Williams, 2002). Often, schools find short-term solutions or programs that defer or inhibit bullying behavior *after* bullying has been enacted by students over a number of years. Schools use programs that often may either ignore the behavior or punish a set of routines that students have been experiencing as a part of their schooling for the majority of their educational experience.

Effects from bullying can have devastating results, immediately on learning and even long-term effects that can last, perhaps, a lifetime. Students who intentionally bully others are more likely to: get into frequent fights, steal and vandalize property, drink alcohol and smoke, receive poor grades, perceive a negative climate at school, and even carry a weapon onto school property. One student can change the dynamics of an entire classroom and perhaps have a negative effect on twenty-five or more children for years and years. If a bully can have such a negative impact on a classroom, a teacher can have an equally good chance, if not better, of having a positive impact on a classroom, including the potential bully.

Supporting diversity rests on enlisting empathy to truly understand and relate to the differences and similarities between people of differing cultures, beliefs, races, and genders: The

question guiding this paper is meant to inform my understanding of how to promote diversity: what are some proven, powerful effects resulting from teaching empathy in the classroom and how might these effects be realized?

Empathy is considered the tendency to vicariously experience other individuals' emotional states (Davis, 1994) and an emotional response that is more focused on another person's emotional situation. This type of emotional response can be either identical or congruent with that of the other person involved. Empathy can be more concretely defined as the tendency to vicariously experience other individuals' emotional states (Advancing Insights, 2011). A lack of empathy, conversely, implies the inability to view the world from other individuals' perspective or to feel sympathy towards their suffering (Davis, 1994). A lack of empathy can also lead to a predisposition toward prejudice and also has predictive power with regards to bullying and defending behavior in students, in that low levels of empathetic responsiveness can serve as a predictor for the risk of students being involved in the bullying of others (Endersen & Olweus, 2001).

The empirical, peer-reviewed studies that were used in the review of the literature were gathered during the winter of 2012 using searches through the Educational Resources Information Center (ERIC). The studies include students whose ages range from kindergarten through high school and were located in many countries including America, New Zealand, Italy and Switzerland.

Literature Review

Effects of Empathy on Students

McAllister (2010) analyzed the practices of 34 teachers regarding the role of empathy in their classroom and its effects on students. She found that when empathy was used by teachers

in cognitive, affective and behavioral components, that not only did bullying decrease in classrooms at high rates, but that three major themes appeared in these empathetic classrooms: (1) More positive interactions with culturally diverse students. (2) More supportive classroom climates. (3) More student centered practices. Teachers were able to achieve these results in several major ways including cultural immersion trips and sharing with students their own experiences as minorities. Showing and including empathy in their teaching had positive effects on reducing bullying in their classroom in both the short and long term.

Similarly, Cooper (2002) also observed teachers' use of empathy in classrooms. Sixteen practicing teachers, residing in England, took part in interviews and observations of their classrooms in this study that was designed to assess how to best use empathy in the classroom. Cooper found four different types of empathy used by practicing teachers. These types of empathy were: functional, feigned, fundamental and profound, listed in increasing order of effectiveness. Cooper found "functional empathy" most often in the teachers' classrooms, a form of empathy in which the teacher treats the class as one entity during interactions. While used most often by teachers in an attempt to find similarities among a group and touch more than one person at once, functional empathy actually tended to be the most detrimental to a group. Functional empathy was found to increase stereotyping in classrooms (the opposite of what cultural diversity tends to do). Rather than modeling real care or individualized attention, the teacher was seen as showing disinterest for individuals (albeit unintentionally) while modeling to students the inability to listen and respond with true empathy.

Cooper (2010) found that teachers who "feigned" empathy, only pretending to be empathetic, seemed to decrease their students' ability to bond with the teacher in the classroom. Cooper writes, "[in] the moment of interaction or contemplation, the empathetic person has a real

sense of accepting and understanding the other" (p. 108). This can be conveyed to the recipient of empathy, and some common area of feeling or understanding is reached, forming a 'mutual bond.' If empathy is feigned, this mutual bond cannot take place.

Cooper (2010) defined "fundamental empathy" as the ability to make true and real connections between individuals, which over time was seen as having the ability to transform into "profound empathy." Profound Empathy included the teacher's ability to demonstrate a personal level of care and concern when modeling morality and empathy to students. In classrooms, with teachers who showed profound empathy, students were bonded with each other and reported feeling as if their room was a place where they could share their innermost feelings and thoughts.

This research (Cooper, 2010; McAllister, 2002) showed empathy to have a positive impact on creating a positive classroom environment. Additionally, when explicitly taught in schools, empathy decreased student bullying (Su, 2010), aided in teaching and appreciating multicultural education in the classroom (McAllister, 2002) and provided a stronger classroom community (Cooper, 2010).

One way researchers have measured empathy is using the "Basic Empathy Scale" (Albiero, Matricardi, Speltri and Toso 2009). The effectiveness of the BES was established in a study that involved a sample of 655 Italian adolescents from two mid-sized towns. The study students ranged from 14-18 years of age and included 252 males and 403 females. The final version of the BES included twenty total items, which measure two distinct parts of empathy. Part 1 of the self-assessment (which remained anonymous for all students) focused on that of the congruence with another person's emotions, which, as stated earlier, is the element of empathy that allows the individual to be able to share a common experience with another. In Part 2 of the

self-assessment, the BES also measured the ability for one to understand another person's emotions so that, not only is the individual relating to a common experience, but is also experiencing emotional empathy that allows an understanding of that shared experience. Possible responses on the BES included such statements as, "I don't become sad when I see other people crying" and "I can usually realize quickly when a friend is angry." The results of the BES were compared with distribution rates of older, similar scaled-studies, including the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) and the Balance Emotional Empathy Scale (Mehrabian, 1996). Using the BES, students can be measured as either high or low in total empathy and the results can also show the different measurements of Cognitive Empathy (Part 1) and Affective Empathy (Part 2), which gives a total and more realistic picture of one's placement on an empathetic scale. Because of this, the BES is a useful tool in the measurement of empathy.

Research Studies On Empathy

The following research studies the correlation between empathy and bullying. Simona, Caravita & Blasio (2009) conducted a study that included a sample of 266 primary and 195 secondary students, located in Milan, Italy, and the researchers tested students for both cognitive and affective empathy. The researchers found a negative correlation between empathy levels and one's ability to participate in and defend the behavior of bullying. They also found a positive association between perceived popularity and bullying. In other words, if students perceived targeted students as popular, these students wanted to share a common bond with these peers and did not want to act in a negative way. This ability to recognize that others have qualities that potential bullies would like to emulate is a form of empathy—being able to imagine what this person's life is like and to share a common bond. The researchers concluded form their study

that empathy allows students to share favorable qualities along with the ability to be empathetic with problems and concerns.

Raskauskas, Grogory, Harvey, Refshana & Evan (2010) conducted research that had similar findings about empathy and bullying. They also found a negative correlation between empathy and bullying and between empathy and the ability to defend and continue such behavior. Self-reported data indicated that involvement in bullying was related to a lack of empathy and the classroom climate, with bullies and bully-victims having the lowest empathetic connection to school and the poorest relationship with their teachers. The sample for this study (Raskauskas, et al., 2010) was a stratified randomized group of 1168 participants residing in New Zealand between the ages 8-13 years of age. Students completed three questionnaires including: the Peer Relations Questionnaire, which assessed the prevalence of bullying; the Index of Empathy for Children and Adolescents, which is highly similar to the research conditions and standards of the BES, and the Measurement of Classroom Climate (Elliot, 2000). The inclusion of asking students about classroom climate, as well as measuring empathy and bullying, enabled this study to show a dynamic involving both the instance of bullying and a decline in empathy. While both the studies by Simona, et al. and by Raskauskas, et al. record the connection between bullying and lower empathy levels, the latter study identifies both bullies and their victims as having a lower level of empathy and therefore a lower connection to the classroom culture. These studies suggest, that not only may limited empathy, starting from a young age, persist and allow the pervasiveness of bullying, but that the act of bullying in schools negatively impacts the level of empathy as well, decreasing it within individuals over time and therefore leading to its continuance (Raskauskas et al., 2009). This decrease in aggression from

both sets of students strongly suggests that empathy is important and powerful in a student's life--especially in regards to bullying.

Su and Mrug (2009) investigated both the effects of bullying on a student's life as well as the use of empathy. The authors discovered, through interactions with 603 adolescents who had and had not been bullied, that family members who both showed and taught empathetic social skills provided positive outlets for both groupings of students. Results were recorded in three waves in which students were interviewed and measured on three distinct points including: violence exposure, aggression, and parental nurturance (which focused on families ability to show empathy). Commonly students showed higher aggression levels due to violence and bullying. But the students who measured their families as showing empathy within the home showed lower levels of aggression. This correlation proved also to be true for students who had not experienced bullying, though the decrease or effect was slightly less. Although this research paper does not specifically study the effects of empathy in a student's home life, I believe that it is also important, for further research, to consider how a family's values and practices of empathy can affect a student's behaviors inside the classroom.

Malti (2009), a child psychologist working at the Jacobs Center for Productive Youth Development at the University of Zurich, also conducted research on empathy and bullying. The participants in this study were 175 Kindergarteners residing in Switzerland; the student's family and teachers also took part in the same questionnaires and interviews. The data was recorded in several categories including "Peer Victimization," in which all participants responded about their awareness and perceptions of bullying and whether the student took part in or received bullying from other students. Researchers measured for empathy of an individual as well, and used the BES accordingly. Researchers used teachers, parents and students to assess

negative emotional responses and, separately, aggression. Because the aggressive attitudes were recorded in this particular study, Malti's findings were similar to the studies mentioned above regarding the negative correlation between empathy and bullying. The harmful consequences from bullying and low empathy indicated in this study included depression, anxiety and an inability to connect with peers and teachers (Malti, 2009). A student's inability to connect appropriately as a result of bullying may skew empathetic behaviors. Malti found that children who have been victimized may also become overly concerned with other children. This over identification with others' needs may prevent children from identifying with their own emotions and needs, inhibiting empathy.

Using Empathy In The Classroom

Empathy is a basic building block in learning how to treat other people, how to maintain self-esteem and confidence, how to bond with classmates and teachers, and how to go through school successfully. The studies discussed in the this next section look at teaching empathy to elementary school students in a number of ways: through fine arts, virtual teaching, story telling and service learning. Moore (2009) studied empathy in her own classroom, investigating the use of art and aesthetic engagement in fostering and teaching empathy. Moore's study included a lesson that she described and analyzed. Two classrooms of her fourth-grade students volunteered with up to 28 students in each classroom. The first lesson included role-playing, where fourth grade students sat in a table-like sitting and were asked about their idea of space. Questions were aimed at developing student's qualitative reasoning skills and exploring perceptual detail and attending to their emotions reactions. Students were slowly launched into the larger idea of design and space in art through the simple exercise of asking questions that initially explored individual and group ideas of space and emotions related to space and the

possible position students held in a particular space. The teacher used the concept of empathy to connect the student to an initial idea about themselves as existing in time and space, how this might affect another person, and working on this empathetic ability to scaffold learning in a particular way. Moore's object was to instill in the student an ability to exhibit composition, to be able to develop an understanding that each art piece has a different function, and to imagine what this may be. This study goes beyond the necessary practicality that makes a lesson plan useful as something that can be replicated successfully in the future; the lessons themselves instill the idea of empathy and are an indication that creating an empathetic classroom culture can decrease in bullying. According to Moore, the "concept of aesthetics as being a distinct mode of perception and dimension of experience is currently experiencing a strong revival in aesthetic theory. To defend aesthetics as a sensory perception with the goal of understanding another through an understanding of self is exactly the term that I will relate to the practice of caring" (pg. 27). What Moore defines as an understanding of another through the understanding of self is, in effect, empathy. Moore develops an approach to aesthetics and classroom lesson plans that can be used by other teachers to slowly build a caring culture in the classroom. As the classroom culture in Moore's research study became more positive and empathetic, bullying was seen to decrease

Research studying empathy in the classroom of Baker (2009) also found that teaching social skills such as empathy, even in a virtual environment, had positive results. This study is important, especially in an era where more and more students spend hours online rather than developing person-to-person social connections. In this study, 54 rural students from Pennsylvania took part in a daily lesson in which they were taught and discussed ways to better use empathy towards others. They then created avatars (a graphical representation of the user)

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and their avatars practiced these skills within a virtual reality with other users. Students ended their sessions by answering open-ended questions about themselves as well as other users. Baker used these findings to make the case for "social skill interventions" which can make huge impacts in students' self-assessing their ability to handle negative emotions within school, such as guilt and shame, and their ability to better connect with their peers and to show genuine empathy. Using simple teaching strategies online, such as students introducing themselves when meeting a new person, developing positive techniques to start conversations and keep them going, and inviting someone else to play and expressing feelings, students were better prepared when dealing with social situations within their classroom and had a much stronger ability to reflect upon their own emotions and to see how those feelings relate to and within the group.

While Baker describes ways to intervene in young students' lives when they are already lacking in social development or struggling from bullying, Upright (2002) records the great success that can be achieved when starting empathy teaching at a very early age. In *To Tell a Tale: The Use of Moral Dilemmas to Increase Empathy in the Elementary School Child*, Upright uses the strategy of moral dilemmas and role-play within story telling to teach and foster empathy in young children. Upright makes the point that, as Piaget (1960) has written, very young children generally have a very egocentric view on the world, which gradually expands to encompass the feelings and motives of others. One way to help a child experience the world from another's perspective is through the use of role-play and moral dilemmas that the student can associate with and work out in the comfort of the story. These strategies are potentially significant, in that a student's ability to understand and use empathy can lead to a caring attitude and can decrease bullying within the classroom.

Upright (2002) indicates that a student's ability to connect with stories can gradually increase their moral level and ability to become empathetic. Upright observes his students in whole groups, as well as individuals, through interviews. Upright originally does interviews with his students in which he asks his students "What is kindness?" or "What is empathy?" Based on the 27 students' responses, Upright makes decisions about literature and scenarios that students would benefit from, such as what to do for another student who is sad and left out of the group. After such an assessment, a teacher will better know which stories to select and work on with individual students. Students can take part in reading with warm-up exercises that ask them to share in detail what they see on the cover, or what the story may be about, as well as to brainstorm possible situations they have encountered that are similar to the story. Not only do these exercises allow students to begin thinking empathetically but they also aid their comprehension and reading strategies (Marshall, 2011).

Upright (2002) found that students undergoing these lessons are better able both to show and to reflect upon empathy, which in turn leads to less bullying. Upright demonstrates that, while empathy is indeed a learned process that can be strengthened, it does not happen automatically or instantly, but must be cultivated with the care and through repeated modeling. To demonstrate this complex approach, Upright shares the story of Joshua, who on Valentine's Day voices his desire to share his treats with another student in the class who is sad because they did not receive many valentines. Joshua is not only able to understand his classmate's feelings, but shows empathy by both verbalizing his peer's emotions and seeing his own ability to show compassion and kindness. Empathy serves in the short term to foster caring and kindness and to reduce the rate of bullying; but it is also a long-term solution which decreases bullying in schools, advances students' learning across the curriculum, increases a teacher's ability to work

with multicultural students, and encourages students to develop life-long habits of participation and service.

Fox (2010) noticed similarly long lasting affects of teaching empathy with a yearlong approach towards community integration and service. Through a sequence of lessons on poverty, both elementary and secondary students in North Carolina worked towards the state standard of "strong student character and personal responsibility of cultural learning." (pg. 17). This study indicated that there is an innate desire in elementary students to help others and to participate in the understanding of human needs. Empathy towards those living in poverty, and service towards the betterment of those individuals, seemed to decrease as students became older. Though the study refrains from hypothesizing why this may happen, it seems that while many teachers begin empathetic teaching in younger grades, the practices tends to decreases as students advance. Fox used a year-long integrated approach towards empathetic teaching. The results showed positively that students increased their awareness and ability towards empathy, bullying decreased, and students (especially young students) became connected on a deeper level to their community as well as to global issues and civic action.

Durlak, Dymnicki, Weissnerg & Schellinger (2011) present a meta-analysis of the findings behind the Collaborative for Academic, Social and Emotional Learning's (CASEL) school-based program of Social and Emotional Learning (SEL). SEL can be defined as the process through which students acquire knowledge to recognize their emotions, demonstrate caring for others, set and achieve positive goals, establish and maintain positive relationships, make responsible decisions and handle interpersonal situations effectively (Payton, Weissberg, Durlak, Dymnicki, Taylor, Schellinger & Pachan, 2008).

The SEL program builds on the previous skills developed by teachers explicitly teaching. modeling and allowing for practice in five empathetic competencies, including: self awareness, self management, social awareness, relationships skills and responsible decision making. The implementation of this program in schools has been researched in 213 schools involving 270,034 students from kindergarten through high school (Durlak et al., 2011). Information was taken before and after SEL was implemented in the areas of students' attitudes towards self and others, positive social behavior, conduct problems, emotional distress and academic performance. Findings from the meta-analysis showed that students in the SEL programs demonstrated improvements in areas including student's social-emotional skills and attitudes towards self, school and others. Conduct problems such as bullying also decreased as well as reported emotional distress. Additionally, SEL programming yielded a consistent rise in academic performance across schools, showing an average gain on achievement test scores of 11 to 17 percentile points (Durlak et al., 2011). The findings indicate that "SEL programs appear to be among the most successful youth-developed interventions ever offered to K-8 students" (Payton et al., 2008).

As each study shows, regardless of the different approaches or theories employed, empathy has a profound effects on both classroom environment and individual students when implemented and taught by an educator within schools; and the key point, in terms of my paper, is that empathy is something that can be taught. Empathy can positively change both immediate classroom culture and student interactions in relation to bullying and peer victimization, while providing long-term enhancements in students' ability to socialize and connect with their peers and their community.

Conclusion

There is a definite pattern throughout the research, which can be organized into three main findings that should help other teachers better understand the primary question guiding this paper: What are some proven, powerful effects resulting from teaching empathy in the classroom and how might these effects be realized? The first finding is based on the need for implementing empathy in the classroom. The incidence of violence within schools is documented throughout this paper. As stated in a 2009 National School Climate survey, nine out of ten students reported either verbal or physical assaults (Kosciw, 2009). This is distressing in and of itself, but the findings relate these assaults to lower grades, missed classes, depression, self-harm, suicide, and substance abuse. This paper suggests that there is a significant problem of bullying that exists in classrooms and that implementing empathy in the classroom is a possible solution to this problem. (Simona et al., 2009). Findings of this paper indicate a correlation between teaching empathy and a decrease in bullying (McAllsiter, 2010). Empathy in a classroom was found to increase a teacher's ability to demonstrate a personal level of care and concern when modeling moral or ethical matters, so that students were better able to self-regulate positive behaviors, which in turn led to a decrease in bullying.

The second finding from this research that can benefit teachers is the fact that teaching empathy can positively change the overall atmosphere of a class. Empathy has been shown to increase positive interactions among culturally diverse students, increase over-all supportive attitudes of students, raise achievement test scores, and enable greater student-centered practices, which allows the teacher more time to teach and offer individual attention to students and reduces the amount of time spent simply enforcing classroom rules (Cooper, 2002). Teaching is very much a group activity, where students are affected by the teacher as well as one another.

The teacher's ability to bring students together, to use appropriate group work, and to provide occasions for students to better see themselves as connected to their classroom, school, community and on a global scale, is not only required through state standards (The Academic, Social, and Emotional Learning Act of 2011, HR 2437) but is also a direct route to more efficient and positive teaching.

The third finding has to do with the relationship between self-understanding and outwarddirected empathy in the classroom. The research strongly suggests that empathy can be used to help teach students gain a greater understanding of their own selves, which then can be used to teach empathy toward others (Moore, 2009). This paper suggests, more specifically, that the teaching of art and aesthetics can be used as an effective tool for promoting individual selfawareness and shared perceptions and experiences. The use of art to teach sensory perceptions has an ultimate effect of improving the understanding of the self in relationship to others, by scaffolding learning on the basis of empathic perceptions of space, emotions, time, and functionality (Moore, 2009). The teaching of empathy through aesthetics can be combined with students' creation of individual and group art pieces to explore understandings of self and others. Open-ended questions and discussions can be extended beyond art projects and can lead to social skill interventions (Baker, 2002). Social skill intervention can increase students' abilities to handle negative emotions, such as guilt and shame (emotions connected with bullying) and enhance positive connections with peers. Empathy can help students to develop foundational social skills, which in turn can help them to learn how to properly regulate their interactions with others, to perform successfully as a member of a group, and to handle stressful situations without resorting to violence (Upright, 2002). Upright (2002) found that empathy is a learned process. Empathy is not something that happens instantly, and to be most effective, empathy must be

modeled over a sustained period of time. These findings show the importance of including empathy as part of the regular curriculum.

Teaching empathy involves using and modeling the attributes of positive behavior to students. It has been shown that higher levels of empathy lead to lower levels of peer victimization. Empathy enables students to connect with other students' emotions and to learn to verbalize their responses. This can have a significant impact on both the social and cognitive outcomes for students and their schools. Empathic students have an increased ability to connect with their communities and to see themselves in a global spectrum; and they are far less likely to participate in or defend bullying within their schools. Because of the evidence in the research, it is the recommendation of this paper that making use of lesson plans that teach empathy, beginning as early as elementary school and continuing in all upper grades, is something that should be implemented by educators across the curriculum to combat bullying. It is through the teaching and modeling of empathy that bullying can be prevented and reduced within schools across the globe.

In concluding this paper I would like to move out of the mode of a literature review and into a telling a story. This is a true story from my student teaching experience that initially motivated me to review the research on empathy. In sharing this story, I hope to support this paper's conclusion that empathy can be a powerfully positive force in the classroom. Working in a first grade classroom, I have witnessed bullying even at this young age, especially with students who fell outside any "norms" the children were already identifying with. In particular, students were bullied for differences in gender, the clothing they wore, or their ability to socialize and bond within the group of the classroom. I also witnessed resistance against bullying from my young students, particularly from the effects of the inclusion of empathy

within the classroom. In the middle of my student teaching experience, my master teacher's husband died very suddenly. He had been close to all of my young students and my students had to deal with the loss, and changes of the classroom, together as a group. Students were encouraged to share experiences in their own lives, write stories and letters, create artwork and sit and talk together in a way that seemed impossible previously. Through the use of storytelling, shared discussions, writing, and art work, these students were able to develop a sense of shared experience and a heightened sense of empathy for one another. This ability to share an experience enabled the students to understand the similarities between themselves and the other students in the classroom.

As Davis (2004) notes, empathy is considered the tendency to experience others' emotional states. And while this particular tragedy is not something I would like other classes to have to experience, my point is that it was the implementation and use of empathy that allowed for even a very negative and tragic emotional situation to ultimately be something students could learn and grow from in a positive way. If the use of empathy can turn a class around with such a difficult issue as death, it is, I think, very hopeful to imagine how much benefit empathy can have in a classroom during a normal school year—with all its ups and downs. This sense of community and classroom culture allowed my students to practice empathy and respect one another in ways they had not shown previously, and helped them to grow from this ability to see another person's point of view. During this experience, I saw a dramatic decrease in classroom bullying and peer victimization. It became apparent to me that using empathetic teaching tools during this occurrence of a shared common experience allowed students to see more closely how they all related, and therefore made it much harder to defend any behavior of bullying between their peers. This occurrence and the research that I have done for this paper, have led me to

believe that empathetic teaching in school could significantly decrease bullying.

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Bridging the Gap: Strategies to Support Students in Low-Track Classrooms

Krystle D. Laughter

Abstract

Significant research shows that tracking has insignificant effects on high track students and negative effects on low track students. Despite this evidence tracking remains a common practice in schools throughout the United States. In this literature review I examined tracking research to answer the question: What are strategies to support students in low track classrooms? The studies in this literature review looked at research on educational tracking in order to conclude common tracking outcomes and provide practical solutions to foster the academic success of students in low track classrooms. The studies were constructed in a variety of communities and frameworks; they include an examination of topics that range from teacher and student perspectives on tracking to gentrification and how it can create in-between school tracking. Findings suggest that teachers of low track classes fail to meet student need by maintaining low student expectations, producing negative teacher-talk, and watering down curriculum. These studies imply that teachers can create positive environments that support academic motivation by providing students with rigorous and culturally relevant curriculum, high teacher expectations, and opportunity to learn grade level-standards.

"Children are the world's most valuable resource and its best hope for the future" -John F. Kennedy Bridging the Gap: Strategies to Support Students in Low-Track Classrooms

Each fall millions of parents send their children to elementary schools all over the United States in the hopes that their local school system will foster and cultivate the cognitive potential of their precious children. At best these parents believe that these schools will inspire and promote academic growth in their children, preparing them adequately for future school curricula, and college readiness. Nevertheless, despite parents' best wishes for their child, the school system might be setting them up for failure. A system has been established in public schools that can either foster a bright academic future, or potentially hinder students' potential for success. This system is called tracking.

How does tracking work? In my observation of a tracked kindergarten classroom I witnessed some revealing teacher talk around ability grouping. My observation took place in an urban school in Washington State. The neighborhood in which the school was housed had a high poverty rate. Throughout my observation, and without any prompting, the kindergarten teacher made countless references to the cognitive ability of her students stating on one occasion, "My kids are very high, this is the highest group I've ever had." Sometime during my observation I mentioned to the teacher that I had two young children, she quickly responded by asking me if they were "high" or "low." I was baffled by her question because I believed that it was professionally inappropriate to ask such questions. Secondly she was attempting to categorize my two very young children.

Some research studies have suggested that this type of teacher talk is not uncommon in tracked schools. Rist (1970) found that students in kindergarten were placed into reading groups within the first few days of kindergarten, not based upon their ability, but upon such factors as physical appearance, racial differences, and parental work patterns. Oakes (1985) found that

students who test into high tracks are presented with more rigorous curriculum by more experienced teachers, while students in lower tracks, often students in poverty, do not have access to the necessary courses that prepare them for college. My brief experience in a tracking atmosphere has shaped my perspective on educational tracking, but what does the research show?

Research has shown that people hold a variety of perspectives on tracking. Ansalone (2009 & 2010) found three perspectives on tracking: efficiency, self-development, and critical. Some proponents of tracking view the efficiency perspective as a means of social proficiency by allotting the best resources to students with the most potential and guiding the others into varying levels within the labor market. The self-development perspective is viewed by it proponents as a adequate means for meeting the differential needs of students; believing that students benefit from not having to compare themselves with students who are more academically advanced them, thus allowing them to focus on their learning with like-peers.

Opponents of tracking who believe that low-track students receive inferior education in comparison to their high-track counterparts may take on the critical perspective; they argue that higher-tracks receive more access to more creative and rigorous curriculum. The main argument of this view is that tracking is a means for maintaining class stratification.

The topic of tracking is of interest to me not only because I am a mother of two young children, but also because I believe that school should be a place of engaging learning experiences that challenge students and incite metacognition. From my personal experience observing and student-teaching in a school that uses ability grouping I have witnessed some unsettling teacher attitudes and behaviors that suggest that tracking may produce negative teacher talk and academic outcomes for students.

In this study I will use the terms "tracking" and "ability grouping" interchangeably. I will discuss a students' opportunity to learn (OTL), which is a student's access to academic content, exposure to grade level standards, and the time spent learning them. I will largely focus on students in low-track classrooms with limited research regarding students in high-track classrooms. The goal of this study is to gather practical classroom strategies and practices that support students in low track classrooms. In order to do this it is essential that the research on tracking be examined. I will look at a small body of tracking research, discuss tracking outcomes, and suggest strategies that teachers can use to support students in low-track classes.

Literature Review

What is Tracking?

What is tracking and how does it work? Tracking by definition is the categorization of students into groups based on perceived ability. These perceived ability levels are often viewed as innate and past track placements often influence present and future placements, thus perpetuating academic inequality (Oakes, 1985). The most common method utilized for determining the "appropriate" track level for a student is standardized testing; however, other factors such as socioeconomic status can determine a student's track placement.

Students are sorted and assigned to specific ability groups based upon achievement test scores, I.Q. tests, or even teacher recommendations. In his study Ansalone (2003) investigated the question, is track placement class and race biased? He examined American and Great British research to discover if similar results regarding tracking would surface. He discovered that the tests that were utilized to measure student ability were not always accurate and that they may lead to race or class bias. He found that a teacher's first knowledge about a student frequently came as a result of track placement. Teachers often held low expectations for students in low-

track classes and had more positive comments toward high-track students. To some tracking may appear to be the solution to the differing needs of students; but to others it's another vehicle to perpetuate social inequality. A disproportionate number of low of track students are minority and low socioeconomic status students (Ansalone, 2003).

He also discovered that track placements were not always procedural. Many variables such as, dress, social status, previous track placements, and not testing alone could determine a student's current and future track placement. As a result of tracking procedures students were separated by such factors as: race, ethnicity, and economic status. Sixty percent of the children in the high-track classes were composed of children of "advantaged professionals" (p. 7), and almost 50% of a lower-track class was composed of students whose parents were classified as manual laborers. Additionally, children whose families lived near or below the poverty level were more likely to be placed in low-tracks than students whose parents had a higher socio-economic status.

Research points to the fact that minority and students of low socioeconomic status are placed in low tracks at a higher percentage than their non-minority peers, but less research has been conducted on how low ability grouping affects student aspirations? Akos, Gilbert, Lambie, and Milson (2007), focused on student occupational aspirations comparing students from different tracks. The initial student sample consisted of 812 eighth graders from four middle schools in North Carolina: two rural, one urban, and one suburban. In accordance with the new North Carolina graduation requirements the standard course of study (SCOS) was split into four distinct tracks for high school graduation. Eighth grade students and their parents choose from one of these tracks. Schools provided documented curriculum choices for 522 students (the study sample).

The study sample included 259 males and 263 females. Minority students were represented as follows: 20% African American, 4% Latino, and 3% Asian American. Additionally, 15% of the students received free or reduced lunch, 18% were identified as gifted, and 3% received ESL services. The researchers found that there were many variables that impact a student's occupational aspirations such as, the values and beliefs of others, perceived career accessibility, intrapersonal factors such as social skills, and systemic factors such as socioeconomic status. The research revealed that college/university SCOS had a higher GPA (3.25), than did students who chose the technical college SCOS (2.56).

Additionally, relationships were identified between SCOS student attendance and behavior referrals. Students who chose college/ university tracks had significantly less absences (4.60 vs. 9.67) then did students who chose technical college SCOS, as well as fewer behavior referrals (0.46 vs. 0.96). This research suggests that students in higher academic tracks perform better in school, have higher attendance rates and have less behavior problems than students in lower tracks. But what accounts for these differences between tracks? The study cannot answer what caused the difference, because it was correlational. Perhaps students' choices effected their behaviors.

Although tracking is typically established through systematic factors within the school system this is not the only way tracking occurs. Ansalone and DeSena (2009) conducted a qualitative study that examined the connections between gentrification and educational tracking. The research was carried out through observations at a pre-school sponsored by the YMCA over a period of eleven years. Formal interviews were conducted with parents later on. The neighborhoods at the forefront of this study Greenpoint and Williamsburg are located on the peninsula of Brooklyn. In 2000, the combined number of residents was 160,338. Of these

residents, 48% were white, 6% black, 38% Hispanic, 4% Asian and Pacific Islander, and 5% were non-Hispanic. The researchers utilized observations, interviews to gather information.

The researchers found that gentry families living in urban neighborhoods created an in between tracking school in two Brooklyn neighborhoods, Greenpoint and Williamsburg by petitioning for their children to attend schools outside of the urban neighborhoods in which they lived. These neighborhood schools were deemed less desirable because of their location and low socioeconomic status association. In an attempt to provide a more prestigious education, advantaged families petitioned for their students to be sent to more affluent schools outside of the neighborhood in which they lived; resulting in students left at their home school receiving less educational resources and funding and being plagued with a type of societal stigmatization.

What About High Track Classes?

Research about low track students is prevalent, but what about students in high track classrooms? Although some research suggests that low tracks may retard students' academic success, less is known about students in high track classes. Smith (2008) conducted a yearlong ethnographic study in a literacy honors class. The participants in this study were freshman students in a literacy honors class at Oakton High school. This school is located in a suburb of a large midwestern city in the United States. This study examined the connections between school related events, practices and the identity formation of honors students.

Smith found that honor's students were regularly encouraged by teachers to identify themselves based solely upon their honors status and to esteem their status above other students. The teacher made it very clear what specific behaviors were associated with being an honors student and the expectations that went along with it such as honesty, being able to handle a heavy work load, flexibility, and linguistic capability. Honors students were viewed as more capable by
their teacher and received less disciplinary action for inappropriate behavior than did students of regular classes.

If students in high track classes appear to be successful among other capable peers, what happens when they enter heterogeneous groups? Burris, Heuberr, and Levin (2006), conducted a study to answer this question. The investigation was conducted in a suburban community with a student population of 3,500 in Nassau County, Long Island. Students who attended the community's school were predominately white and upper middle class. The average high school enrollment is about 1,100 with 8% African American, 12% Latino, and 2% Asian.

The researchers utilized a longitudinal methodology to examine the effects of universal acceleration. Universal acceleration is Mathematics achievement data was examined over a sixyear period. Burris et al found that after universal acceleration, initial high achievers took more advanced mathematics courses, more advanced placement calculus exams, and more high achievers earned higher scores on the advanced placement calculus exams, as did other groups. This study, although small in scale, may imply that all students benefit from heterogeneous grouping.

What are Student's Perspective on Tracking?

The effects of ability grouping on student achievement are important, just as important are student perspectives on tracking. A study done by Yonezawa and Jones (2002) collected data from approximately 1400-3000 students, 9-12th graders of various races and academic levels about their perspectives on tracking. Student inquiry groups met for at least one hour for each meeting. The study found that students were acutely aware of the injustices of tracking. Students in low track classes felt inadequately prepared for AP exams and ill prepared for college, and some students held strong beliefs that viewed tracking as inequitable.

A critique of this study is that the original study was expanded during the two years that followed to include a total of 12 high schools across three urban districts. The researchers never explain their reasoning for expanding their research, which may lead some to believe it was because of lack of favorable evidence. In spite of these uncertainties this research article is essential because it provides a rare look into the minds and attitudes of students about tracking.

The Teacher Perspective and Practices

As important as student perspectives are teacher perspectives. What are teachers' perspectives on tracking? These are a few of the questions that Ansalone and Biafora (2004) attempted to answer when they implemented a study of one-hundred and twenty-four elementary school teachers in three New York State public schools. Researchers collected anonymous 35-item questionnaire that the elementary school teachers completed. The key findings and conclusions that the researchers gathered were inconclusive.

Fifty-seven percent of teachers either "agree" or "strongly agree" to the statement "Brighter students learn best when grouped with brighter peers." However, just over threequarters of the teachers also agreed "Slower students should be grouped with brighter students so they can learn from one another". The research also revealed that the reasons teachers are in favor of tracking have nothing to do with academic success, but may be based on the fact that its easier to manage and teach students who are at the same academic level, thus alleviating the complexities of responding to differing needs.

The researchers do not mention written responses being part of the questionnaire, which lead the reader to believe they were not included. The researchers also provided evidence of contradictory attitudes among teachers, however; they failed to allow the participants to explain

the reasoning behind their views. If the researchers had included more space for teachers to explain the reasoning behind their answers maybe some underlying causes would surface. This research is vital to my topic because teachers are a group of people who have the ability to effect change within the classroom. Teachers are the ones who establish the classroom values; determining what is and is not acceptable in their classroom, because teachers possess this power it is essential that teachers attitudes toward the subject of tracking be examined.

A study conducted by Worthy (2010) examined how teacher attitudes and assumptions about student ability affect content access and delivery. Twenty-five sixth grade teachers participated in this study. This study was conducted in eight urban middle schools in large districts in Texas where 56% of students live in poverty. The ethnic distribution was as follows: 53% Latino, 14% African American, and 33% European American. Analysis of observations and interviews were utilized to gather information for this study. Observations were used to provide contextual analysis and were the primary data source; however, the researchers utilized interviews with the honor's teacher.

The research found that teachers rarely focused on individual students, but made broad generalizations and sharp distinctions based solely on students' placement. Differences in classroom environment and instruction were also found; honors classes were given more creative instruction and access to more rigorous materials. In regular classes the skills were taught in isolation with little integration. Teachers also voiced low expectations and minimum instructional goals for low-track classes when compared to the middle-level/ high-level groups.

Without any prompting teachers freely discussed perceived differences among students in different tracks, as well as lower academic requirements for students in regular classrooms. Teachers often made remarks about how they "watered-down" (p.7) curriculum for low-track

students. This study is relevant to my question because student placement into tracks affects access to quality content and curricular connectedness.

Since research on tracking may point to students in low tracks experiencing a disparaging residue of lost opportunity and social inequality, then this leads to the question: What are effective strategies teachers can use to mitigate the effects of tracking programs in elementary school?

The Power of Teacher Expectations in Combating Tracking

The expectations that teachers hold for their students are vital and have the potential to positively or negatively influence a student's overall success. It is important that teachers view the cognitive ability of their students as something that is developed over time, and not innate. Dillon (1989) sought to answer the question, what makes an effective teacher? He conducted a small ethnographic study in an eleventh grade Basic English classroom in a secondary school in the southeastern part of the United States. The students in this study were predominately black with low reading ability based on the Metropolitan Achievement Test.

The teacher, Mr. Appleby, was a white, middle-class, 38-year-old male. The school community was composed of students from two counties, Brown and Hill. Of the 2,985 residents, 51% are nonwhite (predominantly black) and 49% are white. Residents in both counties have a low-socioeconomic status, with \$6,611 dollar yearly income in one county, and even lower in the remaining.

In this study the researchers define success by observable student motivation, engagement, and participation in classroom and homework activities. Dillion found that Mr. Appleby was successful with his students because he made a conscious effort to help his students learn by assuming the role of translator during classroom interactions, connecting home and

school culture, establishing a environment where students could be open and free to express themselves, and by structuring and planning his lessons to meet student interest and needs. He also implemented lessons that involved active participation. Although this is single case study it is vital to understand some key elements that allowed his students to be successful in low track classes.

Gamoran (1992) conducted a study of nine mid-western secondary schools in rural, urban, suburban, public, and Catholic schools. He followed students from eighth to ninth grade, studying 108 English classes over a two-year period. The researcher utilized observations, interviews, questionnaires and weekly logs to get insights into whether ability grouping could be implemented in a way that provides high quality instruction for all students. Two out of 108 low track classes were shown to accomplish this. Both of these classes were part of Catholic schools, one in a suburban district and one in an urban district. The researchers drew the conclusion that this was a result of the school's rigorous curriculum, oral interactions between teachers and students, teacher effort for student success, experienced teachers teaching low-track classes, and high expectations of all students.

Although the results of the study illustrated that only two of the 108 low track classes held high-quality instruction for low track classes the implications are worth noting, because students in low track classes that received high quality instruction meet or exceeded grade level expectations. A limitation to this study is that both of the classes in which low track student's excelled were in Catholic schools. The researchers did not provide any further in depth explanation into the practices or attitudes of the Catholic school personnel that accounted for their success.

How Teachers Promote Tracking

Classroom teachers have the ability to establish values and attitudes within the classroom that value all students. In previous research noted by Worthy (2010) teachers of non-honors classes described their students as lacking the skills to perform grade level tasks and unable to handle the amount of work or responsibility that went along with the higher-level curriculum workload. As a result these students did not receive as much instructional time or homework as the high-track students did, thus limiting their exposure to grade-level standards and concepts. What if the opposite were true, what if all teachers made a choice to believe that cognitive ability is not an innate characteristic, but something that evolves over time as a result of learning processes?

Conclusion

Significant research demonstrates that institutional tracking negatively impacts students in low-track classes. Students in these classes have been shown to receive less instructional time, lower-quality curriculum, and lower teacher expectations. Despite this disparaging evidence there is hope for teachers and students alike; bringing me back to my original question: What strategies support students in low track classes? The answer to this question is simpler than you might think. Teachers in low track classrooms may better support students by ensuring that they receive high-quality curriculum. Curriculum should be engaging and challenging. Students in low track classrooms also need more instructional time and a focus on grade-level standards. Thirdly, teachers can help encourage student motivation by holding high expectations for them. Holding students accountable and the letting students know that you believe in their ability to succeed may help students in low ability groups. Teachers of low track classrooms can also refrain from making broad generalizations about student abilities and take steps to help them achieve their goals.

Importantly as rigorous high quality curriculum, teacher expectations, and OTL is culturally relevant teaching. Cultural relevant teaching emerges from genuine consideration for student engagement and learning. Just as people select hobbies and recreational activities that meet their cultural and individual needs so students need to feel a connectedness to their learning in ways that are practical and relevant. The only authentic way to accomplish this is to get to make a conscious effort to get to know students; although this takes great effort on the teacher's behalf the reward is worth the time and energy spent.

Although educational tracking is a reality in schools all around the country teachers hold the power to positively impact the academic lives of the children within their classroom by first believing in their ability to learn and succeed and second by holding themselves accountable for building a democratic classroom that values and supports students of all ability levels.

Every student, no matter what their perceived cognitive ability, race, gender, or socioeconomic class can be taught in a safe environment where they feel free to make mistakes and reach their fullest potential.

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Evolving Instruction: Effective Approaches toward Teaching Evolution to Secondary Students

Benjamin Lee

Abstract

There are many approaches to teaching the subject of evolution to secondary students. This literature review will focus on the most common approaches of instruction that are most effective in teaching evolution, particularly to students whose religious or philosophical beliefs leave them less open and willing to learn about the subject. The literature has shown that the four most common approaches to evolution instruction are advocacy, affirmative neutrality, procedural neutrality and avoidance. Based on the results found during the review of the literature and on suggestions made by the National Research Council in (1996) it appears that a neutral approach (affirmative or procedural) may be the best approach to attempt when trying to teach students with a religious or philosophical belief that leave them less open to the topic of evolution. Further studies need to be conducted that test the four approaches directly against each other and on groups of students using a mixed approach.

Evolving Instruction: Effective Approaches toward

Teaching Evolution to Secondary Students

The Evergreen State College "On the Origin of Species" was published by Charles Darwin on November 24, 1859 (Darwin, 1859/1936). Before that book was published Western students of biology were taught either William Paley's Intelligent Design (ID) hypothesis that stemmed mainly from literal interpretation of the Christian bible or Jean Lamarks hypothesis of evolution due to an inherent need. The Lamarkian hypothesis was an attempt to explain the mechanism of change that was observed in plants and animals (Dagher & BouJaoude, 1997). Paley's hypothesis lacked a mechanism all together. Neither of these hypotheses were able to hold up to the fires of scientific scrutiny for very long. But, for over two centuries many a man, woman, and group have attempted to scientifically discredit the theory proposed by Charles Darwin that species originate via evolution by means of natural selection, and for nearly two centuries the bulk of the theory has held up to the battering ram of scientific scrutiny. It is safe to say that today in 2012, Darwin's theory of evolution is no more controversial amongst scientists than Pasteur's germ theory of disease or Newton's theory of gravitation (Ohanian & Ruffini, 1994; Tracey, 2007). Not only is evolution not considered controversial amongst scientists but amongst biologists it is considered to be the cornerstone of the biological sciences (Dobzhansky, 1973; Mayr, 1982). Despite these facts, evolution is still considered to be the most controversial subject in science education in the United States (Hermann, 2008; Hildebrand, Bilica, & Capps, 2008; Moore, 2001).

There are two major differences between a scientific controversy and a science education controversy (Mayr, 1982; Rosenau, 2008). Scientific controversies are normally held in the domain of the scientific community amongst other scientists that have had high amounts of

formal schooling and experience in the field testing information obtained from the reporting of others. The members of the scientific community follow strict procedures enforced by the scientific community (i.e. competitive funding and peer reviewed journals) designed to resolve controversy. Science education controversies often involve parents, community members, and administrators who are likely to not have a scientific background. They are also not bound by the same strict procedures. My motivation for wanting to write a literature review about a controversial topic like evolution comes from the fact that as a biology teacher I will have to deal with non-scientists everyday in the form of students, parents, and administrators.

The need to make sure that I am ready to teach this controversial topic to all students is based off of the National Science Education Standards (1996) and Washington State science standards. These standards state that students need to learn about the factors that underlie biological evolution: variability of offspring, population growth, a finite supply of resources, and natural selection. Teachers are held accountable for student tests scores and those tests are composed of information based around the standards. Without a whole-class strategy on evolutionary instruction it is very likely that student's who traditionally shut down (i.e. students with a religious or philosophical block towards evolution) during instruction on evolution will struggle on those state tests. It is also likely that because evolution is the cornerstone of biology, the students who fail to fully understand evolution will struggle with the rest of the content in the class. It has also been suggested by a researcher that to avoid teaching evolution is equivalent to committing educational malpractice (Moore, 2001). Knowing that teaching evolution is going to be one of my greatest challenges ahead, for this review of the literature I asked the question: What are common and effective approaches toward teaching evolution, particularly to secondary students who enter with a religious or philosophical block to learning it?

The specific focus of this literature review will be on the kinds of lessons and teaching philosophies that engage and attempt to promote conceptual change in secondary science students from around the world in evolution. Because the word effective can be difficult to quantify and standardize, I will consider, for the purpose of this literature review, that a teaching approach on evolution is effective if the researchers conducting the study state that the research met or exceeded their expectations. My secondary focus during this review of the literature will be on students who enter with a religious or philosophical block to learning evolution. While these students might not be the primary focus of any of the literature reviewed, they will need to at least be accounted for or acknowledged in order for the study to be formally reviewed.

Literature Review

Just as there is no one true universal teaching style or a consensus on a philosophical approach to teaching, there are different ideas, methods, desired outcomes, and ethical and/or philosophical approaches to teaching evolution to secondary students (Hildebrand et al., 2008). This review of the research will focus on the multiple types of strategies found and how researchers and teachers have implemented each of the strategies. While conducting my review of the research four approaches for teaching evolution to secondary students around the globe surfaced again and again. The approaches that make up the majority of the focus of this literature review are referred to by the following titles: advocacy, affirmative neutrality, procedural neutrality, and avoidance (Hermann, 2008). Each of these approaches has arguments for and against their use in certain situations when teaching evolution to secondary students.

Advocacy

When reviewing the literature the most common approach that was studied was advocacy (Banet & Ayuso, 2010; Demastes, Good & Peebles, 1996; and Zabel & Gropengiesser, 2011).

The advocacy approach to teaching evolution is when a teacher attempts to promote evolution in a way that will move their students' schema more or less in line with that of the general scientific community. Two studies which exemplify the advocacy approach are Banet and Ayuso (2010); Demastes et al., (1996). In addition these studies are useful for direct comparison because both studies were implemented from a constructivist perspective, both studies were looking for conceptual change in how students understood evolution, and each study created a different method to allow for that change to occur.

In 2002 a study was done by Banet and Ayuso in Spain. The purpose of the study was to analyze and provide some answers to the problem of learning and teaching about biological inheritance and evolution of living organisms at the secondary school level. Biological inheritance and evolution were taught together for this study because the authors felt that biological inheritance is key to understanding the causes of species diversity. The authors also felt that learning and teaching these topics can be difficult to successfully achieve. Because of the sequential nature of the instruction in this study, by the time the students were being instructed on the topic of evolution, there was no opening for the students to discuss the validity of competing theories. The instructor did not present the material in a neutral voice or with neutral questions and because of this, this study along with many others encountered in the literature like it, fall into the category of an advocacy approach towards the instruction of evolution.

Instruction was conducted over the course of six weeks. During that time classes were held three times a week, and taught by a teacher that was involved in the research. The content was taken out of Spanish curriculum outlines but constructed based off of the information obtained about students schemes from the pre tests. There were two groups of students in the

study. Group A was a sample of 50 students, and group B was a sample of 32 students. The objectives and methods were different for each group. Both groups of students were between the age of 14-16 years old and both were in the last year of compulsory education in Spain.

The objectives for the study of Group A were to determine the students knowledge of inheritance and evolution and to analyze the learning that did or did not occur. This was done by administering a series of tests that were analyzed to help establish conceptual schemes on the location and transmission of heredity information, mutations and on the mechanisms involved in the evolution of living organisms. Pre, post, and retention tests were administered to the student's via a written questionnaire. The post test was administered a few days after completion of the program and the retention test was administered three months later. The objective of all three tests was the same but the situations on which the questions were based were changed in an attempt to prevent students from recalling from memory their previous answers. The questions in the post test and the retention test included more complex aspects which had been covered during the lesson. For the quantitative analysis of the change in student schemes a Wilcoxon-T test was conducted in order to ascertain the usefulness of the program.

The objectives for Group B were to determine the progress made during the program and to aid in the evaluation of the program. The methods for Group B as described by the researchers were limited to individual interviews. How these interviews were conducted was not explicitly reported on in the research paper, but it was implicit that these interviews were conducted in an attempt to provide better instruction. The extent of how this information was used throughout the paper by the researchers is also unclear based on how they reported their results.

Because of the way the study was carried out the pre, post, and retention results findings were categorized into four sections: 1) the location of inheritance information (Chromosomes,

Genes, DNA, etc.); 2) the transmission of inheritance information between cells (focus on the cells and situations that transmission occurs); 3) mutations (phenotypic, genotypic, and random mutations); and 4) the evolutionary mechanisms of living things (natural selection).

The results on the evolutionary mechanisms of living organisms indicated that most students came into the class with two kinds of conceptual schemes. Before this six week class on evolution 94% of the students demonstrated two schemes, the other six percent falling into hard to classify placements. The most common (\approx 86%) scheme was that evolution took place through need (Lamarkian). Assuming a sample size of 50 students this placed 43 of those students into the Lamarkian scheme. The other scheme (\approx 8%) that students expressed before the class was that changes are random, and the organism best adapted, if any, will survive (Darwinian). Also assuming a student sample size of 50, that means that only four students began the program with a Darwinian scheme. After the class had been instructed, the post test demonstrated a huge swing in the other direction. Approximately 70% or 35 total students demonstrated a scheme of Darwinian nature and only 14% of students continued to show a Lamarkian scheme in regards to evolution. The results of the retention test were not as significant, with 52% or 26 total students demonstrating a Darwinian scheme and 30% of all students showing a Lamarkian scheme. When the pre test and the retention tests were compared side by side it was found that 44% of all students demonstrated progress toward a Darwinian scheme but 18% of all total students regressed from a Darwinian scheme as well as 30% of all students showing no change in their initial scheme at all. Of the four categories focused on in the program only the portion on evolution saw double-digit percentages in reporting on regression and no change, suggesting that this area was the least effective instructional part of the research. The authors were at a loss for an explanation as to why the results of the section on evolution were so poor in comparison to

the other three sections and were only able to suggest that the margin of error may have been responsible.

When considering application of this study for improved instruction of evolution the small sample size of 50 students, use of a Spanish curriculum, and meeting schedule of only three hours of class a week, allowing for considerable time to reflect on material presented should be taken into account. The reader must also ask themselves if slightly more than half of their students retaining the information three months later is in accordance with their instructional goals on the unit.

Another study that demonstrated the advocacy approach to teaching evolution was published by Desmastes et. al (1996). In this study the researchers were investigating patterns of conceptual change within the theoretical framework of biologic evolution. The teacher was selected by the research team specifically because she used evolution as a unifying theme in her biology class and because the researchers had seen students in her class applying the theory of evolution toward ambiguous biological data. By using evolution as a unifying theme in an attempt to help students explicitly see how and why evolution applies itself to biology the teacher removed herself from a neutral position and became an instructional advocate of evolution in her classroom. The researchers and teacher worked together but the teacher did not change her method of teaching the class at any point during the study.

The specific class studied was a Biology II course. The nine units addressed in this Biology II curriculum were: the nature of science, dinosaurs, animal behavior, animal rights, genetic techniques, anatomy, evolution, microbiology, and anthropology. Evolution, the unifying theme of the curriculum, was integrated throughout the course of the full school year, and was taught as a stand-alone 10 day unit. The 10 day, standalone unit was taught around the middle of

the school year. Rather than focus on the mechanism of evolutionary change this teacher focused on the knowledge of evolutionary theory. The topics that the teacher focused on in the unit included historical development of the theory, evidence for evolution, evolutionary relationships, patterns of evolution and parts of evolutionary explanations. Students were expected to discuss implications of evolutionary theory in both whole group and small group discussions, journal entries, and written reports.

The setting of the class was at a University Lab School run by Louisiana State University in Baton Rouge. The students at this school all paid tuition and had to provide their own form of transportation to and from school. The specific class that was selected for study had a population of 22 students but only three were used to generate data for this particular study.

The three students selected were all high school seniors and female but were moderately different other than grade level and sex. The pseudonyms of the three students in the study were Stephane, Meredith, and Tyler. Stephane was reported on as being an articulate, high achieving, student with many academic interests. She was also strongly religious and despite her fondness for anthropology she felt very conflicted about evolutionary issues. Meredith was a shy, struggling student that felt a disconnect between academic knowledge and the practical application of that knowledge to the real world. While Meredith was religious, she demonstrated to the researchers that she was capable of maintaining a dichotomy between science and religion. Tyler was identified by the authors as being a high energy student that did well in biology class but struggled in her other classes. She was also like the other students in that she was openly religious but unlike the other two girls in the study, she frequently felt the need to ask authorities for resolutions on varying matters. Lastly, Tyler also differed in that she viewed biology as a body of static, proven knowledge and she struggled to use a mechanistic approach to biology.

Data for this study was obtained by a variety of ways but the majority of data collection came from 17 interviews held with each of the study's three participants. The type of interview ranged widely from very structured to open ended. Open ended interview questions focused on religious beliefs, and the implications of acceptance of evolution. The structured interviews focused on students explanations or production of a picture that had to do with many overlapping concepts of evolution. This overlap of concepts included topics like explaining evolutionary mechanisms, demonstrating knowledge of genetics, applying words like mutation in different contexts, and explaining evolutionary events in hypothetical populations. This information was collected by the use of transcriptions, field notes, and field journals. The transcriptions were generated from audio collected during the open interviews and from audio and video collected during the structured interviews.

The results of this study showed four patterns of conceptual change in students. These included: a) cascade of changes, b) wholesale changes, c) incremental changes, and d) dual constructions. A cascade of changes often occurred when one conception started a domino effect allowing other conceptual changes to occur rapidly in secession. Wholesale changes and incremental changes happened gradually, with a strong focus on the evidence of competing conceptions, and were characterized by a prior conception being completely discarded in order to make room for the new conception. The main difference between the two was that wholesale changes tended to occur with much more robust concepts (i.e. need based change vs. random mutation) and incremental change tended to occur when the students had been using new information learned to inappropriate examples. An example of this would be Stephanie's conception of population change and species change. Lastly, dual construction is when a student fails to recognize their application of two logically incompatible conceptions. For example, both

Tyler and Meredith showed dual construction when they recognized in the interviews that mutation is random but also that mutation is only beneficial.

While this study did provide some interesting results toward the understanding of conceptual change; the results can not suggest that this particular biology curriculum, educational environment, or method of instruction could be effective or ineffective on all students because of the homogenous nature of the sample (Desmastes et al., 1996). The researchers in this study's rationale was that their review of the literature showed that conceptual change seldom occurs during instruction on evolution. They attempted to maximize the chance that conceptual change would occur in this study by using a homogenous study site and sample to keep variables to a minimum.

This study does strongly suggest particular moments when conceptual change occurs in all three of the students, along with the context for that specific change. But the amount of change the whole student undergoes in regards to their specific pre and post study views on evolution remains aloof of the data. The study also suggests that conceptual change does not happen overnight and teachers seeking that type of change will need to take into account the need for long blocks of time specifically dedicated to the change of current student conceptions.

The fact that all of the students in the study subscribed to a theism should also not be lost on the reader. Particularly those readers interested in promoting conceptual changes around evolution towards students with religious beliefs that may or may not hinder those conceptual changes. It may be that because religious questions were a portion of the introductory interviews, that those questions affected the degree to which change was obtainable in the study's participants or that because each student was religious that this study may have showed better results on a group of agnostic/atheist students. In conclusion, this study does suggest that more

work needs to be done on the promotion of conceptual change in students, particularly in evolution.

Affirmative neutrality

Affirmative neutrality is accomplished by the instructor when effort has been taken on the part of the instructor to view a topic from several perspectives without emphasizing or openly siding with one particular point of view. In the case of evolution an instructor would have to present several points of view that stray from the scientific into the pseudoscientific and theological. The benefit to temporally leaving the scientific arena for the theological one may be the alleviation of some of the conflict associated with instructing a class about evolution (Passmore & Stewart, 2002; Rudolph & Stewart, 1998).

In a connected series of papers that focus on evolution education from 1998-2002 the researchers Stewart, Passmore, and Rudolph looked into and described the construction and implementation of an evolutionary biology course implicitly based on an affirmative neutrality approach (Passmore & Stewart, 2002; Rudolph & Stewart, 1998; Stewart & Rudolph 2001). The rational for the review of this particular connected series of qualitative studies to show affirmative neutrality has three parts. First, it is very difficult for the reader to envision the difference of the two neutrality approaches (affirmative and procedural) without some detailed information on the instruction techniques. Second, many studies often lack the specific details of instruction that students received, making it difficult to infer a neutral approach. Lastly, while the affirmatively neutral approach is a fairly common approach it is a truly neutral approach. This makes the approach unlikely to attract researchers looking for alternate, and dynamic approaches to instruction on evolution because it is often taught in dry PowerPoint/lecture type format. (Farber, 2003; Hermann, 2008). The study conducted in 2002 by Passmore and Stewart is

heavily focused on in this review because the 2002 study is inclusive of the other work done by the research group of Stewart, Passmore, and Rudolph between 1998-2002.

The purpose of the 2002 study by Passmore and Stewart was to construct a curriculum that would help develop a deep understanding of natural selection by instructing around key exploratory scientific models. The term model in the context of this study was defined as a set of ideas that are used to help describe a natural process. The researchers wanted to take into account the ways in which different kinds of scientists practiced science in their various fields of study. They also wanted students to be able to progress, revise, and use those models in ways that real scientists use them.

Upon completion of the aforementioned curriculum, a nine-week study was conducted on a high school class specifically on evolution. The stated goal of this study was to guide students into the thinking patterns of scientists by engaging them in extended inquiry based learning exploration that required the students to develop, use, and extend Darwin's model of natural selection while gaining some experience with the significance of historical reconstructions. This class was an elective offered to only juniors and seniors. The elective nature of the course may have allowed students with strong philosophical or theistic beliefs to avoid taking the course.

To begin the study students were instructed on the proper use of argumentative language, the differences between observations, inferences made based on observations, and beliefs or prior knowledge based on observations. After the introduction of the class norms condensed information was then presented on the intelligent design model proposed by William Paley; the use inheritance or need based adaptation model championed by Jean Baptiste de Lamark; and the model of natural selection first used by Charles Darwin (Dagher & BouJaoude, 1997). Each of

the three historical figures and their models were presented to the students without any advert favoritism demonstrated by the teacher. It was the hope of the teacher and the researchers that the students would use their understanding of the scientific model to come to the conclusion that only Darwin's model could be scientifically tested. At this point the instructor would become affirmatively neutral and could naturally continue teaching only Darwin's model.

The way the approach was carried out by the teacher in this study seriously conflicted with the traditionally dry, hands off, text and lecture intensive approach to affirmatively neutral instruction on evolution that had been previously reported on (Farber, 2003; Hermann, 2008). All three models were presented in turn and in the same fashions, with students explicitly told to refrain from making comparisons until all information for all three models had been presented. Students read a condensed version of the author's original work, answered questions about the reading, and participated in a teacher moderated discussion in class where the students elaborated on the proposed explanations for species diversity and adaptation. After students had read and participated in discussion/clarification of the author's idea, the students were able to participate in more kinesthetic activities that were based around the author's data or inspiration for their writings. For Paley students were able to dissect an eye. For Lamark students were able to view adaptation found in fossils, and for Darwin the students were able to talk to a visiting Pigeon breeder that brought with them several of the breeds of Pigeon discussed in Darwin's *On the Origin of Species*.

After the kinesthetic examination of the specific model, the students reread the author's work and had another teacher moderated discussion. This time the students focused on the underlying assumptions and proposed forces for each of the author's work. Also this time around it was the hope of the instructor that the students would be able to find fault in Paley's

supernatural influence and Lamark's individual need proposed mechanisms for change. According to the study, the students fulfilled the researchers expectations. Darwin's naturalistic mechanism was not as easy for students to dismiss, and because of this, the teacher had the students spend the remaining portion of the course developing their understanding of evolution by means of natural selection. The teacher did this by giving his student's tasks like providing Darwinian explanations for simple adaptation, change of a plant's seed coat over time, selective advantage of particular sex traits, and phylogeny.

Overall, the researchers expressed a tone of satisfaction with the implementation of their research in the classroom. The data of this study suggests that students may have developed a deep understanding of the Darwinian model of evolution but because of the qualitative nature of the studies essay/oral based assessment methods and the metaphysical nature of modeling evolution, this study was incapable of definitively stating anything other than the need for future analysis. Specific samples of these students work from this study were published in a inquiry based science textbook for instructors, in a chapter that focuses on using a model-based approach, (Stewart, Cartier, & Passmore, 2005). In this chapter of the textbook, the authors also attempt to make case for the use of their curriculum in order to achieve the National Science Education Standards (1996). They state that because of the strong use of authentic student based inquiry, their affirmatively neutral evolution curriculum allows for teachers to not only effectively teach evolution but also simultaneously achieve National Science Education Standards that are based heavily on inquiry.

Procedural Neutrality

As mentioned in the section on affirmative neutrality the differences between these two neutral forms of instruction can appear minimal unless the reader has familiarized themselves

with the subtle nuances of the two. According to Herman (2008) the main distinction between affirmative neutrality and procedural neutrality is that in affirmative neutrality, the instructor presents multiple perspectives on the issue, and in procedural neutrality, a variety of perspectives are elicited from students or resource material. The instructional practices in the procedural method provide students with an chance to discuss views of evolution alternative to the scientific view typically found in textbooks and curricular materials. Similarly to the section on affirmative neutrality, this portion of the literature review will present a more in depth look at a qualitative study; with some detailed information on the procedural techniques so that the differences between the two neutral approaches can be further emphasized for the reader and to aid science teachers reading this review in self diagnosing which of the four approaches they may or may not be currently attempting in class.

In a study conducted by Oliveria, Cook and Buck (2011) the authors stated that they were particularly focused on expanding the limited body of classroom discussion of controversial issues. This study added to the limited body of research by exploring how a secondary teacher facilitated classroom discussion about evolution. The question asked by the researchers was: what ways did the teacher go about "framing" the discussion intellectually (i.e. orally guide student voice about evolution as social events or occasions of an academic nature)?

The study starts out by explaining what the authors mean by the ambiguous word *frame*, and how an individual goes about effectively framing a question. For the purpose of this paper, the word frame or framework refers to the speaker and their audience's sagacity or perception of the specific nature of what goes on in a given social engagement. In this study, the authors explored the framing of whole-class discussions on evolution by the biology teacher acting as a facilitator. They did this by specifically examining the physical, verbal, and written ways that the

teacher conducted conversations with his students that lead to academic discussions about evolution.

The school that the case study took place in was an inner city high school with a population of approximately 1200 students. The small schools initiative was in effect at this school distributing those students between six academies within the school. The particular academy that the study took place in had block periods of 110 minutes that met Monday-Friday, and combined English Lit with Biology into a sections. The class/section that was focused on in the study was held in the afternoon, had a population of 46 freshman students, 39 of which were identified by the researchers as white, 29 as male and 17 as female. A first year, male teacher, that was hired as a Biology teacher, directly instructed the class for the majority of the time. A second teacher that was female and had over twenty years of experience was present at all times but played a minimal role in any of the instruction that took place during unit on evolution.

The unit on evolution was taught over three weeks with the goal of having students research evidence for and against varying aspects of evolution and present their ideas on how the theory should be taught. In the first two days three whole class discussions took place. These discussions served to introduce the students into the evolution debate and establish some classroom norms. At no time did the teacher take a definitive side and at all times he made his neutrality on the subject well know by the class. The instructor also made a concerned effort to make sure that all probes, questions, comments, and discussion were done in a very structured or framed approach in an attempt to maintain neutrality throughout the three-week unit.

On the third day of the unit students were haphazardly placed into groups of three and assigned to work on various projects exploring evidence related to evolution. The topics included

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but were not limited to vestigial appendages, fossils, DNA, and more controversial topics like should evolution be taught in school. In an attempt to naturally include students that may have had a bias towards the discussion of evolution the teacher used very specific framing strategies. The first framing strategy used was done in an effort to promote the discussion of evolution as being partially mandatory because of state standards. While at the same time attempting to inform his students that it was not his goal to change the students beliefs or force the students into acceptance of evolution. The second framing strategy used by the teacher was done to frame the upcoming unit as a series of discussions about multiple evolutionary topics, explicitly emphasizing that some parts of the theory of evolution are more controversial than others.

Implicit modeling for this style of class discussion was also provided by the instructors choice of article that the first debate was to based around. The article in question focused on the need for better communication between scientists and the general public. A formative assessment was taken anonymously by having the students submit post-it notes on various poster boards located around the room. The questions on the boards included: a) "What should schools teach about evolution?"; b) "Do you agree with Darwin's theory?"; c) "Questions about evolution?" and d) "Are faith and Science Incompatible?".These notes were then read aloud and discussed by the entire class. The teachers stated motive behind this was to protect both the student who wrote the comment and the student that addressed the class about the comment at hand. Contrary to many of the lessons taught using other approaches of instruction on evolution, a focus was not brought to evolutionary thinkers of historical significance (Banet & Ayuso, 2010; Demastes et al., 1996; Passmore & Stewart, 2002; Rudolph & Stewart, 1998; Stewart & Rudolph, 2001 and Zabel & Gropengiesser, 2011). Throughout the lesson the teacher intentionally kept the focus off of historical people involved in evolution by using evasive and vague reactive comments. Also

prominent throughout the lesson, was the instructor's conscience effort to discuss the nature of science with his students, pointing out some of the more subjective aspects of science. When discussing evolution with the students the instructor made sure to create a dichotomy between micro and macroevolution, and only took a position of scientific authority when he spoke about microevolution. Using this framing the teacher went on to discuss topics like bacteria, human evolution, heredity, and rudimentary cladistics (species classification).

Data from this study was collected by the use of open-ended research methods. These methods included video recorded observations and informal debriefings between researchers, never including the teacher for longer than the length of a passing period. A microethographic analysis was then performed on the video to describe and show the secondary instructor's evolution teaching strategies. During the debriefing sessions particular scenes were examined collectively and the account of the event was adjusted to be more reflective of the group interpretation.

The results presented by the researchers found that while the teachers focus on politeness was successful at creating a safe and social atmosphere, his evolution discussions were lacking the necessary academic element needed to promote conceptual talk or scientific reasoning. This made the researchers classify this portion of the study a failure to achieve the desired goal of academic discussions. Despite the lack of success in the study, the researchers declared that the teacher was able to successfully practice a procedurally neutral approach, given that he facilitated extended discussions in which he maintained his neutrality by eliciting different viewpoints from the students and instructional materials without suggesting that those different perspectives were wrong, inferior, or foolish.

The most glaring of limitations to this study was the stated focus of the study itself. Because the researchers were focused on the strategies the teacher employed to frame evolution discussion intellectually, they missed out on a chance to quantitatively test the effectiveness of the instruction at changing the students conceptions around evolution. The focus of their assessment of the classroom discussions was on the teacher, not on the students. This leaves the reader with room for speculation as to whether or not the procedurally neutral approach was effective at changing students conceptions around evolution.

Avoidance

During the review of the literature on evolution education, it was implicitly and explicitly suggested that one of the most common approaches of teaching evolution in class was to simply avoid the topic all together. Only because it appeared in so many of the readings and only because it appeared to be an actual strategy carried out by a particular group of teachers have I found it worthy of inclusion in my literature review on instruction (Griffith & Brem, 2004; Hermann, 2008; Hildebrand et al, 2008; Sanders & Ngxola 2009; Schilders, Sloep, Peled & Boersma, 2009). It may seem odd that one of the preferred ways to teach a concept is to omit it from the curriculum but that is exactly what was suggested in many of the studies when compiling this review of the literature of teaching approaches based around common and effective instruction on evolution. The instructors that omitted evolution from their classrooms in my review of the literature did so for a variety of reasons but the four most common reasons were: 1) They did not believe in evolution so they felt no particular need to teach it (Griffith & Brem, 2004; Hildebrand et al., 2008). 2) They lacked the specific background knowledge of the material (Banet & Ayuso, 2010; Hildebrand et al., 2008; Sanders & Ngxola, 2009). 3) They did so in an attempt to avoid controversy in their classrooms (Griffith & Brem, 2004; Hildebrand et

al., 2008). 4) Until, very recently (and in some cases as yet to have happened) evolution was not part of the state standards the teachers were expected to teach (Hildebrand et. al., 2008; Rosenau, 2008; Sanders & Ngxola, 2009). While avoiding a concept regardless of the justification is not teaching, and may even be illegal, in an effort to be fair and balanced this review has dedicated a brief rationalization/defense of each of the four aforementioned avoidance methods.

The teachers that claimed that they did not believe in evolution often cited faith as a major reason why they did not cover the concept in their class (Griffith & Brem, 2004; Sanders & Ngxola, 2009; Schilders et. al, 2009). These same teachers also stated that while faith was their justification for omission it was not necessarily done in malice. Science teachers that are of the creationist faith often cited that omission was done as a way to help keep their personal beliefs closeted to the students in their class and the other teachers in the science department. These teachers feared that they would be made social pariah. To get around having to teach evolution these teachers commonly cited lack of time as a reason the concept of evolution was not brought up in their class.

In some countries the amount of schooling that the instructor must undertake is minimal (Sanders & Ngxola, 2009). In most secondary curriculums the main evidence that supports evolution is presented in conjunction with genetics (Banet & Ayuso, 2010). If the instructor has not had proper, in depth, prior instruction, lab time, or professional development, they may not have the mastery of the material that is necessary to teach evolution or genetics at an introductory level to secondary students. Given this information it should not be surprising that teachers reported being intimidated when having to teach controversial topics like evolution in their class. All teachers fear losing the students respect and there may be no faster way towards

losing that respect than to be asked questions that you cannot even begin to clarify much less answer due to lack of knowledge (Hildebrand et al., 2008).

Avoiding controversy in class is yet another reason why teachers decide to skip or omit the portion of the curriculum that deals with evolution. This particular method seemed to be more common with teachers that had yet to obtain tenure (Griffith & Brem, 2004). Nobody doubts that teaching is a stressful profession but it can be especially stressful for teachers that have yet to obtain tenure in their school district. These stress levels are even higher when the new teacher is in a state, district, community, or school were the teaching of evolution may act as a way of attracting unwanted attention. Interestingly enough, regardless of the perceived attitude about evolution, if the controversial material will be covered on the state test, then the students, parents, community, and administrators seem to only care that the students do well on the test.

Last but not least, the instructor does not need to cover any material that the state does not feel is necessary to the curriculum. In the United States several states have historically had issues with the instruction of evolution (Cracraft & Donoghue, 2004). The majority of these states tend to be found in the southern part of the country and also tend to be more heavily populated by evangelical Christians then other parts of the country. It is thought that because of this political environment, that states as diverse as Florida did not have evolution added to their state science standards until February, 2008 (Rosenau, 2008). The issue of not having evolution as part of the state standards is not just a problem in the United States. The country of South Africa did not add evolution to its national curriculum until 2008 and some countries in the Middle East still refuse to accept the theory altogether (Sanders & Ngxola, 2009). It is not surprising that in hostile environments with little or no expectations placed onto the teacher to cover the concept of evolution, that the concept is avoided.

Conclusion

Overall, the results found in the review agree with previous research that indicated that conceptual change seldom occurs during instruction on evolution (Demastes et al., 1996). The results found in the review also suggest that the greatest amount of conceptual change could be created by the use of an approach similar to both neutral approaches if more of an emphases was placed on what makes science the best suited tool for the study of the natural world (Oliveria et al., 2011; Passmore & Stewart, 2002; U.S., 1996). This emphasis on uniqueness of science is in accordance with the National Research Council and would have to be done in a way that would allow, but not encourage, the non-scientific method of inquiry and questioning. This information should be taken into consideration by any science teacher who is going to attempt to teach evolution to secondary students regardless of, but especially if they have a block toward learning about evolution because of their theistic or philosophical beliefs.

When considering the question, "What are the common and effective ways to teach evolution, particularly to secondary students who enter with a religious or philosophical block to learning it?" all of the instructional approaches mentioned in the literature review with the exception of avoidance have demonstrated some ability to teach students evolution. It is likely, based on the lack of strong results presented in this review of the literature that portions of each of the instructional approaches are flawed and are in need of a philosophical realignment. It has been suggested that the most effective approach toward teaching evolution is when the teacher purposefully designs the curriculum so that it emphasizes the uniqueness of science without opposing or advocating for non-scientific methods of inquiry and questioning (U.S., 1996). The closest example of this type of approach covered in my review of the literature was the procedurally neutral approach (Oliveria et al., 2011). The biggest flaw in the procedurally neutral

approach was that the teacher did not emphasize the uniqueness of science enough, and because of that the class had a series of discussions that were lacking in academic merit. It should also be noted that this flaw in the procedurally neutral approach study is not inherent in the approach. This flaw seemed to stem from the instructors inability to frame questions to the class; specifically questions that could stimulate discussions that would in turn, force the students into a deeper thinking about how science is used to answer questions about the natural world. Teachers need to be honest with themselves when considering their ability to maintain a neutral approach should they attempt that approach to instruction. It may be easier from a time perspective, or just feel more natural for the instructor to teach evolution from an advocacy approach but is it the best pedagogical practice? It is not clear at this time what approach is best, but the inconclusive data presented in the literature can be interpreted that none of the approaches are universally perceived by all students the same way.

Possible future research around this topic could include several combinations of these studies. For example a mixed methods approach using one-on-one student interviews and reflective journals to see the relationship between what teachers do and how the students experience it. This might push teachers closer toward their goal of finding the right instructional approach regarding evolution for their teaching style and their student population. It would also be interesting to see the advocacy, affirmatively neutral, and procedurally neutral approaches compared directly to each other in a quantitative study somehow, perhaps modifying the assessment method of Banet and Ayuso (2010). The direct comparison between the beliefs, opinions, and possible misconceptions that students hold before, during, immediately following, and three months after instruction on evolution would go a long way to helping settle the debate about whether or not we should be openly debating evolution in the science classroom.

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Plugged in for Class: Technology Uses in English Language Arts to Foster Student Engagement and Academic Success

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Abstract

As technology is mainstreamed into our daily lives the effective integration of technology with education lags sorely. Meanwhile, precious school resources are invested to offer technology access and education for students. The purpose of this literature review is to explore technology suitable for use in secondary English Language Arts classes to enhance student engagement and academic achievement in reading comprehension and writing. Three main avenues of consideration emerged as vital: discerning what students want from school technology, selecting aspects of effective educational technology and corresponding use; and, measuring the effect of technology use on low, average, and high achieving student success. The conclusion offers suggestions for teachers and recommendations for further research.

Plugged in for Class:

Technology Uses in English Language Arts to Foster Student Engagement and Academic Success

Our modern lives revolve around technology. It is increasingly difficult to encounter people who do not own a cell phone or personal computer with Internet access. Like it or not, personal technologies such as cell phones, smartphones, computers, and/or tablets have become all but necessary to our lives.

Most students enter the secondary classroom with years of technology experience. In contrast to some teachers, today's students have grown up saturated with technology. Even so, schools and classrooms remain largely devoid of technology. In fact, the idea that technology can distract and impede student learning has led schools to ban cell phones, smartphones, iPods, MP3 players, etc., during school hours. Concerns about technology distraction and dwindling school resources, and you will generally limit computer technology to specific days or locations. Though computer use is often restricted, Spires, Lee, Turner, and Johnson (2008) found that using computers and the Internet was a favorite school activity. Recent developments in interactive and sharing capabilities, commonly referred to as Web 2.0, have transformed the Internet with interesting educational possibilities. For the purposes of this paper, "technology" will generally refer to computer and Internet use, including software programs and online platforms or sites.

I witnessed students' excited whispers and exclamations when technology was part of classroom instruction for English language arts. At the same time, I also saw many students avoid academic work with technology. Where provided computer access, I noticed that students tended to search immediately for online Flash games or look up images of certain products or

celebrities. Many students reported they frequently access social networking sites, such as Facebook, outside of school; though, very few of those sixth graders submitted computer aided assignments.

As a student teacher in a newer school with *SMART* Boards and at least four desktop computers in every classroom, I was often encouraged by experienced teachers using technology to engage students. My mentor teacher viewed technology as a means to draw students into material and engage them more fully in learning. It is generally agreed that student engagement in a lesson or learning activity can increase motivation and lessen discipline problems that distract others from learning. Admittedly, I was often hesitant to integrate technology when I taught because I did not know what technology would help to enhance both student engagement and academic achievement. I lacked knowledge about effective ways to integrate technology as well as which technologies might be suitable for classroom use. Additionally, I was deterred by the knowledge that some adolescents would navigate straight to a game or other entertainment.

Several of my colleagues were thrilled to learn about educational technology and worked to obtain grants for classroom scanners, Netbooks, and even iPads. My mentor teacher used the *SMART* Board daily and looked for interesting and engaging ways to format some of the presentations. Many students appeared pleased to share *SMART* Board knowledge gained from earlier experiences.

Technology is a generally accepted as an essential component of K-12 education, and Washington's Office of Superintendent of Public Instruction (OSPI) mandates specific technology learning requirements. A recent OPSI policy brief, entitled *Writing: K-12 Grade Level Expectations: A New Level of Specificity* (2005) noted that computer use, especially word processing programs are useful and essential tools in the writing process. The Essential

Academic Learning Requirements (EALRs) for writing state that students should be able to use technology for publishing and, by fifth grade, they should also use it for editing (OSPI, 2005). In 2007, OSPI planned to further develop EALRs and Grade Level Expectations (GLEs) for technology education. According to *Educational Technology Learning Standards* (OSPI, 2008), teachers are required to help students learn technology literacy that address integration and digital citizenship.

The purpose of this literature review is to explore technology that can be used effectively in secondary English language arts classes. This examination focuses on applications for secondary students; however, much of the information could also apply in earlier grades. This analysis is limited to peer-reviewed, empirical studies, and sadly, peer-reviewed studies addressing technology use in English language arts classrooms are sparse. Research on educational and literacy-related Web 2.0 applications are still in the early stages (Beach, Hull, and O'Brien, 2010, p. 164). The following studies were conducted after 2000, in order to examine the most recent research involving the most current technologies. The peer-reviewed studies for this literature review were collected in the winter of the 2011-2012 academic year using the Educational Resources Information Center (ERIC).

Studies explored in this literature review ranged in methodology, size, and research questions. Some included surveys while others relied on observations. Some included both surveys and observations and others focused on test scores. While the studies were diverse, three central concepts emerged: discerning what students want from school technology, selecting aspects of effective educational technology and corresponding use; and, measuring the effect of technology use on low, average, and high achieving student success.

Literature Review

Technology education EALRs and GLEs require technology integration and use in all academic subjects; however, teachers enter classrooms with differing ideas and varying levels of comfort in the use of technology. Schools are investing innumerable funds to offer technology access and education for students. Many students, in turn, enter the classroom already saturated in technology. The challenge for teachers is to find ways to integrate technology into classrooms so that students are engaged and their academic progress is enhanced. This poses problems for secondary English language arts teachers who perceive books, paper, and pencils as the traditional, tried and true tools for the subject.

Because each student is a complex individual with unique interests and motivations, there is no easy solution to the general question of what technology will engage and help educate students. Just as students are diverse, so were the studies in the articles I surveyed. The articles researched for this literature review ranged in topics and methodology. Some surveyed students and teachers while others looked at the effects of specific technologies or technology programs on student learning. Still others looked at how general computer or technology use impacted student test scores, or observed interactions among students, teachers, and technology. The size of each study and associated methodologies also differed. In spite of the diversities of these articles, three main avenues of consideration emerged as vital: discerning what students want from school technology; selecting aspects of effective educational technology and corresponding use; and, measuring the effect of technology use on low, average, and high achieving student success.

What Students Want

State legislatures and school administrations frequently hypothesize about what students need in their K-12 educations, while student perspectives often remain silent. Many of the studies I reviewed included a survey or interview of student reactions to technology (DeGennaro, 2008; Kay & Knaack, 2009; Luckin, Clark, Braber, Logan, Mee, & Oliver, 2009; O'Byrne, Securro, Jones & Cadle, 2006; Spires, Lee, Turner, & Johnson, 2008). Since students are the major consumers of educational technology, it makes sense that their opinions about technology use in school could provide valuable insight. Utilizing student insight may enhance engagement in learning activities, and thus increase learning.

Student opinions and perspectives were emphasized by Spires, Lee, Turner, and Johnson (2008). Spires et al. (2008) sought middle and high school student perspectives regarding what will help them engage and succeed in school. The study surveyed 4,000 students from sixth to eighth grade in a North Carolina after-school program. Students were selected using stratified random sampling based on geographic region, race, gender, grade level, and family income. A majority of participants, 85%, scored at or above grade level on standardized math and reading tests.

Researchers distributed one of two questionnaires which asked questions concerning computer use in and out of school, knowledge of basic computing skills, uses of other technologies in and outside of school (e.g. cell phones and gaming), as well as what types of activities students liked best in school. Next, during focus groups, the researchers compiled information related to interest in technology as well as student perceptions of school, technologies, and academic engagement.

Results from surveys revealed no significant difference in computer use in or out of school among rural, low-income, and higher income students. The surveys also revealed that students who were identified as the highest frequency users of computers also reported more computer use at home than at school; 75% and 90% of students reported an understanding of basic word processing and spreadsheet skills from experiences at school, respectively; students, regardless of race or ethnicity, reported that general computer use and web-based research were the most liked school activities; and the majority of students (86%) stated they preferred gathering information on the Internet rather than from books.

Findings from the focus groups indicated that students considered technology to be engaging. Increased technology use in school was desired because they perceived it to be a major part of their daily lives. Students also expressed a desire for technology to prepare them for future jobs or careers. Some of their ideas for integrating technology in class included research and writing projects for language arts and social studies. However, students also expressed a dislike of the numerous restrictions placed on technology use in school and noted some restrictions contribute to boredom in current school technology use. Students reported communication and social interactions as the main uses of technology outside of school, but few students reported using social media to work on schoolwork or enhance academic understandings.

The researchers made it clear they do not believe this information can be generalized to all students. They also suggested middle school students' desire to please others might have skewed responses to questions. The article certainly reflected the middle school students highly sophisticated ideas about technology for learning and engagement in school.

Student ideas and opinions were explored by Luckin, Clark, Graber, Logan, Mee, and Oliver (2009). These researchers looked at how students used Internet technologies as well as what students thought about these technologies both in and out of school. Specifically, this study explored four questions:

- 1) What types of Web 2.0 technologies did learners report using?
- 2) What types of activities were Web 2.0 technologies used for?
- 3) What different types of Web 2.0 users can be identified?
- 4) What differences were apparent between school and non-school engagement with Web
- 2.0 technologies?

The research also elicited student perceptions concerning which Web 2.0 or other technologies would be appropriate for schools. Again, Web 2.0 is a term used to describe the Internet and all of the social media, sharing, and collaborative opportunities now available on the Internet. This research was conducted along with a larger study exploring Web 2.0 use in United Kingdom schools.

A total of 2,611 students between ages 11 and 16 years took an online survey in schools located in England and Wales. The students were from 27 schools with 15 schools representing multiple school types and demographics and 12 schools had prevalent Web 2.0 use. After the surveys were completed, researchers led focus groups in 22 schools.

Results indicated students predominantly used the Internet for social networking and sharing artifacts (such as photographs), personal communication, gaming, and looking at blogs and wikis. One notable response is that students reported email as their preferred mode of communication with teachers. Also, students appeared to desire less reading, reporting reading

and researching on the Internet as preferable to traditional texts because they viewed web-based information as less text-heavy.

Responses to the surveys suggested three main types of Web 2.0 users: Researchers, who used the Internet to acquire information; Collaborators, who used the Internet to share acquired information but seldom collaborate to create knowledge; and, Producers or Publishers, who initiated or published original content, usually with the encouragement or help of someone more experienced. Students reported positive reactions when teachers used blogs or wikis to for student-facilitated discussions or projects, but most students were adamant that social networking was a respite from school and does not belong in the classroom. Students also reported using Web 2.0 more outside of school than to inside of school. Research also suggested that students were interested in using online tools to share schoolwork with others in their school community or with students at other schools, but not with the wider world. Students also seemed hesitant to produce original material because of concern for personal privacy, not thinking that what they could produce would be beneficial to others, and/or the time commitment involved (as in making regular blog postings).

Noting the popularity of different web applications and the level of hierarchical engagement of students when interacting with different applications suggests avenues for teachers to strengthen learning skills with technology inside and outside of the classroom. Student opinions concerning the types of technology they would like to use in class and the types they think do not belong in class is also helpful. Eliciting student responses can help to frame an understanding of the best uses of Web 2.0 technology in the classroom.

The information may not be directly generalized to students in the United States since this study surveyed students in the United Kingdom, and the researchers did not specify what

demographic factors made certain schools representative of diversities. Since the results were based mainly on self-reports from students through surveys and interviews, the information may not be completely accurate. Also, while the study suggests ways that Web 2.0 that could help with student engagement, there was no information from teachers and little from students about academic growth or learning due to use of Web 2.0 technologies. However, knowing what students want and how they engage with technology can help shape how to integrate technology into learning activities.

Effective Aspects of Educational Technology

Students taking the initiative to use technology to communicate with a teacher inspired DeGennaro's 2008 research. Her study sought to find out how learning can be supported when students and teachers use a popular youth-oriented electronic communication tool. Specifically, DeGennaro, looked at how instant messaging (IM) among students and a teacher could illuminate practices with this type of technology in a learning environment. The teacher, students, and researcher offered explanations for this student preference and the student/teacher behaviors and interactions through IM.

The participants in this study were four upper-middle class white males from a private, suburban, all-boys school near Philadelphia, Pennsylvania and their female teacher. The teacher was the school's director of technology and the students were members of the Lab Manager's Club. The purpose of the after school club was to involve students with technical support and technology related decisions at the school and provide students leadership responsibilities and skills. The boys in this study were seniors and held more responsibility than others in the club. The study took place over six months.

Data included transcripts of IM conversations, semi-structured interviews with students and the teacher, and journals kept by participants about their thoughts regarding the IM interactions. During the interviews, the researcher shared data interpretations with students and the teacher to confirm, disconfirm, or add to. The researcher used a sociotechnical analysis to evaluate interactions among the students and teacher. Three themes emerged as directly relating to learning activity through the IM interactions: negotiated goals, co-constructed problem solving, and supportive argumentation.

With negotiated goals, the interactions revealed that the teacher generally had a specific goal or task in mind for the students, but that the students would also suggest and add goals of their choosing through conversations over IM. The teacher noted that in classroom situations the students would rarely approach her with alternative ideas or goals of their own. Co-constructed problem solving occurred when students and teacher shared knowledge to solve a problem. Sometimes either a student or the teacher had more expertise, while, at other times, all parties struggled. With Supportive Argumentation, IM served as a medium for students and teacher to offer and support their ideas in an attempt to gain consensus and learn.

According to DeGennaro, rooting learning activities in real world experiences and in ways that are authentically integral to learning activities help foster student learning and engagement. Other suggestions include encouraging learners to innovate, especially with tools or skills they are already familiar with, and welcoming different forms of student participation.

Though this study was not specific to language arts and the participants in the study were a small group of male students from an upper-middle class private school, it is still useful to look at how popular forms of electronic communication could impact learning or engagement in

communications between students and teacher. This study could be particularly useful when looking at ways to engage small groups or individual students for differentiation.

One limitation of this study involved DeGennaro sharing interpretations with participants, which could influence participant reactions. The limited number of participants, socioeconomic status of the participants, and particular interest these students had in the subject due to membership to an after school club mean that the interpretations of this study could not be easily generalized to diverse students populations.

Countless web and computer based technology is available for educational use, but lesson planning first involves finding technology that helps students achieve learning targets. Clearly, not all educational technology options are created equal, so some studies surveyed whether particular technology interfaces offered effective or ineffective learning or engagement.

Gomez, Schieble, Curwood, and Hassett (2010) explored the use of Moodle to facilitate student learning in a secondary English class. This case study examined the questions: how can distributed cognition be enacted in literacy teaching and learning, and what is the intersection of tools, culture and social context within a frame of distributed cognition? Distributed cognition referred to the idea that information, knowledge, and thinking was disseminated across and through multiple modes. For the purposes of this study, Web 2.0 tools were used to distribute and facilitate learning. Participants were undergraduate pre-service teachers enrolled in an adolescent literature course in the Midwestern United States and secondary students from a public high school in a suburban area near the university. Data was collected on three sets of preservice teachers and secondary students over three semesters. Part of the data came from the preservice teachers' Moodle websites which served as online classrooms in which they facilitated

discussions, information and work done by the secondary students. Teaching journals kept by pre-service teachers over their three-week teaching period provided evidence.

Focus group interviews were conducted with pre-service teachers and high school students who wished to share their ideas and reflections about the project after its completion and after grades had been completed. The interviews were recorded and transcribed. Gomez et al. proposed that the use of case studies demonstrated that student meaning-making processes were complex and were mediated through many factors. The key factors for this study were the preservice teacher education program, multiple resources on the Moodle site, and adolescent worldviews shaped by the communities in which they live. Gomez et al. argued that an online forum can offer students a space where they feel more comfortable expressing their ideas and where the power structure of teacher/student as expert/novice is disrupted.

Analysis of the online interactions of students and pre-service teachers suggested that even though many different avenues for knowledge and learning can be presented through technology, a teacher as facilitator still needs to be present to guide students to encourage deeper critical thinking. An experienced teacher as facilitator is invaluable to encourage and guide students toward deeper knowledge.

This study illuminated possible advantages for technology to help students mediate and construct knowledge and understanding; however, its validity could be questioned because the researchers mainly state their interpretations of the discussions on Moodle or of student responses to the focus group questions. These interpretations could be biased toward wanting this interaction with technology to show a positive outcome.

The researchers suggest that technology can offer opportunities for differentiated skill and interest levels, but this study does not measure student learning due to limited discussion

postings. Overall, the study seemed narrative in the way it is written. Even the literature review seemed to focus primarily on an analysis of one student's perceived intelligence/competence in school versus in an online community. Additional research into student success and engagement with online forums would be beneficial to this study's validity. Still, the observations offered useful ideas on how to use technology as a tool to help students achieve meaning with guidance from a teacher. This article is useful because it suggested using of the technology as a tool to encompass more diverse points of view and as another avenue for students to demonstrate understanding.

Usability and effectiveness of learning objects and student engagement with elementary and secondary students was the focus of a study by Lowe, Lee, Schibeci, Cummings, Philips, and Lake (2010). The researchers analyzed field study data in primary and secondary schools regarding student use and perception of learning objects. Learning objects, in this case, are "a reusable computer-based resource comprised of one or more files of material that might include graphics, text, audio, animation, calculator and interactive notebook and that is designed to be used as a stand-alone learning experience" (p. 228).

Field observations and survey data were evaluated through the lens of whether students could use the learning object easily, how much they enjoyed using the learning object, and what ways the use of the learning object guided learners to engage with the content. Participants were chosen from 14 primary and secondary schools across rural and urban Australia and New Zealand. Groups of two researchers observed for one to five hours in each of 20 classrooms. A total of 300 students and 40 different learning objects were observed. Observers recorded audio of interactions they conducted with students and of the students with peers or the teacher while using learning objects. Later, researchers interviewed students to try to gauge student perceptions

of using the learning object and understandings of intended content. Academic content areas included in the study were literacy, science, and mathematics. Teachers were also interviewed after the lesson to address how they used the learning object in class and their perceptions of the usefulness of the learning object(s). Afterward, surveys were later given to teachers to distribute to their students.

Interview and observation data was evaluated through a qualitative analysis. Results showed that the vast majority of students (81%) found the learning objects enjoyable, but fewer students (65%) reported that they were engaged in the activity the whole time. This indicated that enjoyment and engagement were not synonymous terms or concepts.

While older students generally found the learning objects easy to use, they sometimes neglected helpful elements when lots of information was presented on the screen. Along those lines, researchers observed that when students were given little guidance from teachers about the learning objects, students' attention was less focused, fewer elements of the learning objects were explored, and achievement of learning targets was less reliable. In all cases, students were more likely to skip lengthy text instructions and information to experiment with the graphical cues and buttons.

Some of the features of learning objects that students seemed to find the most engaging were "choice" within a structured activity, relatability, manageable amounts of information that directly related to the activity, immediate feedback for all student inputs, and that the activity was appropriately challenging. Learning objects that were complicated to navigate, contained too much text, offered a goal or prize not related to the learning target, and did not provide immediate feedback to student inputs proved to be frustrating. Furthermore, they did not seem to be effective in helping students create knowledge or understanding. Lowe et al. noted problems

with novelty distracting from learning goals if the activities were not structured, challenging, or focused.

Since this study partially relied on researcher observations, it is possible that the analyses were susceptible to their biases. Results may not be able to be fully generalizable to students in the United States of America because the study took place in Australia and New Zealand. While this article stated that literacy was one of the observed subjects in the study, both explained examples presented in the article were for science-related activities. Even though this article did not specify information or results about literacy related to learning objects, results are still relevant to English language arts teachers because of the evaluation of specific characteristics of computer-based activities that are engaging to students and offer benefits to learning specific content still provides applicable insight.

Kay and Knaack (2009) also explored the use of learning objects. Though further work can be completed on this topic, the study does identify correlations among quality, engagement, and learning, which is helpful to consider when selecting technology for classroom use. The research focused on student and teacher perceptions of learning that occurred, quality of learning objects, and engagement of students with learning objects in middle and high school classrooms. In this study, learning objects are defined as online tools that assist learners in understanding concepts "by enhancing, amplifying, and/or guiding the cognitive processes" (p. 147). Convenience sampling was used to select 1,113 students with ages ranging from 10 to 22 years of age. Of the 33 teachers who participated, the vast majority taught mathematics or science throughout six middle schools and 15 high schools across three school districts. Teachers chose their own learning objects after receiving a half-day of training about choosing and evaluating learning objects.

All students used the learning objects, but only those who returned a signed permission slip could then fill out the survey. The survey, called the Learning Object Evaluation Scale for Students (LOES-S), asked for student perceptions on learning due to the learning object. The LOES-S also asked about the quality of the learning object and level of engagement with the learning object. Teachers filled out a similar survey about the learning objects.

Results of the data suggest strong correlations between perceptions of learning and quality, and perceptions of engagement and quality. Comparing student and teacher surveys showed moderate consistency among student and teacher perceptions of learning objects in each class. Students who indicated higher levels of comfort with computers were more apt to rate learning objects highly. There was only slight correlation between positive perceptions of the learning objects and higher student achievement. However, the pre- and post-tests used to measure student learning were created by teachers and there was little, if any, record of how the learning objects were incorporated into classroom learning.

Relying solely on survey and comment data from students and teachers without observations of classroom activity was a limitation of this study. It is difficult to speculate how well the information from these studies can be generalized since the demographics of schools involved in the study were not described. The researchers suggested that further study should consider not only whether or not students found learning objects engaging, of quality, or offering learning, but also what specific aspects influence their perceptions of those qualities.

O'Dwyer, Russell, Bebell, and Tucker-Seeley (2005) examined the types of home and school computer use that students engage in and the relation of that activity to English language arts test scores. This study explored the effects of fourth grade student and teacher technology use in and out of the classroom on English/Language Arts scores on the Massachusetts

Comprehensive Assessment System test. Researchers looked at test item level achievement data, individual student test scores, and responses of both students and teachers on a technology-use survey to examine the relationship between computer use and academic performance. Data came from 986 regular students, from 55 fourth grade classrooms across 25 schools in nine school districts in Massachusetts. The data from this study was part of a larger study, entitled the Use, Support, and Effect of Instructional Technology (USEIT) Study.

Following initial surveys of teachers and administrators, teachers were categorized into groups as high, medium, or low instructional technology users. Teachers were recruited from these groups and from a few other schools to participate in additional surveys to look at student test scores and the relationship between computer use and achievement. The researchers did not use the data of students considered to be English Language Learners or students with disabilities. Schools in the study generally contained a slightly higher percentage of "white" students than the state average and a lower percentage of students on free or reduced lunch than the state average. These schools also demonstrated slightly higher performance scores on the MCAS in math and language arts than the state average. However, the article stated that 25 schools participated in the study and had a diverse range of technology and student demographics.

To evaluate the relationship between technology and achievement, researchers used data from student and teacher surveys and the state mandated ELA MCAS test. Students were surveyed on both academic and non-academic uses of computers, and teachers were surveyed about the use of technology for lesson planning, delivering lessons, and shaping student products. Survey results were compared to assessment results and other factors such as socioeconomic status.

Results of the survey showed that students tended to use computers and technology more at home than at school for both academic and entertainment purposes. Playing games was the highest reported at home activity on the computer. The survey data also showed that teachers tended to use computers more for preparation purposes, rarely used technology to deliver classroom instruction and hardly ever required students to create products with technology. In relation to the ELA MCAS, third grade reading scores and socioeconomic status were significant predictors of fourth grade scores. There was a negative and statistically significant relation between ELA scores for students who reported using computers for recreation at home with high frequency.

The only statistically significant uses of computers in school were using a computer to edit a paper and create a Hyperstudio or PowerPoint presentation; however, students who indicated higher computer use in school to create presentations actually had lower ELA total scores. For literature, writing and reading scores, prior achievement and socioeconomic status were strong predictors of achievement. Home use of computers for academic or recreational purposes appeared to have significant effect on writing scores. Overall, students who reported more frequency using computers for recreation than academic work at home had lower test scores. However, teacher use of technology in planning lessons or in executing learning activities did not appear to be a significant factor on student achievement for ELA or writing scores.

Some shortcomings of this study remained in inability to use random assignment of students to control or experimental groups. Additionally, discarding the data related to students with disabilities and who are English Language Learners, as well as the relatively high socioeconomic status of the students may have influenced the findings. The results of this study may not be able to be completely generalized because of the overall demographics of the schools

used in the study. Surveys only reviewed student and teacher perceptions of personal technology use, and the researchers did not look specifically at classroom practices. Classroom practices may have provided a better picture of the types of learning activities in the classrooms and uses of technology. With an emphasis on standardized test scores in making administrative and school decisions, the results offered beneficial insights concerning technology implementation in terms of computers, LCD projectors, and Palm Pilots, as well as language arts work that is likely to show results in student test scores.

Another study looked at a specific software learning program's effect on the learning and engagement of students with disabilities. Kim, Vaughn, Klingner, Woodruff, Reutebuch, and Kouzekanani (2006) sought to examine how the Computer-Assisted Collaborative Strategic Reading (CACSR) program affected reading comprehension of middle school students with learning disabilities, and the student perspectives on CACSR. Two female, special education certified, middle school reading/language arts teachers at an urban middle school volunteered their classes to participate in this study. The students whose data was used for the analysis met the following criteria: they were legally identified as having a disability; they decoded words at or above a 2.5 grade level; they were at least one grade level behind in reading comprehension; and, they were enrolled in a reading class for students with reading difficulties.

The students of each teacher were randomly assigned to an intervention group or comparison group. It should be noted that all students, regardless of whether they met all four criteria, worked with the same materials, but only data from those who met the criteria were analyzed for the study. The comparison groups worked with resource reading materials. The analysis showed no statistically significant differences between the intervention and comparison groups in demographic variables. The researchers conducted standardized pre- and post-tests and

researcher generated pre- and post-tests to assess the student reading comprehension. Students were paired to work together based on their scores.

Teachers and students were trained in the fundamentals of the program prior to the study. The CACSR program recorded student performance data that prompted the teacher to give short lessons at the start of the next class to target areas that required improvement. Both teachers had students in the control and intervention groups who collaborated with each other to implement similar programs. An implementation checklist was developed and used to score how well teachers implemented the intervention program and how well students engaged in the activities. At the end, researchers also interviewed students and teachers with open-ended questions about perceptions of CACSR. They were asked whether they would want to continue with the program, if they thought reading comprehension improved, and what was/was not helpful about CACSR. Pre- and post scores showed that the intervention groups showed more improvement than students in the comparison groups. Results, in fact, showed that the intervention groups did better on the tests than the comparison groups, and the intervention groups' achievements were statistically significant.

According to the interviews, the majority of students and both teachers viewed the CACSR positively. Most students noted the three main strategies presented were helpful. Students also reported control, reading passages, partner learning, and having fun with CACSR as particularly helpful. All but one student perceived improvement in reading skills and comprehension as a result of the intervention, and some students noted that others commented on their improvement. The majority of students stated that they would like to continue with the CACSR program. The students who did not want to continue with the program cited boredom.

Limitations of this study included the research assistant taking primary responsibility for implementation of the program rather than the teachers and the small sample size. Data coming from different types of classes could also impact the results of this study. Another possible limitation is researcher bias, since pre- and post-test data was analyzed by the researcher. This study showed both student achievement with a computer-assisted program and student perceptions about that program which connected to my research question.

Low-Achieving Students Show Highest Gains

How to best help lower achieving students engage and improve in academics can occupy much of a teacher's energy in designing learning activities. One of the most interesting ideas uncovered in this review of studies was that lower achieving students seemed to show the highest academic improvement when technology was integrated with teaching. Results from the following studies may be among the most compelling for skillful integration of technology into English language arts classes.

Judson (2010) indicated the students who had the highest gains in technology literacy also had the highest gains in language arts test scores. Judson intended to find out whether there was a positive or negative effect on achievement in traditional subject matter (e.g., reading, mathematics, and language arts) correlated with improvements in technology literacy. The study consisted of doing pre-tests of technology literacy for fourth and seventh grade students in Arizona and post-tests of technology literacy for the same students the following year, when they were in fifth and eights grade, respectively.

Only students who took pre- and post-tests were included in the data analysis and of students who took the state's standardized tests in reading, math, and language arts from one year to the next. Scores of other students in Arizona in the same grades were also reviewed for

comparison. After collecting data and filtering out students who did not have scores for all components, the researchers translated the scores of the technology proficiency tests to scale scores with possible scores ranging from 100 to 300. Proficiency was set at a score of 220. A Pearson correlation analysis was conducted to determine the relationship between changes in technology literacy and changes in standardized test scores for reading, math, and language arts.

Students were then subdivided into high, medium, and low technology literacy gain groups and student scores were compared to determine significant differences among groups. Results showed that students in the high gain technology literacy groups, generally started with the lowest pre-test and standardized test scores in the first year of the study. Overall, they showed the highest gain in scores in language arts. While this study indicated a correlation between high technology proficiency gains and language arts scores on a standardized test, it was not able to determine causation. The researchers offered hypotheses for the correlation based on related work, but could not offer any evidence to suggest why this gain only occurred with high gain groups. Also, the researchers could not differentiate students based on classrooms; therefore, they could not relate teacher practices to gains in technology literacy or content areas.

Questions about the significance of this study can be raised since previous studies did not show significant correlations in academic achievement and technology literacy and this study did not yield significant correlations until students were separated into high, medium, and low gain groups. However, this information is highly valuable to English language arts teachers since language arts revealed the highest correlation.

A study of the Merit reading and writing integrated learning system (ILS) also indicated that that program had the most impact on lower achieving students. O'Byrne, Securro, Jones, and Cadel (2006) sought to investigate the merits of a Merit reading and writing ILS in relation to

achievement of middle school students. Specifically, the researchers in this study focused on three questions:

1) Did the reading and writing ILS continue to have positive impact on middle school student achievement, as measured by WESTEST results?

2) Did the reading and writing ILS have a significant impact on the performance of lower achieving middle school students?

3) Did the reading and writing ILS have the same impact on the achievement of students attending rural and urban schools?

Students in this study were selected from the rural Calhoun Middle School in West Virginia that serves grades 5-8 and from the urban Grandview Elementary School near the capital of West Virginia that serves students in grades K-5. Both schools have high percentages of Caucasian students, with the urban school having 19% African American students and the rural school having even fewer. The persons living in the rural area were more likely to be impoverished with 25% living below the poverty line, while fewer (14.4%) lived below the poverty line in the urban area. Schools were selected because of similar education-related characteristics. Students at Calhoun in grades 5 and 6 scored and students in grades 3 and 4 at Grandview scored below state averages on the state test, but scores seemed to improve to higher than state average at each school when students were in grades 7 at Calhoun and 5 at Grandview.

For the study, students used Merit Integrated Learning Software designed to serve as a tutorial to support learning and encourage higher-level thinking and metacognition. At Calhoun Middle School, a computer program assigned students to classes based on grade level, subjects needed, and skills needed. The students at Grandview Elementary were randomly assigned to grade-level teachers with a computer program. One teacher at each school taught the treatment

classes where students and teachers would work with Merit ILS and a different teacher taught the comparison classes. Because of teacher schedules and variable class sizes, there was not an equal number of students in the treatment and comparison groups.

Treatment classes received a total of 90 minutes of intervention with the ILS per week along with the regular reading and language arts curriculum tied to West Virginia standards. If intervention meant displacing some of the regular curriculum, students did not make up the displaced work. The researchers designed a quasi-experimental post-test to assess the impact of the Merit ILS, focusing on low achieving students. Some pre-testing was completed which suggested relative equivalency of academic skills in both treatment and comparison groups.

The post-test only design was used for this study because West Virginia had just developed a new standardized test the year of the study; thus, pre-test data for the same test was not available. On average, students in the treatment groups at Calhoun middle school scored higher than students in the comparison groups on the standardized test, with the biggest difference in social studies scores. However, the Merit program had the most impact on low achieving or "at risk" students, who showed the most gain. There was no statistically significant difference in scores for average or higher achieving students in treatment and comparison groups. There was no significant difference found about the effectiveness of the Merit software between the rural and urban schools.

There are a few factors which limit the reliability of the findings of this study. The researchers were not able to do a random selection of participants and focused only on students in rural and urban settings. Also, the age difference of the students in each setting could have had an impact on comparing the information from each school. The unbalanced numbers in the treatment and control groups at Calhoun Middle School make it difficult to say whether some of

the more positive results in the treatment groups are due to more data or if the results accurately reflect the effects of the Merit software. Lastly, the researchers lack pre-test data for participants due to the new test administered the year of the study limits the findings.

Despite these factors, this study provides insight because the researchers reviewed the mean achievement scores of students in four areas on a state standardized test. In particular, the results revealed that lower achieving or "at risk" students seemed to benefit the most from the integrated learning system as compared to comparison groups. Furthermore, the findings did not show that the software diminished the learning of the higher achieving students in the treatment groups.

Conclusion

Integrating technology into the secondary English language arts classroom is a complex issue. Student interests and educational needs factor into teacher technology decisions. Technology resources, educational outcomes, and teacher comfort levels also factor into choosing educational technology for classroom use. The research surveyed offers numerous avenues from which to look at this complex issue, particularly in relation to English language arts classes.

Articles were categorized according to three themes to assist teachers when considering integrating technology into the classroom. What students want from technology in school has implications for level of student engagement with educational technologies. Engagement, in turn, has implications for academic success. Considering the most helpful aspects of technology can help teachers choose technology that is most likely to be beneficial for students. Finally, it is important for teachers to consider that research demonstrated lower achieving students had the highest gains with technology integration.

Teaching Toward a Better World

Research also demonstrated that students have specific opinions about what they want from technology in a school setting. All students seemed to enjoy using computers and working online in school (Spires et al., 2008). According to surveys, students wanted more technology use in school that related to their lives currently or prepared them for future careers, and to have some choice when using technology in school (Spires et al., 2008). However excited students seemed to be about using computers and the Internet, in another survey, students seemed adamant that they wanted to keep the social networking sites they use for entertainment and socializing out of school (Lukin et al., 2009). Lukin et al (2009) also noted that many students absorbed information from the Internet and participated in artifact sharing, but few actually contributed or created original content. Despite the ease of creation for original content with Web 2.0, students are still not confident enough to produce their own content. This suggested one avenue for including technology in the English language arts classroom is to encourage students to create content. Surveys also revealed that students preferred using email to contact teachers. It may be prudent for teachers to consider this preference so that students can communicate with them electronically.

Not all educational technologies are created equal. Aspects of computer technology that seemed to be the most beneficial in enhancing student engagement and academic success included quality, connection to learning targets, and feedback. Learning objects that gave immediate feedback to all student inputs seemed to engage students and help them reach that desired learning target. Immediate and relevant feedback in small chunks of text also seemed to help students to know where they needed to improve. Students seemed to respond better to small chunks of text and often skipped longer passages. However, Kim et al. (2006) found that a

software program helped to increase reading comprehension and there was no mention of students skipping longer passages.

Teachers provide a critical link to technology. Research indicated that when teachers did not give clear directions, students were more likely to miss key aspects of a learning object, get confused, or move off-task (Lowe et al., 2010). This suggests that careful teacher planning and integration is key to successfully using technology to increase student engagement and academic success. A teacher's guidance and facilitation can also help students to achieve deeper understandings and connections with content and concepts. Research also suggests that a clear purpose for the desired outcome of technology use is necessary. O'Dwyer et al. (2005) located a correlation between the type of activities with computers at school and standardized test scores. Students who reported using PowerPoint or other presentation programs the most in school had lower test scores in English language arts, while students who reported using word processing programs for composing and editing papers had higher test scores.

According to the studies surveyed, low achieving or at-risk students seem to have the highest academic gains when technology is integrated with instruction. The test scores of average and high achieving students were not significantly affected when technology was integrated in lessons, but low achieving students showed significant gains in test scores. Since all students seem to like using computers in school and technology integration appears to help low achieving students make academic gains, it would be helpful for teachers to integrate technology into lessons to help all students become successful. However, it is also important to remember that enjoyment and engagement is not necessarily the same thing. Kay and Knaack (2009) found that while many students found learning objects enjoyable, fewer found the learning objects engaging. Quality seemed to be the factor that best related to engagement and learning.

Research on technology application in secondary English language arts is still in its infancy and many avenues are yet to be explored. Of the studies surveyed in this literature analysis, few related directly or solely to English language arts. While studies exist that can illuminate what students desire in the classroom or school in terms of technology and offer suggestions for general aspects to help students, few exist that explore the impact of technology on learning or engagement in English language arts. Research in the future should focus on specific applications of technology in English language arts classrooms. This is especially important since studies suggest that students are likely to skip long passages of text. More research should be focused on integrating technology into reading comprehension and writing activities. Addressing how students interact with those technologies will help English language arts teachers effectively use technology.

Even though the studies in this literature review seem diverse, they tend to only look at computer and Internet based technology application in schools. While computers and the Internet will certainly represent the bulk of technologies available to most students and schools, more educational technologies are becoming available for school use. *SMART* Boards, for example, are the latest zeitgeist in education and many teachers and schools seem interested in purchasing these devices. However, little to no research about the integration and use of *SMART* Board technology is currently available. Research needs to focus on the effects that new technologies have on student engagement and academic success so that teachers and schools can make informed decisions about purchasing or using such technologies.

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Teaching Toward a Better World

Reconsidering Instruction: Culturally Relevant Social Studies for African American Students

Matt Lester

Abstract

Social Studies abounds with content that includes a multicultural lens. More challenging to find are specific pedagogies that work effectively with students from diverse cultural backgrounds. This literature review addresses the question: what is effective pedagogy for African American adolescents in Social Studies? It examines the specific problems faced by African American students, the themes of culturally relevant teaching, the dilemmas of white teachers, and the instructional implications for Social Studies. This literature review focuses specifically upon actual teacher practice not teacher dispositions or training programs. It excludes culturally relevant studies that were about microcultures other than African Americans. Many studies were based in homogenous classrooms and instructors observed were primarily African American. The results of the studies suggest that the tighter the connection between the community and home with the classroom the more effective teachers of African American students will be. The strategies of community and home to school connections were displayed through teacher expectations, care for students, cultural competence and positive cultural identity, communication, and community and classroom environment. Major areas left for greater research are: how white teachers can successfully emulate these themes of cultural congruence and how to implement culturally relevant teaching into heterogeneous classrooms?

Reconsidering Instruction:

Culturally Relevant Social Studies for African American Students

I was struck by uncertainty and doubt when I taught at an urban school. While I knew about content that challenged the racism embedded in the textbook, I did not know much about challenging the latent racism in my own instruction and classroom management. I did not know about pedagogical practices that work effectively with adolescent African American students. What if my pedagogy alienated, confused, or unjustly penalized those from a culture different than my own? After all how exactly does a white-male Secondary Social Studies teacher work effectively with African American students? These anxieties were the seeds of my research question: what is effective pedagogy for African American adolescents?

In cursory searches for research on these questions I primarily came across literature on Culturally Responsive Teaching (CRT). CRT is an educational reform that aims to increase participation and motivation of students of color who have not been academically successful or have experienced alienation (Vavrus, 2008). At a general level it aims to do this by incorporating, not assimilating, the cultural difference into an inclusive pedagogy. It embraces differences and modifies instruction so that it is congruent with all students' backgrounds. Thus CRT was the school of thought that most often dealt with my questions.

Several scholars have linked the disproportionately high discipline rates for African Americans with the cultural incongruence of their instructor and instruction. For example, while a teacher may expect complete silence during instruction, some African American students prefer a call-and-response interaction, which can be seen by the teacher as disrespectfully speaking out of turn (Delpit, 1995). Additionally, Delpit (1995) observed that while middle-class white teachers will often give instructions in the form of a question—"Could you please take a

seat"—many African American students culturally expect instructions as commands—"Sit down now." This can be seen as not only confusing, but the teacher lacking the skill and affect to teach. This suggests that conflicting teaching styles and teacher-student relationships created in the classroom can have just as deleterious of an effect for African American students as the content itself. If true, teachers need to reconsider their approach.

Exploring the literature on this topic is particularly important when the majority of teachers are middle-class and white. Because they are generally from another culture they will typically interpret experiences, act, and speak differently than their students of color. For the purpose of this review cultures are the "values, traditions, social and political relationships, and worldview created, shared, and transformed by a group of people bound together by a common history, geographic location, language, social class, and/or religion" (Vavrus, 2008). As a consequence of a majority of teachers being white and middle-class, cultural misunderstanding can lead to incorrect assessments of behavior and academic capacity.

As the reader can surmise there are many directions one can go with a literature review of CRT for African American students. For the purposes of this review I will focus upon three aspects of CRT literature. The first section will examine the calls for the need to culturally modify instruction, the second will describe practices—broken down by themes that emerged from the literature—considered to be effective for African American students, and the last will discuss the dilemmas faced by white teachers and research that directly deals with social studies content.

Literature Review

Many problems faced by African American students are the subject of research: the achievement gap, high dropout rates, disengagement, tracking, and oppositional behavior
(Bergeson, 2002). As Tyrone C. Howard puts it, the existing data paints a "bleak picture" (Howard, 2002). Underscoring that bleak picture, Howard points to a startling fact: "although African American students make up approximately 16.2% of the entire K-12 population, they constitute nearly 30% of all special education students" (p.422). Monroe and Obidah, in their case study of culturally congruent management strategies, recalled the conclusions of others that "African American students, particularly boys, are disciplined more frequently and harshly than students of other ethnicities" (Monroe & Obidah, 2004, p. 257). In 1998, African American students are of 21%, and were subject to corporal punishment at a rate of 27% (West-Olatunji, et al., 2006).

The root causes of these problems are not agreed upon, but many (CRT) scholars attribute aspects of the inflammation, and the importance of addressing the problems, to the changing student demographics (West-Olatunji, Brooks & Baker, 2006). Some call the need for pedagogy that suits a changing population as a "demographic imperative" (Morrison, Robbins, & Rose, 2008). There has indeed been a major shift for schools in recent years. "Racial/ethnic minority students consisted of 44 percent of the total public school population in 2007; this percentage is a 22 percent increase from 1972 as the percentage of White students in public schools showed a 22 percent decrease from 78 to 56 percent of the population" (Brown-Jeffy & Cooper, 2011, p. 65). Despite the changing demographics, those who teach are still primarily white and middle class; consequently this creates a tendency towards instructional and management methods that cater to white students (Teel, Debruin-Parecki, & Convington, 1998).

Moving the research focus from the existing problems to methods that challenge the tendency to (re)produce them, some scholars have explored what effective teachers of African

American students do in the classroom (Delpit, 1995; Howard, 2002). Often the effective teachers are African American themselves. From a review of the literature observed, recurrent themes of effective teachers of African American students emerge. Effective teachers hold high expectations for all their students regardless of past achievement, display care for their students, are culturally competent, use communication styles similar to that of the students' home, validate students' histories through content integration, and create classroom environments that embody qualities similar to students' home and community. As these traits appear in many articles, below I will use them as subcategories to explore the literature. A caveat: these categories overlap and what one scholar identifies as "teacher expectations" another may consider and label "care for students."

Teacher Expectations

Stereotypes and deficit beliefs about their African American students appear common among teachers (Howard, 2001; West-Olatunji, et al., 2006). Deficit beliefs and low expectations can lead to a number of disruptions in the classroom and academic difficulties (Howard, 2001). Indeed, these stereotypes and low expectations can be answered in turn by the students with noncompliance and resistance to what they may see as racist practices. Effective teachers of African American students, on the other hand, hold high expectations for all their students. Even students who have poor academic histories or who may not be at the same level as their peers are still held to high standards. This is what sets these effective teachers apart from others. They refuse to lower the bar, because they believe any student can reach their potential.

Howard (2002), over the course of a year, interviewed and observed 30 students—17 girls and 13 boys—who described their perception of their school and the effectiveness of their teachers' pedagogy. The interviews were tape recorded and transcribed, and the data was

analyzed using a constant comparative method from an interpretivist stance. This meant that the author saw each collection and analysis of the data informing one another throughout the study, and great value was placed upon context and the way individuals constructed meaning. Through his study a number of the aforementioned traits of effective teachers emerged.

One of the common themes that students noted in their evaluation of teachers that made them effective was their stern verbalized expectations. When students did not turn in work the teachers would become very upset and emotional and reemphasize that they were all capable of more. "In many instances, sarcasm or approval was replaced with anger and disappointment when students did not complete assignments, return homework, or address the teacher in a respectful manner" (p. 433). The study, however, did note that the stern, emotional verbalized expectations were not effective with all students. Some had a difficult time remembering that the teacher still cared for them as they demanded their best work. The authors made sure to remind the reader that students' perceptions were not monolithic. This study demonstrated considerable overlap with the effective traits of care, communication, and environment.

Care for Students

Crucial to the success of teachers of African American students is student recognition that their teachers care for them. The effective display of caring, however, were culturally congruent with the students. In the literature this is also referred to as "culturally connected caring." That is a "display of caring that occurs within a cultural context with which students are familiar." In Howard's study (2002), observed practices that students believed were displays of teacher caring were verbalized high expectations, direct statements about students' academic potential, and wide ranging emotional responses for approval or disapproval of performances.

In a study that interviewed high achieving African American students—measured by their ability to get a state scholarship and maintain a 3.0—teacher care was mentioned as one of the primary aspects that helped them achieve (Wiggan, 2008). The data collection strategies included a questionnaire, purposive and snowball sampling, interviews, and classroom observations. The purpose of the study was to explore the experiences of African American students and to understand the process that contributed to their success. Students in this study described care in a different way than Howard's students. They described caring teachers as those who gave extra help, asked for student opinion in the classroom, and altered instruction based upon student need. This form of teacher care seems to be less culturally specific than Howard's study of care.

Roberts's (2010) study of eight successful secondary African American teachers found that care was demonstrated in a fashion similar to Howard's study. The participants were selected through community nomination, which meant principals and parents identified teachers who "were exceptionally successful in helping African American students achieve academically" (p.456). Each participant was interviewed three times. The first 90 minute interview concentrated on concrete experiences and their understanding regarding their care for African American students. The second was designed to elicit greater elaboration upon themes from the first interview. The last interview was to comment on the narratives of their life. The study itself was concerned with care, or as the author puts it *culturally relevant critical teacher care*. Roberts (2010) found that *political clarity*, that is, the ability to create classroom or one-on-one conversations that acknowledge that race makes a difference in the day-to-day realities of life, and concern for students' futures was among the characteristic traits of effective teacher care. How they both were manifested in the classroom is discussed in the next section, "Culturally

Competent and Positive Cultural Identity." This study did not state how teachers who are not African American can use similar approaches.

Culturally Competent and Positive Cultural Identity

Effective teachers of African American students were also noted for their culturally competent curriculum. This could include their awareness of students' mannerisms and needs, and it could also include knowledge of content that reflects the students' identities and interest. In Robert's study (2010) of "culturally relevant critical teacher care", effective teachers of African American teachers had political clarity. These teachers often believed that these conversations helped their students unmask racism and guide them away from ideals of success manufactured by television.

Building from the idea of political clarity, teachers in Roberts' study (2010) exposed students to vocational possibilities with or without a college degree and warned students to steer clear of actions that could blemish their academic, financial, or criminal records. These actions fall under the theme of cultural competency because the teachers believed that these words of advice were to help students navigate a system that affected African Americans students differently than European Americans students.

Communication

A last trait that Howard (2002) noted was firm, direct communication styles. Many students stated that teachers who used stern, strict commands were remembered in hindsight as those who motivated them to work to their greatest potential. Because the studies of effective teachers documented yelling and emotive scolding of misbehavior, some have labled this communication style as authoritarian (Higgins & Moule, 2009). Nonetheless, most students in the study believed that what they described as "hollering" and "yelling" were effective forms of

communicating classroom rules, expectations, and affirmation. Howard (2002) cited research that many students found this form of communication familiar to the communication found at home.

Monroe and Obidah (2004) studied a classroom of an African American teacher to evaluate how an instructor with a similar cultural background would perceive discipline problems. The data was collected through 36 field visits during which observational notes were taken, two formal one hour and 15 minute interviews with the teacher—one at the beginning of the study and one at the end. Twelve informal interviews with the teacher were conducted throughout the study. The data was coded by behavior when it violated the classroom code of conduct, invited disciplinary action from the teacher, and behavior that was identified by the teacher as inappropriate during the interview.

The researchers identified two culturally specific behaviors that marked the teacher's communication style: cultural humor and demonstrations of emotion and affect. The authors found that teachers could use linguistic and colloquial student expressions to create a connection between home and school. The author claimed that the humor was specific to African Americans living in Southern Urban areas, and was described as playful bantering. Students in the study saw use of these colloquialisms and banter as an acceptance and validation of their culture.

Validation and Inclusive Curriculum

Because the standard narrative of history and culture in public schools is Eurocentric, successful teachers of African American students validate African American students' identities and incorporate their culture into the curriculum. Students in Wiggan's study (2008) recalled that teachers who were disengaging and ineffective looked at history only from the perspective of Europe. Those students recommended that teachers should look at history more broadly by

including the development of the world from the perspective of Africa, South America, and Asia. Additionally, they judged the quality of teachers in how they presented Black History Month. Effective teachers used it as a way to bring students together and ineffective teachers allowed white students to leave class during the unit. The study did not indicate what arrangements were made so that white students could leave class. Further, effective teachers did not begin and stop teaching African American history once it was Black History Month, but included histories that went beyond Eurocentricity year round (West-Olatunji, et al., 2006).

Class Environment

Effective teachers of African American students placed a student's community in the center of the curriculum. In practice this can be teachers who bring community members into the classroom to share their knowledge or assigning projects that allow for students to place their community at the focus of their investigation. Central to this theme is allowance and encouragement for students to examine their most immediate surroundings.

In Howard's (2002) study, a student identified characteristic of effective teachers was the teachers' ability to "make school feel like home." This was accomplished in part through daily rituals, classroom traditions, mannerisms, modes of interaction, and phrases that resembled or mirrored that of their family members in the classroom. The author recommended that more cooperative learning situations, the elimination of homogenous ability grouping, democratic principles, and interdependence would create an environment similar to the effective ones students recalled

In Wiggan's study (2008), students recalled that teachers whose classroom environment was well managed and ordered set the tone for their learning and responded positively. As the student put it: "She [the teacher] was just like this neat dresser, and her room was neat, and

everything was just neat about her...it kind of make you like straighten up, like oh, I better pay attention" (2008, p.330).

Dilemmas: What About a White Teacher Outside of the Culture?

Here I wish to briefly address what the literature does and does not discuss regarding white teachers who work with adolescent African American students. The studies themselves rarely observed classrooms that were taught by effective white teachers. This poses a dilemma for white teachers who wish to be culturally responsive. If the studies of effective teachers highlight specific characteristics—communication, care, and class environment—manifested in a culturally congruent way by African American teachers, can white teachers from a different cultural context adopt some, if not all, the characteristics and still be successful? For example, can the aspect of communication that students in studies described as stern and emotionally varied, work just as effectively when used by a white teacher? Or would students see this as offensive? The research reviewed does not directly address this specific question (Howard 2002; Monroe & Obidah, 2004; West-Olatunji, et al., 2006). However, below I will briefly examine the studies that were of white teachers intending to be culturally relevant.

Stairs's (2007), "Culturally Responsive Teaching: The Harlem Renaissance in an Urban English Class," was an observation of two of her former students teaching a culturally responsive lesson. The lesson was taught in a Boston high school, which was 46.3% African American, 39.7% Hispanic, and 8.3% white. Information was collected through observational notes, informal interviews, and the teachers' journal entries. The teachers used rap lyrics from Jay-Z and 50 cent and poetry by Langston Hughes to examine poverty and racism. As described, the methodology of this study was weak because the author was analyzing her former students, which suggests an immediate bias, and the duration of the study was short. It is unclear how

effective their approach could have been over a greater duration. However, what is significant about the study is that what the author observed was deemed as CRT. Yet only a handful of the themes used to explore the literature above were evident in the teachers' practice. This suggests a potential flaw of the study or a theoretical disconnect between CRT done by African American teachers and CRT done by white teachers.

Higgins and Moule (2009) were participant observers of 13 white interns working at an urban K-5 school. There the interns taught a minimum of 10 mathematics or science lessons for three weeks. The study was focused on how these interns would reconsider, alter, or adopt management strategies that they found more effective than what was taught at the university. Data was collected through intern journals, observations, and a closing interview. The authors used a constant comparative method to identify patterns and themes. They organized these findings into two categories "The Parks Way," which referred to the school they interned at and the "University Way" which referred to the university they attend. The interns stated that the "University Way" was not as effective as the "The Parks Way" with their African American students. The "Parks Way" was initially described by the interns as an authoritarian approach. Yet over time they found it to be an effective way to communicate care to students. The authors of the study believed that a more accurate way to describe what interns labeled as "authoritarian" as actually "authoritative." While communicating this way was unnatural for many of the interns, the authors conclude that the "authoritative" approach could be successfully adopted by white teachers (p. 137).

The degree to which white teachers can emulate successful practices used by African American teachers or unlearn racist practices is unclear. In 2011, Chubbuck conducted a study to determine how two white teachers developed their beliefs about race, how their pedagogy and

policy matched their understanding of race, and how they enacted or disrupted Whiteness in their classroom. Chubbuck states that defining Whiteness is difficult but it is connected to institutionalized power and privilege. Who can access the power and privilege is constantly in flux (p.303). The two teachers were studied using a narrative inquiry/life history.

The selection process for the participants began with sending 200 nominating surveys to African American churches and community organizations asking for effective White Secondary teachers. These surveys failed to identify an effective white teacher—no teacher received more than one vote—so the author of the study personally contacted African American administrators, counselors, teachers, teacher educators, activists, pastors, parents, and students to identify a white teacher who they believed was an advocate for students and an effective instructor. From the six teachers nominated, the author interviewed and observed their practice to narrow the participants to two. They were chosen based on their congruence with the scholarship on effective teachers of African American students. A potential limitation of this study is the sampling technique. Identifying people who might be good for African American students and then observing only those with practices congruent with the literature may be problematic because it picks a particular outcome to guide the process of sampling.

Data was collected over the course of one school year. Three semi-structured interviews, each 60-120 minutes long, 25 observations for each teacher, and follow up interviews were the primary methods for data collection. The information was analyzed using constant comparative coding. The findings suggested that the teachers' understanding and analysis of race did not always match corresponding practice. One teacher, for example, displayed low expectations for behavior and academic achievement despite their belief that too often teachers hold low expectations for African American students (p. 322). One student noted that this particular

teacher was not strict enough in their management. Other students felt that she was not adequately preparing students for challenging academic work.

The other observed teacher stated in interviews low expectations and expressed deficit beliefs for students. However, their actual practice embodied high demands both in behavior and academic work. The author noted that this was confirmed by interviews with students. Adding to the complexity of this breakdown between theory and practice, this particular teacher did not believe that African Americans were negatively affected by school tracking.

Chubbuck (2011) concludes that the first teacher's practice conflicted with her understanding of race because her practice was motivated by an intention not to be guilty of racism towards African American students. Being a mother of an adopted African American child, the author posited she may have a loose management style because it prevented her from being seen as too harsh on her African American students. These conclusions were the author's not necessarily the participants themselves.

Social Studies

In the introduction of this literature review it was stated that the question of how to work effectively with African American students arose out of a social studies classroom. The remainder of the paper will focus upon studies that dealt specifically with Social Studies. The findings may overlap with other studies already discussed. Similar to the order used above, it will begin by describing some specific problems or issues for African American students in Social Studies and close by discussing approaches that African American students or teachers believed were effective.

As mentioned more than once in this paper, social studies textbooks, curriculum, and teachers are often Eurocentric. But not noted thus far is that consequently some African

American students valued secondary sources and evaluated people and historical events differently than European American students (Epstein, 1998). Using questionnaires to determine how 22 African American students and 27 European students rated the credibility of secondary sources, the three most important people in United States history, and the three most important events in United States history, Epstein identified three salient aspects of the data. First, African American students in this study believed family members were the most credible source because they filled in the missing history that was not presented by the teacher, textbook, or news. This contrasted with the European American students who rated the textbook as the most reliable source, followed by the teacher and library books.

The second finding is that even when African American students and European American students' selections of the most important people overlapped, no European American student justified their selection in terms of race. For example, whereas a majority of African American students selected Martin Luther King Jr. for specifically advancing African American equality, only two European American students cited King's contribution in terms of race. Similarly, Epstein's last finding broke down over student understanding of race.

Although African American students and European American students shared some selections of important historical events, their reasoning and understanding behind the choices was markedly different. The majority of African American students who chose the Civil War, five out of six, focused on African American freedom as the cause of the war. A majority of European American students, on the other hand, framed the cause of the war by focusing on national unity (p. 405). The one event that both groups explained the significance of in a similar fashion was the Bill of Rights. But African American students explained the event in third person

or in general terms such as it gave people rights, unlike European American students who used words such as "we" or "our" in reference to their rights gained through the legislation.

European American students' narratives of United States history aligned with dominant ones and viewed racial oppression as an aberration without any group or institution responsible. African American students' narratives incorporated the experiences of their family members with racism, the denial of rights, and white people's or the government's responsibility in their oppression. With these dilemmas in mind, how does a Social Studies teacher address and alter their curriculum accordingly? In her conclusion, Epstein (1998) posed the idea of using racial hierarchy as a way to address these ostensibly irreconcilable perceptions of history. She argued it would allow for a narrative of racial and/or ethnic groups simultaneously experiencing events but differently. For instance, she argued that the concepts of freedom and slavery would thus not be seen as paradoxes but as things that can coexist at the same time for different groups. This framework, Epstein suggested, could demonstrate that both African American and European American perspectives are partial and can be broadened by others.

In another Social Studies classroom, Sampson and Garrison-Wade's study (2011) investigated two questions: do African American students prefer culturally relevant lessons in school and how do culturally relevant lessons relate to the lives of African American students? (p.281). The study used both quantitative and qualitative methods. The 9th to 12th grade classroom studied was located in a large urban high school in Colorado. The number of students who participated ranged from twelve to thirty depending on the particular lesson and attendance. Data was collected through student feedback forms, group discussions which used results from the feedback questionnaires as their prompts, and an African American focus group. The data

was collected over the period of six weeks—half for culturally relevant lessons and half for nonculturally relevant lessons. Sampson, an African American woman, administered the lessons.

Culturally responsive lessons used cultural artifacts, language, ethnic referents, and cognitive and linguistic contexts familiar to African American students. Non–culturally responsive lessons were simply developed from the existing curriculum and omitted those aforementioned approaches. From the qualitative feedback received after these lessons, the authors identified three themes: racially challenging topics can be enriching and stimulating; lessons should be interesting and fun; teacher interactions, energy, humor, and interest in the students promotes learning.

The first theme emerged out of student responses to a culturally responsive lesson on the history of the "N word," which through the quantitative data was identified as the lesson they preferred the most. Many African American students were excited by the lesson because it focused upon them, but other students stated they were unsure about the lesson because it may offend non-African American students. Indeed, this lesson provoked a sharp argument between a Latino and African American student over using the N word, which had to be physically broken up (p. 293).

The second theme was evident in student responses to a culturally relevant field trip to an African American library. Many students were excited to see their community studied positively for the first time. Students also mentioned that after experiencing an engaging and meaningful field trip they were more critical of direct instruction lessons they had received throughout their school experience. The students also stated that they wanted lessons that explored the past, but preferred ones that were interspersed with current history. The last theme identified from the

qualitative data reflected students' appreciation for Sampson's pedagogical approach and the classroom environment that she created.

What is significant about the last theme is that it echoes the culturally responsive characteristics examined above. Students identified effective teachers who cared as those who went to sporting events, chaperoned school events, recognized cultural fashions, and accepted slang/vernacular. In the group discussions students stated that the culturally relevant lessons were empowering. They enjoyed the experientially based activities, found Sampson's interactive teaching style and tone of voice engaging, and underscored the importance of classrooms that prioritized understanding and embrace of cultural difference. They appreciated that in tandem with the lessons they were allowed to move around the room and make noise. Students pointed to their interest in group work and their desire to choose their own groups as something that they stated had not been allowed to do before.

What is particularly unique about this study is that it raised questions about how to teach culturally relevant lessons to one group and not to another. Some African American students reflected in the group discussions that it is possible that Latino students were ignored in these lessons (p.297). Nonetheless, the study in the social studies classroom suggested corroboration that the themes of care, environment, cultural competent and positive cultural identity, communication, validation and inclusive curriculum, community and class environment were effective with African American students.

Conclusion

From a brief review of the literature, Culturally Responsive Teaching (CRT) studies partially answered my question of how to work effectively with African American students in secondary Social Studies. As described above CRT is an educational reform that aims to increase

participation and motivation of students of color who have not been academically successful or have experienced alienation. Indeed CRT seems to be the most common pedagogy to work effectively with African American students.

The CRT studies illuminated six themes of consideration and characteristics of effective teaching when working with African American students (Howard, 2002; Monroe and Obidah, 2004; West-Olatunji, et al., 2006; Roberts, 2010; Wiggan, 2008). Effective teachers of African American students held high expectations regardless of past achievement, displayed care for their students, were culturally competent, used communication styles similar to that of the students' home, validated students' histories through content integration, and created classroom environments that embody qualities similar to students' home and community.

How well white teachers could integrate these themes into their pedagogy is not certain because the effective teachers of these studies were primarily African American. However the findings suggest that some themes could be approached and met by white social studies teachers. For example, all teachers can hold high expectations for all of their students, and all teachers can integrate African American history and multiple and varied perspectives into the classroom. While there is a potential that cultural miscommunication could occur, genuine, observable, and explicit attempts to demonstrate care for students may be a start for white teachers. Further, the findings support the implication that white teachers could benefit from regular study of other micro cultures and self reflection of the cultures they are embedded in. This study and reflection could, for example, assist social studies teachers to address Epstein's findings (1998) that students from different cultures often hold different historical narratives, perceptions, and values.

An area left for further research is how teachers implement culturally responsive teaching in classrooms that are not homogenous. For example, how does one use CRT for African American

students and include Latino, Asian, and Arabic students? Using the principles that underlie CRT, that classrooms should embrace differences, can CRT teachers be as effective with African American students when other populations are incorporated into the curriculum?

To incorporate, not assimilate, cultural difference into an inclusive pedagogy, one that embraces differences and modifies instruction so that it is congruent with all students' backgrounds, would be a difficult task. But if there is a committed process of continuous engagement with the themes of CRT, an openness to learn from and about different cultures, learn about ourselves, consistently reflect upon successes and mistakes, then educators may find themselves heading toward a positive direction.

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Discourse Strategies to Elicit, Support, and Extend Student Thinking in Elementary Mathematics

Cara E. MacMillan

Abstract

Current federal mathematics standards encourage teachers to use discourse to support inquirybased mathematics classrooms. Additionally, research has shown that student engagement. understanding, and use of procedures are positively impacted by whole-group mathematics discourse. Unfortunately, curricular and state standards may not always incorporate the use of discourse. In an environment where teachers are pressured to adhere to strict curricular guidelines and standards, how can an educator employ discussion and inquiry in the elementary mathematics classroom? This literature review will address the question: what strategies are most effective to elicit, support, and extend student thinking in elementary mathematics? This paper will examine classroom norms that support whole-group discourse, explore the roles of both teacher and student, and look at specific strategies for teachers to build and maintain these effective practices over time. The literature a) points to strategies and techniques that teachers might utilize to successfully employ mathematics discourse and promote inquiry within the curricular guidelines and standards, and b) suggests how these practices can deepen and solidify students' mathematical understandings, thereby increasing student achievement in elementary mathematics.

Discourse Strategies to Elicit, Support, and Extend Student Thinking in Elementary Mathematics

Elementary mathematics teachers often struggle to employ inquiry-based instruction that also provides insight into students' cognitive progression and understanding of mathematical concepts. Mathematics work is too often reduced to activities requiring low-level thinking such as recall of facts, rules, and procedures (Franke et al., 2007). This style of instruction and learning is not only contrary to the National Council of Teachers of Mathematics (NCTM) emphasis on inquiry-based mathematics classrooms, but also leaves teachers to examine student learning through written work alone, which cannot adequately reveal students' conceptual understandings, misconceptions, or mastery of a concept. To combat these shortfalls, mathematical classroom discourse is needed. NCTM (2000) describes student talk as an essential technique for increasing student learning: "When students make public conjectures and reason with others about mathematics, ideas and knowledge are developed collaboratively, revealing mathematics as constructed by human beings within an intellectual community" (p. 34).

In my own experience teaching in the primary grades, I have seen the benefits of mathematical discourse and inquiry in the classroom. When students engaged in inquiry and explanation through cooperative mathematical discourse, they learned to more fully explain their ideas and understand the ideas of others. This, in turn, allowed me as a teacher to identify and fill any gaps in their learning, and gave students the opportunity to co-teach and co-learn in the mathematical context of our classroom. I found that certain questioning strategies elicited a deeper understanding than others, and specifically worded discourse allowed me to push students to extend their thinking and lead them to a deeper and more sophisticated understanding of the material.

Research has shown that whole group discussion in mathematics classes is essential to promote mathematical learning and deep conceptual understanding (O'Connor, 2002). Additionally, whether in individual conversations or whole group discussions, students' engagement, understanding, and use of procedures are positively impacted by specific classroom discourse norms and expectations (Lopez & Allal, 2007). For students to successfully engage with increasingly complex mathematical ideas as they progress through elementary school, they benefit from a familiarity and flexibility with a specific style of discourse. This allows them to clearly communicate their own ideas, to comprehend the ideas of others, and to re-examine their own thinking when disequilibrium, or conceptual conflict, is introduced by questions from a teacher or peer.

Successful classroom discourse around mathematics is both modeled and demanded by the classroom teacher, and leads to students' full, confident engagement in explaining their ideas, as well as questioning others' strategies (Hufferd-Askels, Fuson, & Sherin, 2004). Straightforward modeling and practice of these norms familiarizes students with how and when they are expected to participate, and appropriate ways to interact with and challenge one another during mathematical discussion (Wood, 1999). When classroom mathematics discourse illustrates to students that their ideas are valid and important, students begin to internalize a personal responsibility for the learning of everyone in the classroom (Hufferd-Askels et al., 2004). A supportive and curious learning environment is created in which students and teacher operate as equal co-learners, each with the ability to teach and learn from another.

There is ample research to suggest that both veteran and novice teachers are capable of fostering rich mathematical discourse in their classrooms (Huffer-Askels et al., 2004; Kazemi & Stipek, 2001). Teacher leadership and modeling of effective and appropriate questioning tactics,

as well as explanatory strategies, will introduce students to a non-traditional mathematics learning style which aims to unveil individual understandings and conceptualizations, rather than to simply find the correct answer. As students grow comfortable with this learning style, the teacher can step back somewhat and allow student-student interactions to guide discourse, thereby supporting and calling for equitable participation from all students (Hintz, 2001). This strategy also provides teachers with deep insight into students' cognitive processes, and that knowledge can be used to guide their instructional choices (Franke, Carpenter, Levi, & Fennema, 2001). The value of such a mathematics learning environment is clear. But any teacher seeking to implement or improve mathematics discourse in the classroom would benefit from knowing: what strategies can teachers use to most effectively elicit, support, and extend student thinking in elementary mathematics?

Creating a format for engaging mathematical classroom discourse is an expansive, widely researched topic, with support from many curricular theories and methods. What I am most interested in here, however, is the practical application of these techniques: specifically, what can a teacher do and say to create successful discourse in his or her classroom? I will not be exploring curriculum reform, nor will I investigate in any real depth contradictory views that problematize mathematical discourse in the classroom. Rather, I will focus on case studies in which teachers practice and promote tangible strategies for *eliciting* student ideas, *supporting* a structured math-talk learning community, and *extending* student understanding through specific questioning.

For the purposes of this literature review, I have defined the term *discourse* to mean: *purposeful, strategic mathematical conversation, in which teacher and student are equal*

participants in uncovering, challenging, and deepening their own mathematical understandings, and those of others.

In this paper, I will first examine general classroom norms found to support strong mathematics discourse, as well as norms and expectations specific to whole-group mathematics discussions. I will explore the specific role of the teacher, and the various roles students can play during discourse. I will then discuss specific examples provided by the literature, and end this review with an examination of how teachers can maintain successful discourse practices over time.

Literature Review

Establishing Norms

In unpacking the ways in which teachers successfully engage their students in mathematical discourse and thereby elicit, support, and extend student thinking, we will first examine the establishment of general discourse norms within the classroom. Hufferd-Ackles, et al. (2004) observed an elementary teacher to examine how this teacher and her students established a classroom community in which mathematics reform practices could be successfully enacted. Researchers and teachers engaged in a professional development project focused on primary-aged students who were English Language Learners. The study began with four teachers, one each in kindergarten through third grades, and each teacher with either no prior teacher experience or one year of teaching experience. Over the course of the project, the third grade teacher demonstrated significant progress in developing discourse skills, and became the focus of this study. This teacher was in her second year teaching the same group of students, moving with them from second to third grade. Almost all students spoke Spanish at home, and

the case study teacher was bilingual. The teacher was observed twice per week from September through April.

Researchers analyzed and coded their observations, and four main components of a successful Math-Talk Learning Community were identified: a) *questioning*, b) *explaining mathematical thinking*, c) *identifying the source of mathematical ideas*, and d) *sharing responsibility for learning*. Within these distinct components, the researchers defined four levels of the Math-Talk Learning Community; Level 3 defines the teacher's role as that of a coach and assistant, but largely designates the teacher and all students as co-teachers and co-learners within the community.

The progression in each of the components of the Math Talks in three distinct steps: students first received specific expectations from their teacher and observed her modeling of these behaviors; gradually students were able to experiment with the modeled practices, with guidance and prompts provided by their teacher as necessary; and eventually students were able to lead and direct math talks largely on their own, with very little coaching from the teacher.

The study provided specific detail on the Level 3 teacher's role within the four components of the math-talk learning community. According to the researchers, a Level 3 teacher's role in *questioning* is to clarify student thought and communication, suggest strategies for resolving differences, and manage time within the classroom. In terms of *explaining mathematical thinking*, a teacher operating at Level 3 was responsible for probing and guiding students' explanations, allowing them to give more extensive and thorough responses with less assistance. In reaching Level 3 in *identifying the source of mathematical ideas*, students were confident that their mathematical ideas had value and significance within the classroom, and teachers recognized that an exploration of students' ideas was valuable and even essential.

Finally, perhaps the most compelling element of a classroom operating at Level 3 is the *shared responsibility for learning*. Students at this level were attentive to the shared ideas and strategies of others, and were quick and gracious in offering and accepting help from their peers.

The goal of a Math-Talk Learning Community, as described by Hufferd-Askels et al. (2004), was to understand and thereby extend all students thinking. The researchers argued that, by operating at a high level in all four components defined here, the teacher led her students to effectively reason, defend, and prove their ideas in classroom mathematical discourse, and thereby strengthen students' overall mathematical understanding and achievement. This study provided strong insights into the nature of a classroom community that enacted important mathematics reform practices. This classroom community implemented a curriculum that was specifically geared toward mathematical discussion, representations, and language. It would be beneficial to further understand how the curriculum played a role in developing discourse.

General classroom discourse norms are essential in building a learning community that fosters sophisticated academic conversation. What aspects, then, are specific to sociomathematical discourse norms, and how are these norms different from those for general discourse? Wood (1999) argued that the social and academic aspects of development are closely intertwined, and therefore mathematical classroom discourse, by definition, supports students in both areas of growth. The researcher observed that misunderstandings and conflicts often occurred during classroom discourse when the emphasis was on student thinking and reasoning, suggesting that interpersonal mathematical conflict can be a highly effective facilitator of student learning.

In a case study of one second-grade teacher's classroom, Wood (1999) sought to understand the interrelationships among context, student learning, and the role of teaching. These

relationships were investigated through the observation of 50 videotaped lessons from one second-grade teacher, collected over a period of 18 months. The teacher had previously participated in professional development on primary students' learning in the classroom, and as a result she had been teaching in a manner aligned with NCTM's recommendations for mathematics reform.

Wood found that the teacher created mathematical discourse norms in three main steps: first, the teacher outlined her basic expectations for mathematical discourse in the classroom; second, she coached students in how to appropriately articulate their mathematical disagreements, and gave students the opportunity to practice; third, she coached students in how to appropriately engage in defending their mathematical ideas if challenged by a peer, and allowed further opportunity for practice. As the school year progressed and students became more comfortable engaging in mathematical argumentation, the teacher's role transformed from that of moderator into that of participant, and her students became increasingly adept at examining, critiquing, and validating their mathematical ideas through reasoned discourse.

In order to closely examine the nature of discourse in the classroom, Wood coded for three types of norm statements made by the teacher: those that invited students to listen to the speaker, those that encouraged students to understand other students, and those that asked students to identify if they agreed or disagreed with the speaker's claim. The researcher also focused on three types of questioning strategies the teacher used: those that prompted students to detail a strategy, those that asked students to provide reasoning, and those that led students to justify their thinking.

The teacher made her expectations clear, and ensured that students followed these guidelines during discourse. When students disagreed with a presenter's claim, they were

expected to politely state their disagreement, provide a reason for disagreeing, and point out where they thought their peer's specific error had occurred. She also consistently provided coaching as the school year progressed and students became more comfortable engaging in mathematical argument.

Wood's research demonstrates that, when a teacher's expectations and encouragement serve as the basis for the establishment of a student-centered discourse forum, the result is a learning environment in which sophisticated academic dialogue between students is not only fostered and supported, but is also the norm.

The Teacher's Role

The previous section examined the ways in which classroom norms for mathematical discourse are established. In this section, the practices of a skilled teacher will be examined. O'Connor (2001) observed a skilled teacher in leading a rich classroom discussion of decimal and fractional equivalencies. The researcher sought to uncover the teacher's work in supporting student thinking by embedding a mathematical question in a position-driven discussion. While the students indeed were participating in challenging mathematical work, the study focused mainly on the work of the teacher, and her role in this complex mathematical discussion. The observed teacher taught mathematics in four fifth-grade classrooms, but this research focuses on one two-day lesson in one particular classroom. The study details the strategies and methods she used to successfully facilitate whole group mathematical discourse.

Rich mathematical discussions do not necessarily spontaneously emerge; teachers carefully prepare for them. In this study, the teacher planned to support a position-driven discussion by carefully framing the discussion's central question, examining the cognitive and physical tools available to students, and reflecting on past discussions, preparing counter-

examples and challenges for these possibilities. The researcher described this intensive preparatory work as essential if the teacher is to hold ideas and strategies in productive conflict during whole group discussion.

The goal of the lesson was a class-wide position-driven discussion in which students took a position on the answer and attempted to support that position with evidence. In this study, the teacher put forth the central question (in this case: can any fraction be turned into a decimal?), and students responded with an answer and a supporting example. Other students were encouraged to respond, question, and challenge the sharer's claim. The act of academic debate between students was portrayed as positive and valuable by the teacher, and understood within the classroom to be central to learning. The teacher recognized, however, that whole group debate can often grow intense, and she consciously built time for small group work into her lesson. This provided students a break from this intensity, and kept them engaged in the demands of the mathematic work.

When whole-group discussion resumed, students were sometimes asked to revoice an idea or strategy shared in their small groups. Revoicing is a strategy in which a student restates an idea or theory previously voiced by another student. In this study, the teacher used this method as an assessment of comprehension for the revoicing student, to provide the whole group with a rebroadcast of an important idea, and to take a moment, if needed, to plan the next instructional move.

A shared error or misunderstanding also provided the teacher with opportunities to foster students' understanding. The teacher may or may not correct the student's error, depending on what she is trying to accomplish at that point in the discussion. As the researcher pointed out, a superb insight might be concealed within an alarmingly incorrect computation. The teacher then

has to make a decision about stopping and correcting the situation, and when and how to most meaningfully approach that correction. When we are developing new ideas and forming new conceptualizations, O'Connor states, stopping to correct every mistake is disruptive to the real work at hand. When concepts are ready to be refined, however, correctness is an essential part of learning.

Teacher preparation is critical to establishing effective mathematical norms. Not only did the teacher studied here craft a high-quality question to lead an appropriately challenging debate, she also prepared for questions that might come up during the discussion, which helped her to be adaptable. She was able to think on her feet, and adjust the flow of the conversation as necessary. The activity challenged students' mathematical understandings, but it also conveyed to them the idea that difficult questions require time and deep thought. Students were reminded that working to understand one another is no easy task, but it is valuable and important work, and deserving of their best efforts.

In the microculture of each individual classroom community, students confront, compare, and negotiate mathematical challenges, and over time specific shared meanings and norms are established by the group. These norms and expectations are guided by the teacher, and are unique within every individual classroom culture. Lopez and Allal (2007) examined two separate classrooms and compared their discourse methodologies in an effort to answer the question: how can teachers maintain a mathematical standard in an inquiry-based classroom? The two classrooms will herein be referred to as Classroom A and Classroom B, taught respectively by Teacher A and Teacher B.

Classrooms A and B shared two main sociomathematical norms in terms of participation in whole group mathematical discussions. Sociomathematical norms are defined as *normative*

aspects of mathematics discussion specific to students' mathematical activity. Primarily, students were expected to explain their problem-solving procedures to the class. Secondarily, any procedures shared subsequently in the discussion should make strategic proposals different from those already presented. Aside from these shared expectations, however, Classrooms A and B had discourse norms that differed depending on the goals of the teacher in utilizing whole-group discourse and strategy sharing. Classrooms A and B also shared one secondary similarity: whole-group discussion alternated with small group work at regular and appropriate intervals, giving students the opportunity to experiment with new strategies, or compare two varying strategies to determine which is the most efficient. Both teachers carefully observed students' work in small groups, and noted strategies or misconceptions that could be topics for subsequent whole-class discussions.

Teacher A employed whole group mathematical discourse in order to provide students with a broad selection of problem solving strategies from which they could pick and choose when solving any given problem; equal value and significance was placed on each shared procedure. During sharing, a student presenter was expected to explain step-by-step procedural instruction to his/her peers, as the teacher asked guiding questions to further reveal the student's mathematical thinking and reasoning. The student's peers participated by revoicing the presenter's explanation, or by completing an explanation that was started by another. Students' activity was regulated in that they did not engage in directly challenging, questioning, or critiquing one another's ideas. Rather, student ideas and strategies were validated or invalidated solely by the teacher.

Teacher B's goal in implementing whole-group mathematical discourse was to guide students in identifying the most effective procedure among those presented during sharing.

Students were expected to explain their procedures generally, with the teacher asking openended questions of the presenter and the group. After several strategies had been presented, students engaged in evaluating the different procedures, and together they determined which strategies were *relevant* (meaning they lead to the correct answer) and which strategies were both *relevant and effective* (meaning they require the least amount of time or work to complete.) Students were expected to employ only those strategies that were found to be effective in their future mathematics work, and their activity was thereby regulated through the teacher's standardization of available procedures.

Teacher A and Teacher B utilized whole group mathematical discussion with two different goals in mind, and those goals affected the norms that were established in each class, and the manner in which the discourse sessions were conducted. Both are appropriate and offer valuable insight to student thinking, as well as ways to further push students in their uncovering of mathematical ideas and understandings. Furthermore, both methods could be employed in a single classroom on different days, depending on a teacher's goals, and provided she appropriately supports students in understanding the norms and expectations for each discourse style. As Lopez and Allal show in this study, both discourse methodologies contributed significantly to the progression and development of students' problem-solving procedures.

The Students' Role

Classroom mathematical discourse practices are most effective when they are designed to include and support all students, in their roles as both speaker and listener. White (2003) explores four themes that make this possible. Though we have seen several of these ideas previously in this literature review, it is important to envision them now with a diverse group of students in mind. White states that the following four characteristics are essential on the part of

the teacher: a) value of students' ideas; b) exploration of students' answers and strategies; c) incorporation of students' background knowledge; d) encouragement of student-to-student communication. When these themes are in place, classroom discourse allows students to focus on sense-making and mathematical reasoning, and allows teachers to reflect on students' understandings, and further stimulate students' thinking based on her observations and assessments.

White conducted two case studies of third-grade teachers who embodied these characteristics, and detailed the ways in which they enacted them. For the first characteristic, value of students' ideas, the observed teacher began the day's math lesson by posing a problem or scenario, and asking students to think about the facts presented, and strategies they might use to approach the problem. During the case study lesson, the teacher asked the class to take half a minute to examine a chart she had posted for display, and in that time students were expected to formulate an observation to be shared with the class, if called upon to do so. This technique prepared all students to participate by either sharing or listening. As students began to share, the teacher pushed their thinking by asking students to share the mathematical reasoning behind their observations, and challenged the group to find various methods for problem-solving. No student answers were regarded as trivial, and each student sharer was praised for using common sense, making a connection with previously introduced strategies, and putting forth their best effort.

For the second characteristic, exploring students' answers, teachers focused on eliciting students' strategic thinking and underlying mathematical understandings, rather than on finding correct answers. After giving students think time to examine a given problem or situation, the teacher probed students' understanding of the given information, their concept of what was being asked of them, and the steps they should take to find the answer. Students often worked with

manipulatives, but were not permitted to handle them until they had formulated a plan for how to go about solving the scenario. This gave the teacher an opportunity to see if students understood what the problem was asking, and what possible strategies students might be considering. During sharing, the teacher expected students to provide thorough explanations of their mathematical reasoning, even if their answer was incorrect.

The third characteristic outlined by White is the incorporation of students' background knowledge into the classroom. Students are continually experiencing mathematics both inside the classroom and out, and finding ways to link those experiences with strategies and knowledge, whether formal or informal. In a subtraction scenario described in the case study, three students found three different ways to solve the problem, according to their background knowledge and experiences. One used her knowledge of place value, another his previous experiences with subtraction, and the third his past experiences with playing cards. The teacher incorporated these strategies as real and valuable, and encouraged students to utilize these strategies in the future.

The fourth and final teacher characteristic described by White is the encouragement of student-student interaction during mathematical discourse. This allows the teacher to avoid the authoritarian position of judge and jury, and instead encourages students to question and challenge one another's ideas, and for presenters to defend their ideas as necessary. The entire group is encouraged to become involved in the discussion, and the group must come to a satisfactory consensus by the end of the conversation.

It is important for teachers of elementary mathematics to be skilled listeners in order to employ these effective practices, and recognize that different students have different needs, and therefore require different types of encouragement at different times. White argued that teachers must work to develop the mathematical fluency, creativity, and resourcefulness of all students,

and give each individual the opportunity to advance into their academic zone of proximal development. Discourse conducted in the manner outlined here can successfully facilitate the development of children's mathematical thinking.

Thus far, this paper has explored many ways in which teachers can engage with students during mathematical discourse, by posing questions, challenges, examples, counterexamples, and confusions. As we have seen, these strategies have incredible value in uncovering and advancing students' mathematical thought, but their purpose is to engage students in speaking. Hintz (2011) examined the experience of the role of the student listener, and the distinct demands that are required of the listener as participant.

Hintz (2011) argued that, if teachers are to grant equitable participation opportunities to all students, a better understanding the various demands for participation is necessary. If teachers truly understand how students experience the different demands on varying participant roles during mathematical discussion, they can better support the participation and learning of all students. Hintz asserted that it is only through "intent participation" that students can follow, conceptualize, and problematize the strategies demonstrated by classmates (Rogoff, Paradise, Mej'ia Arauz, Correa-Chavez, & Angelillo, 2003). This type of active participation successfully prepared students for the possibility of moving to participating through talking.

In order to recognize all forms of participation as valuable, Hintz stated the importance of knowing *why* students listen, *what* they listen for, and *what* they do with what they hear. In her case study of one fourth-grade focal student, she found the demands on the listener included: setting one's own thinking and strategies aside, comparing strategies, trying on another's thinking, making sense of and problematizing another's strategy in order to use it, listening to and following instructions, determining their agreement or disagreement with a particular
strategy or procedure, and celebrating the success and thinking of a peer. The focal student voiced two demands in particular as central to her consciousness as a listener: developing a repertoire of strategies, and mitigating the risks of sharing her own ideas or solutions.

Through observation and interviews with the focal student, Norah, Hintz discovered many tactics employed by the listener as she attempted to incorporate her peers' mathematical schemes into her own repertoire of problem solving strategies. During whole group discussion, Norah attempted others' strategies in her math journal, a task that required setting her own thinking aside in order to try others, and examining all strategies diplomatically in order to determine which is most effective, and therefore most employable in the future. Norah described setting her own ideas aside to examine a classmate's strategy, and deciding which method is the most effective for her to use.

Another important factor for Norah as a listening participant was mitigating the risks of sharing. In describing a past incident in which she shared an incorrect answer, Norah described the stress of publicly realizing that the solution she was sharing was incorrect. She also mentioned her anxiety around engaging in talk about the error in front of her classmates. Yet, as Hintz reported, Norah was happy to share her strategies when she felt she had enough time to solve a problem, and when she felt confident in the correctness of her answer. The researcher argued that allowing students a space to participate as listeners gives them the opportunity to gain familiarity with the norms of strategy sharing, and eventually to become comfortable and confident enough to share a procedure of their own.

By noticing and appreciating the role of listeners as participants in mathematical classroom discourse, teachers can expand their definition of what qualifies as active participation. Moreover, Hintz argued, this redefining of participation "has critical connections to

equity issues. If we only value students who participate by talking, we are overlooking other important forms of participation that may be part of the 'repertoires of practice' (Gutierrez & Rogoff, 2003, p. 22) that students from nondominant communities bring to classrooms" (p. 270). For teachers who strive to employ socially just and culturally responsive norms in the elementary classroom, this is an essential argument to bear in mind.

Specific Strategies for Teachers

Mathematics reform in the United States is moving students away from simply memorizing and reproducing established strategies, and instead encouraging students and teachers to construct personally meaningful conceptions. Many misunderstand the teacher's new role to be that of a passive observer to students' progression of ideas. On the contrary, strategic teacher intervention is essential in the inquiry-based classroom. Research has shown that mathematical classroom discourse not only provides teachers with the opportunity to formally assess students' mathematical thinking, but perhaps more importantly, discourse offers learning opportunities through the act of talk itself (Chi, 2000; Chi & Bassok, 1989; Chi, Bassok, Lewis, Reimann, & Glaser, 1989; Cooper, 1999). This section will provide evidence to support that claim, and detail specific strategies teachers can use to best support their students during discourse.

Students develop deeper and more meaningful mathematical understandings when they are required to provide justifications, construct inferences, fill gaps in understandings, and internalize new knowledge. Franke et al. (2007) suggested that only a specific kind of student talk can be expected to be productive in supporting and challenging students' ideas, and teachers can orchestrate the most successful math talks by posing questions that elicit, engage, and challenge each student's thinking. The researchers observed three elementary teachers to

discover more about the ways in which teachers can prompt students to provide explanations in a manner that can most successfully influence positive achievement outcomes.

The goal of the study was to examine the teacher actions that most promote student success, and to explicitly distinguish those actions from other similar strategies. While critics may argue that this is an incomplete examination of teacher discourse practices, the content of the study fits our purpose here, in uncovering questioning strategies that can best guide and further students' thinking during discourse.

The researchers noted five different types of questions posed by the teachers in this study: *probing questions* ("so you could put any letter in there and it wouldn't matter?"); *general questions* ("can you show me what you did there?"); *specific questions* ("why did we subtract one from one thousand?"); *bundled questions* ("what do you mean by B has a partner and A has a partner? What does that mean? Can you come up to the board and draw that for us?"), and *leading questions* ("what if we add these two numbers together?") Questioning more often occurred when students provided ambiguous, incomplete, or incorrect answers, but the teacher also questioned students' correct and complete answers. Without follow-up questions from the teacher, however, students rarely took the time to deeply elaborate on their explanations.

Franke et al. (2007) noted that these types of questions demand complex cognitive processes on the part of students, and that students were engaging in a high level of thinking when they were prompted to draw inferences and synthesize ideas. Questions from the teacher did not always result in elaboration or completion of an answer from the student sharer, but this was often due to the refocusing of attention from the sharer to the listeners, as the teacher asked other students to elaborate on or complete the sharer's ideas. The study recognized, however, that questions from the teacher, while helpful, were not sufficient to probe and deepen students'

thinking and conceptions around mathematics. How, then, can a teacher employ questioning strategies to get at the heart of student' understandings, and to engage them in learning through talk?

Fraivillig, Murphy, and Fuson (1999) addressed this question in their description of the teacher's role in classroom mathematical discourse to consist of three essential practices: a) eliciting students' methods and strategies, b) supporting students' conceptual understandings, and c) extending students mathematical thinking. Teachers who demonstrated a strong ability to enact these practices generally conducted near-constant assessment of students' thinking, and modified their instruction accordingly. These teachers made continual adjustments to accommodate students' varying zones of proximal development.

The researchers described several features of successful elicitation of student ideas, including eliciting multiple strategic solutions; providing substantial wait time and truly listening to students ideas and thinking; encouraging students to elaborate on their ideas; providing acceptance, encouragement, and appropriate praise; promoting collaboration among students; allowing students' answers, ideas, and thoughts to guide the content and direction of mathematical discourse; monitoring engagement by asking students to revoice a strategy provided by another; and intentionally managing which students share at which times in order to highlight specific strategies and support students socially.

In order to successfully support students during mathematical discourse, the researchers cited teachers' connection of current mathematical ideas to previously discussed problems or strategies; review of necessary background knowledge and skills; use of group support to bolster one student's strategy or answer; revoicing and extension of individual's methods by both the teacher and other students; instant repetition of students' shared ideas in order to advance clarity

and understanding; insistence of the absence of a "right" way to approach a mathematical problem, and encouragement of all students' thinking; recording of all shared strategies at the front of the classroom; and encouragement of students to ask for help when needed.

A teacher's extension of students' mathematical ideas is perhaps the most difficult to enact of these three principles. Fraivillig et al.(1999) stated that teachers were most successful when they maintained high expectations for all students in both the academic and social realms of mathematical discourse, and encouraged students to draw generalizations between ideas and examine the relationships among concepts. The researchers also pointed to the success of teachers who acted flexibly and allowed students' ideas to determine the flow of conversation, reflected with students on the variety of methods used to solve a problem and encouraged them to identify and use the strategy they deem most effective, asked students to test different strategies and compare the outcomes, and modeled enthusiasm and positivity in order to cultivate a love of challenge in all students.

The study stated that the teacher's role in an inquiry-based classroom was to guide the development of sociomathematical norms, facilitate mathematical classroom discourse among students while they problem-solve, and support students' growing understanding of what elements make up an adequate mathematical explanation. The methods described by Fraivillig et al. (1999) can guide even novice teachers to successfully do just that. There are, however, more intricate questioning strategies that can be used by teachers, when appropriate, to go beyond the procedural sharing of strategies, and to promote deep conceptual understanding.

Kazemi and Stipek (2001) defined these as "high press" questioning strategies, and detailed four essential characteristics of this questioning style: a) an explanation consists of a mathematical argument, not simply a procedural description; b) mathematical thinking involves

understanding relations among multiple strategies; c) errors provide opportunities to reconceptualize a problem, explore contradictions in solutions, and pursue alternative strategies; and d) collaborative work involves individual accountability and reaching consensus through mathematical argumentation.

The researchers observed the same mathematics lessons take place in four different fourth-grade classrooms, taught by four different teachers. All four teachers encouraged students to share their strategies with the group, recognized errors as a part of learning, and emphasized the importance of collaborative work. Only two of the four teachers, however, utilized what the researchers have described as high press questioning strategies; the other two utilized low press questioning strategies.

The first tenet of high press questioning was that, when sharing a solution strategy, students must explain their mathematical argument, not simply their procedural steps. In other words, students must not only explain *how* they reached their answer, but also *why* their strategy is mathematically sound. In high press classrooms, student presenters provided the conceptual reasoning behind their actions during sustained mathematic exchanges with the class. Listening students often offered questions or challenges to the presenter's reasoning, and were actively engaged in the mathematics being presented. Student presenters often justified their actions by triangulating strategies, including a verbal description of their procedure, a graph or picture that demonstrated their thinking, and the associated numerical strategy or equation. Contrarily, in low press classrooms student presenters shared a summary of procedural steps, and the teacher asked listening students to vote with whether or not they agreed with the presenter's solution.

The researchers described the second characteristic of high press questioning as an understanding of relationships between strategies. When multiple strategies were presented in

high press classrooms, the whole group engaged in a detailed comparison and contrast of methods, and each strategy was examined for uniqueness and effectiveness. Effectiveness was judged not by the appearance, clarity, or correctness of the strategy, but rather by the mathematical concepts behind the work. Just the opposite was true in low press classrooms, where little attention was paid to varying strategies, and when it was, a strategy's effectiveness was judged by the correctness of the final product, and not by the underlying conceptual understandings.

Kazemi and Stipek's third characteristic of high press questioning cited the usefulness of errors in furthering mathematic thinking. It is here that the researchers caution specificity, because inquiry-based classrooms often normalize mistakes as an acceptable and useful part of learning. However, the researchers detail a specific use for errors in a high press classroom: the reconceptualization of problems, the exploration of contradictions within the solution, and the pursuit of alternative strategies. This is demonstrated in high press classrooms as teachers encourage students to explore contradiction, rather than simply explaining where the error occurred. Students' conceptual understanding widens when given the opportunity to engage in mathematical argument, explain their thinking, and witness their persistence pay off when a solution is reached. Contrarily, the researchers argue that in low press classrooms it is the teacher who will identify, explain, and correct student errors, in lieu of giving the students an opportunity to engage in this exploration themselves.

The fourth and final aspect of a high press learning environment was idea that collaboration occurs only when students are held individually accountable for their work and ideas, and group consensus is reached through mathematical argumentation. The teachers that were most effective in this area began each lesson with verbal and written reminders of their

expectations for students, especially before beginning small group work or whole group discussion. In small groups, members were expected to reach a common solution through mathematical argumentation. Additionally, all group members were expected to understand the strategy used, and have the ability to explain the group's reasoning to the class. During whole group discussion, every student's full participation was invited and expected, and, should a mathematical disagreement occur, students were expected to reach consensus through academic argument. In low press classrooms small group work was often characterized by the unequal distribution of work, with one student leading the others to a kind of forced consensus. In whole group discussions, students praised one another for their efforts, but questions and challenges were not put forward, and mathematical argumentation was not the norm.

The questioning techniques and sociomathematical norms described here require a significant commitment of time, effort, and reflection on the part of a teacher, and many may feel the rigor and structure of a prescribed academic schedule simply does not allow for this level of inquiry. As Hufferd-Ackles et al. (2004) pointed out, even in high press classrooms, not every day can or should include an extensive math talk. Indeed, it is neither possible nor appropriate to engage in this type of discourse on a daily basis. But as Kazemi and Stipek's study illustrated, if teachers can make the time to deeply challenge students during mathematical discourse, students will be richly rewarded.

This study recognized the many valuable techniques that are employed in inquiry-based mathematics classrooms, including the use of culturally relevant multi-level problems, the employment of manipulatives, an emphasis on collaborative work, and the presentation of strategies and solutions. But to go beyond a superficial implementation of inquiry-based learning, the study argued that sociomathematical norms must be implemented and adhered to.

The researchers defined sociomathematical norms as a set of specific expectations, and state that teachers need to clearly communicate and demand these expectations, and develop pedagogical strategies that can be applied in multiple contexts. In doing so, teachers will more closely align their practices with those seen in high press classrooms, and will move toward the creation of an intellectual climate characterized by mathematical argument and justification.

Maintaining and Furthering Practices

The mathematical discourse practices we have discussed thus far are merely ideas from which teachers can pull to develop the style and mode of classroom discourse that is most effective for their classroom and their students. Indeed, the strategies employed to lead such mathematical discussions may vary from year to year, and perhaps even *within* a given academic year, as the needs of the student body evolve and change. But how might teachers ensure that they sustain the underlying values and principles that manifest as successful classroom mathematical discourse over the span of a career?

Franke, Carpenter, Levi, and Fennema (2001) explored this question and uncovered four main traits shared by teachers who most effectively maintained mathematics reform over the course of several years. The researchers described in some detail the underlying principles that guide teachers who are highly engaged in students' mathematical thinking. They note that these teachers perceive the complex relationship between general student knowledge and the development of mathematical knowledge, and purposefully create learning opportunities to build on students' mathematical thinking. Additionally, highly engaged teachers are aware of the mathematical thinking style of each individual student, not just superficially but in deep and specific detail. They use this knowledge to drive instruction, and to constantly work to push students into their zone of proximal development.

The study cited five traits that have been found to be consistent in the teachers who were most successful in maintaining mathematical inquiry in their classrooms over time. As students' mathematical knowledge and understandings grew and changed, these teachers' own knowledge and understanding of how students' think was also in a constant state of growth and change. The teachers recognized this growth as generative, and sought to learn more about student thinking with each successive academic year. Similarly, teachers viewed their knowledge of student thinking not as facts prescribed by outside research, but rather as their own to discover and gather from their classes, and to develop and shape over time.

In their perception of this knowledge as both generative and self-discovered, teachers sought out further learning about student thinking, uncovering disequilibria in their own understandings, and seeking to right it through research and observation. Teachers also used this exploration as an opportunity to collaborate with colleagues, and to create a professional atmosphere in which teachers support and challenge one another, and often worked together to seek professional development on the subject.

While the researchers did not propose that analyzing children's thinking is the *only* avenue for teachers' growth to become generative, their research does support the notion that this self-initiated discovery does indeed promote generative growth. Teachers who work to ensure their own continuing education about student thinking are most successful, in the long term, in engaging students in productive and inquiry-focused mathematical discourse.

Conclusion

This literature review has addressed the question: what are effective strategies to elicit, support, and extend student thinking in elementary mathematics? The research cited here has detailed strategies used by teachers who successfully engage students in mathematical classroom

discourse. Discourse norms guide and support students in appropriately engaging in mathematics discussions (Hufferd-Ackles, et al., 2004; Wood, 1999). These norms include students' frequent sharing of their own mathematical thinking and reasoning, students questioning and challenging one another's mathematical ideas, an understanding that the learning of everyone within the classroom community is a shared responsibility, and consistent reminders and enforcement of these norms by the teacher. When students operate within these norms and engage one another in mathematical debate, they are involved in higher-level mathematical thinking, and their understanding of mathematical concepts is strengthened (Fraivillig et al., 1999; Kazemi & Stipek, 2001; White, 2003). These studies also emphasized the importance of critical examination of various strategies during mathematics discourse, and the utilization of errors and mistakes to further learning (Kazemi & Stipek, 2001; Lopez & Allal, 2007). When students examine multiple strategies to ensure that not only the correct answer is found, but that the most direct and effective method is employed, they are comparing and contrasting mathematical ideas and procedures, thus stretching their understanding of the relationships between multiple concepts. The same is true of the examination of errors: when students study their own errors to identify their mistakes and misconceptions, their understanding of mathematical concepts is deepened and reinforced. The practice of asking students to revoice another student's idea or strategy has also been cited as a particularly useful strategy by several researchers (Fraivillig et al., 1999; O'Connor, 2001). Finally, we have seen that teachers who are most successful with these practices view their knowledge of students' mathematical understandings as selfdiscovered and generative, and regularly seek opportunities to further their knowledge.

The National Council of Teachers of Mathematics has named student talk within mathematics discourse as a technique that can foster deep learning and understanding among

students. In my own teaching experiences, I have seen the benefits of student-driven math discourse, and observed how these practices have deepened students' understanding of mathematical concepts and relationships, as well as providing teachers with rich opportunities to create disequilibrium and conduct formative assessment. Discourse is an effective way to support and promote inquiry-based mathematics learning in the elementary classroom.

In schools where I have observed, volunteered, and taught, I have witnessed the intense pressure that many teachers feel to follow prescribed curricular timelines, and I have heard teachers voice concerns regarding the time required to establish discourse norms and implement discourse practice; many teachers fear that this devotion of time will impede their students' progression through the academic standards to which teachers are so strictly expected to adhere. In my experience, however, I have found that the front-loading of these skills at the beginning of the academic year typically takes less time than anticipated, and provides students with the skills they need to engage in deep and meaningful mathematic discussion throughout the school year. As the studies in this literature review have shown, mathematics discourse is an exceptionally effective instructional tool. It is my experience that, when time is devoted to teaching students how to appropriately participate in math talk, student learning is more deeply supported and their mathematical understandings and conceptions flourish and grow.

Teachers may benefit from further research on the curricular reforms that have been utilized in the case studies discussed here. Quantitative results on the effect of these curricular changes would be informative, especially data on students' mathematics test scores and continued mathematics achievement in later grades.

I have utilized mathematical discourse in my previous teaching experiences, and plan to do so when I have my own classroom. Establishing discourse norms can not only help elementary

students to more successfully engage in mathematical concepts, but will also provide scaffolding through which students can learn the social skills necessary to engage in discussion, debate, or the argument of a position. The mathematics discourse strategies and techniques discussed in this literature will undoubtedly guide me in establishing my own classroom discourse norms, and provide a strong base from which I can build my own most successful practices.

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Strategies for Supporting Students with Asperger Syndrome

Jennifer Pasternak

Abstract

Asperger syndrome, an Autism Spectrum Disorder, affects nearly seven out of every 1,000 individuals. A student with Asperger syndrome tends to have an increased anxiety level combined with limited social skills, interests, and organizational abilities. These factors may inhibit his or her ability to initiate interactions, collaborate with peers, and successfully complete assignments. In light of these circumstances, teachers often ask: Are strategies available that effectively enhance the social interactions, peer collaboration, and organizational abilities of students with Asperger syndrome? This literature review details the interpersonal success of students and common intervention strategies used in the general education setting. It also references proposed changes in the DSM-V regarding classification of Autism Spectrum Disorders that would eliminate the diagnosis of Asperger syndrome. Recommended instructional strategies include creating a positive classroom environment, using Social Stories, structuring groupwork, combining groupwork with organization skills, and implementing a reward-based, long-term intervention.

Strategies for Supporting Students with Asperger Syndrome

Asperger syndrome affects approximately seven out of every 1,000 students, and is more prevalent in boys than girls. Asperger syndrome is an Autism Spectrum Disorder, and is defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as a diagnosis for an individual with restricted social interaction, repetitive and stereotypical behavior patterns, limited interests and activities, and clinically significant social and occupational impairments. The Autism Spectrum Disorders, often abbreviated ASD, are lifelong neurological conditions that may be inherited, with no identified causes or recognized cures. These facts have prompted many teachers to ask: Are strategies available that effectively enhance the social interactions, peer collaboration, and organizational abilities of students with Asperger syndrome?

Asperger syndrome, hereafter referred to with the abbreviation AS, affects students in nearly all areas of their lives, most noticeably in social interactions with their families, peers, and educators. These students may feel isolated and often struggle with peer collaboration. Students are often unable to communicate their needs, frustrations, and confusion. To compound the social ramifications, these students may also display stereotypical behaviors, such as fixations on one particular interest, repetitive behaviors, and self-stimulation. Sansosti and Powell-Smith (2006) describe students with AS as having restricted behaviors and interests, and limited social skills that are essential to personal interactions.

Students may have a diminished ability to participate in meaningful peer interactions and have difficulty asking questions and knowing how to collaborate with classmates. They also tend to struggle with inadequate organizational skills, perseverate on specific incidents, and exhibit hyper-focus in one or two areas of interest. In my own personal teaching experiences, I have observed students with AS lingering on the outskirts of the playground, appearing awkward

and insecure in gym class, looking confused while working in groups, and showing signs of bewilderment during free choice time. I have also become aware of students with AS that were academically falling behind but who were too reserved, self-conscious, or unsure of how to approach educators or peers for help.

Winner (2002) described three core deficits of Asperger syndrome: theory of mind, weak central coherence, and executive dysfunction. Winner describes theory of mind as the ability to recognize other's thoughts, feelings and intentions; central coherence as the inability to gather together details into a cohesive whole; and executive dysfunction as higher-order processes. Along those lines, Mayton (2005) researched the success of a student with AS in the general education classroom who did not receive any social skills instruction. Mayton found that although the general education classroom was often an appropriate environment for students with AS, it did not directly address or support additional student needs. While students on the autism spectrum often feel socially isolated and rejected in school by their peers and educators, it is important to note that there may be challenges at home as well. Ivey and Ward (2010) studied the families of children with AS and found higher rates of stress, increased familial disruptions, and decreased participation in recreational activities. Also according to Ivey and Ward, only 12% of adults with Asperger syndrome maintain full-time employment. To increase academic, social and occupational success in students with AS, it is vital for educators to both recognize and support these students in their classrooms.

There are many positive intervention strategies available for increasing interpersonal skills of students with AS, including providing a positive classroom environment (Batesko, 2007). Batesko found that students with AS function best in a setting that specifically teaches detailed skills such as listening, asking for help, setting goals and ignoring distractions. Students

with AS may also need to be taught how to follow instructions, complete assignments, use selfcontrol, and problem solve. These students need precise instruction in how to initiate conversations, contribute to discussions, express their feelings and recognize the feelings of others.

A common intervention strategy is the creation of Social Stories (Gray, 2010), which are personalized scripts that are created with the student and a trained instructor, and are targeted to increase a specific social skill or behavior in a designated situation. Similar to Gray's Social Stories is a strategy known as SODA, which helps students learn the steps of: Stop, Observe, Deliberate, and Act while interacting with their peers (Bock, 2007).

Lewis, Trushell and Woods (2005) researched the use of computerized instruction to increase the collaborative groupwork and social interactions of students with AS. Even though the intervention was computer-based, an often solitary activity, the researchers found increased positive social interactions between the student with AS and his peers.

More recently, Southall and Gast (2011) established a positive increase in students' targeted behaviors with the use of teaching self-management procedures designed to increase organizational skills in students with an ASD. Students with AS often have generalized difficulties with organization skills, and Asarco and Saddler (2009) found that planning instruction with a strategy called SRSD led to a positive increase in student writing skills. Wymbs, Robb, Chronis, Massetti, Fabiano, Arnold, Brice, Gnagy, Pelham, Burrows-MacLean, Hoffman (2005) established an increase in pro-social behavior and a decrease in disruptive behaviors with one student following an intensive, four year multimodal treatment.

A majority of the literature that I reviewed focused on a small number of students, and I was able to uncover only limited research on intervention strategies for students specifically

diagnosed with Asperger syndrome. Although students may be negatively affected in many aspects of their lives, their struggles tend to be overlooked or downplayed in many general education classrooms. To complicate this further, the American Psychiatric Association (APA) is considering eliminating the category of Asperger syndrome in the upcoming DSM-V. This is a landmark move toward including all Autism Spectrum Disorders under the single term of Autism. There is an intense need for further research in the general education classroom with students living with AS, and on successful intervention strategies for these students.

Literature Review

Students living with any type of disability frequently face social isolation and rejection by their peers. Individuals on the autism spectrum are at a particularly increased risk due to the inherent social aspects of this neurodevelopmental disorder. Students with Asperger syndrome not only lack social skills awareness, but also have the additional complication of possessing a strong, unfulfilled *desire* to interact socially (Lewis, Trushell, & Woods, 2005). This is reflected in their day-to-day interactions with peers, educators, and families. Students with AS may be found outside at recess wistfully watching a group of their peers playing a game, but may lack the tools to join. These students may also be on the outskirts of a gym class while they watch other students, possibly mirroring them but not quite involved. General education instructors must be prepared to support students with AS in their classrooms and in school activities. While there are numerous interventions available, some are strongly recommended and some can also be quite controversial.

This literature review is divided into three sections: Studies that address the interpersonal success of students with AS; common intervention strategies used in the general education

setting; and finally a discussion about pending changes in the DSM-V regarding classification of Autism Spectrum Disorders.

The interpersonal success and anxiety level of a student with Asperger syndrome is compromised on a daily basis due to their diminished ability to read the faces and emotions of other people and initiate interactions. They struggle with limitations in executive functioning, seeing the "whole picture," and organizational abilities. Educators have an extensive variety of strategies available to assist students with AS to not only function, but also to excel in their general education environments.

The studies in the following pages underscore the importance of creating a positive classroom environment (Batesko, 2007) while also addressing specific strategies that educators may use with individual students. Interventions include using Social Stories (Gray, 2010), a similar approach called SODA for Stop, Observe, Deliberate, and Act (Bock, 2007), structured groupwork (Beaumont & Sofronoff, 2008; Lewis et al., 2005), groupwork combined with organization skills (Stichter, Herzog, Visovsky, Schmidt, Randolph, Schultz, & Gage, 2010) and a long-term multimodal intervention utilizing a reward system (Wymbs, Robb, Chronis, Massetti, Fabiano, Arnold, Brice, Gnagy, Pelham, Burrows-MacLean, Hoffman, 2005).

The last section of the literature review will detail a proposed change in the DSM-V that may alter the diagnostic criteria for Autism, Asperger syndrome, and PDD-NOS (Pervasive Developmental Disorder-Not Otherwise Specified). This change would eliminate the categories of Asperger syndrome and PDD-NOS, thus potentially leading to a reduction of diagnoses and a discontinuance of services for students who do not fit the full criteria of autism.

Attending to Students' Interpersonal Success

Students on the autism spectrum are often perplexed by social norms and misinterpret conventional social signals, placing them at an increased risk for peer rejection and loneliness. The following studies examine the wide-ranging effects of Asperger syndrome on the academic success and social aptitudes of students living with this disorder.

Winner (2002) stated that students with Asperger syndrome have deficits in three main areas: theory of mind, central coherence, and executive functioning. Theory of mind is the ability to recognize and interpret the thoughts and feelings in other people. Students with AS have diminished capacity in this area and are often confused by other people's faces and emotions. Central coherence is the ability to see both the details and the whole picture. Students with AS tend to focus only on the details, not the whole, which can lead to difficulties in organization. Executive dysfunction affects an individual's higher-level processing, limiting their ability to initiate and maintain behavior and to plan for and set goals for the future.

Mayton (2005) examined the quality of life of a student with AS in the general education classroom. Mayton conducted a research study with a 10-year-old female student in a fourth grade general education setting who received no instruction in social skills other than speech therapy. Data collection consisted of a structured interview with the student, detailed observations in the general education setting, an examination of the student's schoolwork, and an analysis of her Individualized Education Program, which is a plan that specifies educational needs and learning goals. Mayton established that the general education environment was appropriate for this particular student because she was able to complete the work. At the same time, the environment did not tend to address or support her additional needs. Mayton indicated that the challenges of students with AS should be directly addressed in order to ensure their

academic and social success. These challenges include explicit support for concrete thinking, routine and schedules, social skills, and interactions with their peers.

Building on what Mayton described, a study by Chamberlain, Kasari and Rotheram-Fuller (2007) examined the placement of students with Autism Spectrum Disorder in general education classrooms. These researchers wanted to know if such classroom placements contributed to an even greater rise in social isolation and rejection by their peers. Participants included 398 general education students in second through fifth grade classrooms. Seventeen of the students were clinically diagnosed with either high-functioning Autism or AS. Participants completed surveys in their classrooms, including a nine-page questionnaire on loneliness and friendship qualities. In addition, students reported on their own friendships and perceptions of their social environment.

Despite social isolation, Chamberlain et al. suggested that students on the autism spectrum reported low levels of loneliness even with fewer peer relationships. The study suggested that student perception of loneliness did not, in actuality, relate to their level of social involvement due to their lack of social awareness. The students with AS tended to be less socially aware than their peers. This lower level of peer relationships may be directly related to their limited interests and their lack of social awareness.

The students with AS did not self-report higher loneliness than their peers; however they did score significantly lower in peer acceptance and reported less reciprocity in their friendship nominations, giving more top three nominations than they received from their peers. The participants with ASD also scored significantly lower in social network centrality. Self-perception of loneliness in students with ASD did not appear to reflect their actual lower levels of peer acceptance, as they scored themselves as having similar social acceptance to their peers.

Compounding these social skills deficits of students with ASD, Ivey and Ward (2010) reviewed how the families have higher rates of stress, increased familial disruptions, and decreased participation in recreational activities. Siblings of children with ASD often define their social relationships with their autistic sibling as being limited and express less hope of future meaningful relationships. Ivey and Ward conducted a study on the effects of a child living with Asperger syndrome on his siblings and other family members. They interviewed the family of a 13-year-old male diagnosed with AS, his 9-year-old sister, 6-year-old brother, and both parents. The authors did find increased familial stress in the target family characterized by reduced interaction and increased overall anxiety.

Ivey and Ward also detailed what they called a 'triad of impairments' – stating that students with AS struggle with communication, social interactions and display odd behaviors. They exhibit difficulties similar to a student with a nonverbal learning disability, and lack social reciprocity and the ability to interpret nonverbal cues.

Students with AS tend to face difficulties in social interactions, peer rejection, and increased familial stress. In a recent study, Cui et al. (2010) questioned how the working memory of students with Asperger syndrome compared to other students. The participants consisted of forty-one students aged 6 to 8. Twelve were diagnosed with AS. The researchers reasoned that these students experienced limitations in their executive functioning skills. This affected their ability to see the whole picture, set goals, and organize their lives. They found that students with AS were impaired in both visual spatial working memory and in verbal working memory while their rote memory was adequate. They also found that students displayed average verbal ability but below average spatial skills and visual-motor integration. Overall, they also required more time to internally process information.

Interventions

Educators have a wide array of interventions and strategies for working with students to increase their social skills, encourage peer interactions, and impart vital organization skills. These include providing a positive classroom environment, creating individualized Social Stories, implementing organized groupwork and computerized programs, and teaching specific organizational strategies.

One strategy that has been found to be successful is the creation of a positive classroom environment for all students. With this in mind, Batesko (2007) completed a literature review exploring how Asperger syndrome affected students' abilities to succeed in social relationships, in turn impacting his or her cognitive, sensory, and communication skills. The students with AS tended to have average to above average intelligence, were inclined to fixate on one particular interest, and had difficulty with change, transitions, organization and coordination. The students also were unaware of social cues and facial expressions and struggled with sensory issues.

Batesko found that teaching specific skills such as listening, asking for help, and following instructions greatly contributed to a positive classroom environment as well as students' academic success. When students were taught the skills that they needed to complete assignments, contribute to discussions, and ignore distractions, their learning experiences were positive and successful. Teaching students how to set goals, initiate conversations, express their feelings, and recognize other students' feelings were critical to their success. The skills needed to implement self-control, problem solve, and accept "no" were also integral skills that students with AS often need to be specifically taught. All of these are vital components of a positive learning environment.

Carol Gray's Social Stories. According to Sansosti and Powell-Smith (2006) students living with Asperger syndrome are often overlooked or misunderstood by their educators due to their average verbal and academic abilities. Educators often describe students as "just normal" students with odd behavioral and social interactions. Yet these students have additional needs and may require interventions to be successful and reach their full potential in their classroom. One often-used strategy is the creation of individualized Social Stories. Social Stories help students with AS figure out the various aspects of a given situation and how to interact in socially acceptable ways. Several studies have shown that personalized Social Stories can be a positive intervention to decrease disruptive classroom behaviors, increase the frequency of acceptable social interactions, and improve socially acceptable play. Social Stories can also be implemented to encourage sharing, reduce tantrums, and increase on-task behavior. A Social Story describes a specific social situation that the student will likely face along with common scripted replies. This enables the student to develop an increased understanding of social interactions and learn appropriate responses.

Hanley-Hochdorfer, Bray, Kehle and Elinoff (2010) examined whether the use of Social Stories would increase the social engagement of students with Autism Spectrum Disorders (ASD). The study was conducted in a general education setting with four students with ASD, aged 6- to 11-years-old. In this study, the researchers utilized Social Stories with the specific aim of enabling students to develop tools to use to be able to interpret and act in social situations. A personalized social story was created for each participant, using Gray's "Social Story Checklist." The results of this study showed only a limited positive increase in social engagement with peers, not as significant as previous studies have suggested. The authors noted that this intervention may not be successful with all students because their high levels of social anxiety and often

adverse reactions to social situations may cause them to perceive forced social interactions as a negative reinforcement. Hanley-Hochdorfer et al. strongly suggested that educators wishing to use this approach for increasing desired social behaviors also consider implementing other effective interventions at the same time.

As an alternative to the sole implementation of Social Stories, Bernad-Ripoll (2007) studied whether the use of videotapes depicting emotions combined with Social Stories would increase the recognition and understanding of these emotions. The student was one 9-year-old male student with AS in a fourth grade public school classroom. At the time, he was having difficulty controlling his anxiety, frustration, and anger. In addition, he struggled with identifying, talking about, and managing his emotions.

For this study, he was videotaped during daily home routines. The tapes included 10 segments depicting stress-inducing and happy moments in his home life that resulted in both tantrums and outward indications of calmness and happiness. Baseline data was collected over 10 sessions and consisted of showing the student a positive and a negative video segment, then asking three questions: "How are you feeling? Why did you feel like this? What you should do next time?" Following the establishment of this baseline data, 10 intervention sessions were employed during which two Social Stories with pictures of the student were introduced. The investigator and the student read the Social Stories together before viewing the videotaped segments. Then the same three questions were asked with two exceptions. First, the last question was omitted following a videotape depicting happy emotions. Second, the last question was replaced with "What helps you to be calm and relax, or what you can do better when you are calm?" Reinforcers were also used throughout the intervention including food, short games or community-based trips.

The student and his parents read a chosen Social Story over a four-day period. After this time, his parents read the Social Story whenever they saw the student displaying emotions that were similar to those in the videos. They then asked him what he should do when he felt that way by encouraging him to choose one of the solutions from his Social Stories. As an additional reinforcer during this phase he earned points that could be exchanged for an activity.

Bernad-Ripoll found that the student's ability to recognize and understand emotions improved with the intervention. His ability to label emotions increased to between 95% and 100%, and his ability to explain emotions and determine an action increased to 100%.

SODA social stories. Similar to Carol Gray's Social Stories, another technique centered on creating personalized scripts for teaching social skills. Bock (2007) researched the effects of this alternative social story approach, called the SODA strategy, to support the interactions of students with Asperger syndrome. The intervention, consisting of personalized SODA stories, was administered by special education teachers within a general education setting with four students aged 9- to 10-years-old. The stories detailed specific rules that students would follow in order to recognize social cues, process information, and identify appropriate social reactions. SODA was identified as a social-behavioral learning strategy that encouraged students to Stop (S), Observe (O), Deliberate (D), and finally Act (A). The first three letters, S, O, and D involved steps for the student to describe the social situation and determine appropriate social responses. The final step, the A, guided students to create a detailed script of words to use in a given social situation. In this study, all of the students showed marked improvement in their targeted behaviors, including participating in cooperative learning activities, playing organized sport games, and visiting with peers during lunch. The students were able to maintain this progress for at least five months after they completed the SODA intervention.

Groupwork and computerized instruction. A common characteristic of students with Asperger syndrome is a difficulty with peer interactions and increased anxiety when faced with working in groups. The following studies focused on reducing student apprehensions and stress level, increasing their ability to positively interact with their peers, and developing basic groupwork skills. Two studies involved computerized instruction along with group interaction while one was centered on intensive social skill development in group situations.

Lewis, Trushell and Woods (2005) detailed the difficulties that students may face in the general education classroom, including rejection and acceptance issues. Key factors in the diagnosis of AS include impairment of social interaction, social communication and social imagination. These impairments often limit imaginative play and flexible thinking. Lewis et al. noted that students with Asperger syndrome tend to be asocial, not antisocial. They often desire to belong to social groups, but they lack the knowledge of how to accomplish this. They have difficulties in naturally reading social cues and must be specifically taught these skills. Lewis et al. completed a study using collaborative computerized group work with a 7-year-old male student in an effort to increase his task-related interactions with others. Data was collected via observations of students and classes and through interviews and questionnaires with the students' parents and teachers. Lewis et al. noted that when they implemented a strategy for developing peer group participation, they found a positive increase in task-related idea generation and instruction and a decrease in inappropriate non-task-related social interaction.

Beaumont and Sofronoff (2008) completed a similar study testing the effectiveness of a multi-component, computerized social skills intervention for students with Asperger syndrome. They questioned whether students would increase their parent- and teacher-reported measures of

social competence at post-intervention. The study included 49 students with AS. Twenty-six students received a computerized intervention for eight weeks called the Junior Detective Training Program. This particular intervention consisted of a computer game that was created specifically to support the recognition and regulation of emotions and improvement of social interactions. Group therapy sessions were also introduced to supplement students' social and problem-solving skills. Activities were created that allowed students to practice new skills with their peers in real-life situations. The intervention lasted seven consecutive weeks, with the parent and child participating together in each session. In the first two sessions parents and the students went to separate rooms, this was gradually replaced by small group sessions including role-plays situations. Beaumont and Sofronoff found that this intervention model positively increased the social skills and emotional understanding of the majority of the students with AS.

Stichter, Herzog, Visovsky, Schmidt, Randolph, Schultz, and Gage (2010) were also interested in methods to increase peer interaction and encourage social skills necessary for groupwork. Stichter, et al. detailed how students with AS have deficits in three social-cognitive areas: theory of mind, emotion recognition and executive functioning. Stichter et al. defined theory of mind as the ability to attribute mental states to ourselves and others as well as understand that other people have beliefs, desires and intentions separate from our own. Furthermore, emotion recognition was described as a common deficit in students with AS, making it very difficult for them to read other people's faces and interpret emotions. Lastly, executive functioning was defined as the ability of our brains to perform tasks necessary to think, act and solve problems. Executive functioning allows the mind to recall information that we have learned in the past, incorporate new information, and use information to solve problems.

Based on the above research, Stichter et al. conducted a study on the effectiveness of a group-based Social Competence Intervention (SCI) on facial expression recognition, theory of mind, and problem solving. Participants included 27 male students between the ages of 11- and 14-years-old with a diagnosis of AS or HFA (High Functioning Autism). The intervention was conducted at a diagnostic and treatment center for Autism and neurodevelopmental disorders and was administered over 10 weeks for two hours each week. There were between four and six students with clinical diagnoses of AS or HFA in each group.

In the first session of the intervention "Rules of the Road" was introduced so students would become comfortable with acknowledging others, offering greetings, and making eye contact. The remaining intervention was scaffolded in two week increments to teach students how to recognize facial expressions, share ideas, take turns during conversations, recognize feelings and emotions, and solve problems. Following the intervention, Stichter, et al. found a significant improvement in the social skills and executive functioning of the participants. The students showed a marked improvement in all three target areas of facial expression recognition, theory of mind, and problem solving.

Organizational skills strategies. A common area of deficit for students with AS is in organizational skills. Often students with AS do not know how to begin a task. In addition, they struggle with asking questions and breaking large projects down into small, manageable sections. In these situations, it is invaluable to teach students strategies for breaking down assignments and for organizing their desks, homework folders, and projects.

Writing skills instruction. Asarco and Saddler (2009) completed a study using instructional planning to increase the writing skills organization of a ten-year-old student with AS in a general education classroom. Their research suggested that writing can be very

problematic for students, especially in the area of planning. According to Asarco and Saddler, these struggles may be due to the students' difficulty with preparation and organizing their thoughts and then understanding how to transfer these thoughts to paper. As a result, students often require highly structured environments to develop their thoughts in writing. Their literal thinking may hinder imaginative skills that would enable them to propose possible future events.

Asarco and Saddler focused on implementing a Self-Regulated Strategy Development (SRSD) method designed to improve the writing skills of a participant with AS. The intervention consisted of seven lessons based on the SRSD instructional model and utilized two mnemonic devices, POW and WWW. Six stages were introduced: development of background knowledge, discussion, modeling, memorization, collaborative practice, and independent practice. They found that the intervention had a positive effect and that the student continued to use the strategy post-treatment, writing more complete stories of an overall higher quality.

Self-management strategies. An integral part of organization is the ability to selfmanage. Southall and Gast (2011) completed a literature review inquiring whether teaching selfmanagement techniques would increase target behaviors. In their literature review, they found a positive increase in targeted behaviors with the use of teaching self-management procedures. The reviewed research focused on ways to increase target behaviors in students with either Autism or Asperger syndrome. According to Southall and Gast, self-management procedures were found to be effective in improving students' social, vocational, and communication skills while decreasing restrictive and repetitive behaviors. They also detailed additional advantages of self-management, including an increase in independence and the ability to transfer these skills to other areas.

Long-term multimodal treatment. Many interventions focus on improving only one particular skill area. However, there are other disorders that commonly coexist with AS: anxiety, disruptive behavior, inattention, hyperactivity-impulsivity, obsessive-compulsive, oppositionaldefiance, Tourette's syndrome, depression, and learning disabilities. Wymbs et al. (2005) explored whether an intensive, long-term multimodal treatment would have a positive effect on the symptoms and functional impairment of a nine-year-old male with AS and comorbid disruptive behaviors.

Wymbs et al. instituted an intervention commonly used with students with ADHD called STP (Summer Treatment Program). The study focused on one student over the course of four consecutive summers. It consisted of opportunities for the student to earn points for appropriate behavior and lose points for inappropriate behavior, all while receiving immediate feedback from staff members. The student worked toward three to five behavioral goals each day and was reinforced for attaining his goals by his parents and staff members. He also received a stimulant medication throughout treatment to manage his anxiety and ADHD-like behaviors. The student demonstrated an increase in prosocial behavior and a decrease in disruptive behaviors both during and post-treatment.

Proposed Change in DSM-V Classification

The American Psychiatric Association (APA) is currently considering significant changes to the autism spectrum category in the new DSM-V. The Diagnostic and Statistical Manual of Mental Disorders provides standard criteria for the classification of mental disorders, and is used in the United States as well as around the world in the diagnosis of disorders. According to Carey (2012) in a recent *New York Times* article, the proposed changes would decrease the diagnosis rate and make it more difficult to meet the new criteria for autism, thereby risking

health, educational and social services for students. Carey indicated that the current criteria for Autism, Asperger syndrome, and PDD-NOS are vague, resulting in a severe increase in the rate of diagnoses – up to 1 in 100. Carey expressed concern that if AS and PDD-NOS are dropped in the new definition, many people with high functioning Autism will no longer qualify and may lose services.

In response to these proposed changes in the DSM-V, Ghaziuddin (2010) argued for a modification of the current diagnostic criteria for AS and for its continued retention as a separate diagnosis. Under current criteria, a student with AS would not fully qualify under the category of Autism. Ghaziuddin urged a revision of the criteria for AS considering the characteristics that set it apart from Autism, such as verbal abilities, the desire for social interactions, and an older age at onset.

Conclusion

Students with Asperger syndrome struggle with increased anxiety and restricted interests, social interactions, and organization abilities. They also have difficulty in interpreting emotions and feelings, exhibiting a desire to be a part of the social world around them, yet lacking the necessary social awareness to achieve this (Lewis et al. 2005). These students are frequently on the outskirts of community interactions and activities, observing and imitating others, but unsure how to actively initiate involvement. Their interpersonal success is strongly influenced by their family life (Ivey & Ward, 2010), their placement in the general education classroom (Chamberlain et al., 2007; Mayton, 2005), and the implementation of appropriate intervention strategies. To support these students, a variety of strategies have been developed with the most widely recognized ones designed to enhance social skills and organizational abilities.

Batesko (2007) indicated that the creation of a positive classroom environment was very effective for increasing student success. Strategies that directly targeted essential social skills were also revealed to be successful, including Carol Gray's (2010) Social Stories and the SODA approach (Bock, 2007). Other effective approaches included structured group work (Beaumont & Sofronoff, 2008; Lewis et al., 2005) and interventions to increase organization skills (Stichter et al., 2010). Finally, an intervention involving a reward system (Wymbs et al., 2005) was discovered to be marginally effective for increasing target behaviors.

The findings indicated that all of the above strategies were successful for students who have been diagnosed with AS. However, a proposed change in the DSM-V would alter the diagnostic criteria for Autism, eliminating the diagnosis of Asperger syndrome and possibly resulting in a loss of services for students with AS. Carey (2012) argued that although the vagueness of the current criteria for AS has resulted in a drastic increase in diagnoses, if AS is dropped entirely many students with Asperger syndrome will no longer qualify. Students would be required to meet the full criteria for Autism or they would not be eligible for services, negatively impacting their success. Ghaziuddin (2010) argued for retaining a separate diagnosis for AS that is distinct from Autism. He proposed modifications that would allow for the features that set AS apart from Autism, such as verbal abilities, the desire for social interactions, and an older age at onset.

After reviewing the above strategies and recommendations, in my own classroom I will focus on incorporating a combination of approaches to positively increase the success of all of my students. This is especially true for my students with Asperger syndrome. As an example, I will provide a positive classroom environment combined with Carol Gray's Social Stories as a way to holistically support students. I also plan to implement organizational strategies in
combination with collaborative group work because these are both challenging areas for students with AS and other students as well. To reduce anxiety in group situations, I will work with students to develop strategies for breaking down assignments into manageable tasks and creating structure inside assignments.

Recommendations for Further Research

There is a need for extensive research that focuses explicitly on strategies that enhance the learning of students with Asperger syndrome. Many of the studies that I reviewed focused on students with Autism, which is a very broad category consisting of several diagnoses. Although some of the approaches work equally well, there is a need for strategies that focus on the specific aspects of AS, such as advanced verbal abilities and a desire for social interactions. Many of the current studies also concentrated on only a few students, some only one student. Additionally, future studies would benefit from larger sample sizes of students to ensure accurate findings and provide replicable models.

I propose the need for extended investigation into determining the benefits of using a combination of approaches to increase target behaviors and skills. I also suggest additional research that delves deeply into improving the organizational skills of students with AS, because this is a vital skill that is often overlooked. In summary, there is a palpable need for future research into strategies that are specifically designed to reduce the struggles of students with AS and increase their success in all areas of life.

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Artistic Necessity: The Benefits of Teaching Arts across the Curriculum

Justin R. Poland

Abstract

Budgets for art education have been downsized across the country. This paper reviews research related to the value of arts education in our contemporary society. The studies include a wide range of subject matter, from mathematics and literacy, to science, standardized tests, and social skills to show the value of arts education across curriculum. One major research finding is that arts education aids in learning in all of the big three subjects of science, math, and literacy. Another major research finding has also provided evidence that students who study the arts, either by itself or as part of an integrated curriculum, have higher scores on standardized tests and other forms of assessment. The evidence presented in this literature review should provide teachers with a defense for arts integration or advocacy for the arts in public schools.

Artistic Necessity: The Benefits of Teaching Arts across the Curriculum

In July of 1999, testimony was given to the US House of Representatives Education Caucuses regarding the value of music education for improving Scholastic Aptitude Test (SAT) scores (Vaughn & Winner, 2000). A 100 point increase in SAT scores was reported for students who have studied music. The arts have been an integral part of American compulsory education for decades (Spring, 2011). They can provide truths to personal and academic gains that are otherwise unattainable (Rogoff, 2003). The arts have provided important social and emotional development opportunities for students, and have also given a practical application to many abstract and otherwise confusing elements of academia that are difficult to draw connections to and make concrete. Now, during a time of global economic strife, this vital and complex form of learning is being called obsolete and unnecessary (Moskowitz, 2003).

In this time of increasing budgetary constraints, governmental control, and economic turmoil, arts education seems to have taken a back seat to what is considered necessary in education (Moskowitz, 2003). Math, literacy, and science budgets are held constant or even increased while arts budgets are trimmed, cut, and slashed in order to make more room for the focus on these "big three" subjects, removing a vital piece of a well-rounded education. Despite its second tier role in schools, there is evidence that arts education can help students develop complex, higher-level thinking, and encourage struggling students (Burton, Horowitz, & Abeles, 2000). The arts have been reported to help students develop outside-the-box thinking that is highly sought after in the business world, and is not taught in any of the big three classrooms with any regularity (Podlozny, 2000). Given the low status and high potential of arts education, what research-based evidence is there that the arts aid student learning in significant ways?

The research studies reviewed in this paper examine how arts education aids student learning in a variety of areas, including reading comprehension and fluency, cognition, complex scientific modalities, speech, social development; the ability to transfer learning from one subject to another, and in overall knowledge as measured by SAT scores. For the purposes of this review, *arts integration* will be defined as pedagogy that includes some form of arts education within a non-arts classroom, and *arts education* will include methods from theater arts, visual arts, and photography.

One limitation on this review of literature is the lack of current research based on the benefits of arts education. Given the lack of research that has been conducted on this topic within the United States, many of the studies in this review were conducted in other Western countries.

Literature Review

The research that is reviewed in this section is organized into the following categories: the arts, transfer, and social skills; the arts, the SAT and literacy; and the arts, science and math.

The Arts, Transfer, and Social Skills

Arts education is not limited to what is common in public education today. It is also relevant to practitioners of medicine, engineering, and teaching, which are all seen as arts in the professional world (Brown, 2001). It has been speculated for many years that the arts have the ability to transfer knowledge to other subjects (Winner & Hetland, 2000), as well as to teach students valuable social skills in a real world setting. This section on the arts, transfer, and social skills will review research studies that have looked at the broader benefits of an arts education.

Smithrim and Upitis (2005) completed a longitudinal study using a sample that consisted of over 6000 students and their parents, teachers, and administrators. The researchers examined

a nationally adopted arts program, *Learning Through the Arts* (LTTA), to determine its effect on student learning. They collected qualitative data in the form of interviews and surveys, and quantitative data in the form of standardized test scores and holistically scored writing samples.

One important finding of the three year study was that achievement in any subject did not come at the expense of math and language (Smithrim & Upitis, 2005). In fact, the LTTA program yielded higher achievement, albeit modest, across curriculum including reading, writing, and mathematics—showing an intangible transfer from the arts. The reported findings stated that schools that used the LTTA program had more academic achievement than the control schools in the study. The mean test scores in computation and estimation, geometry and applications, and vocabulary were significantly higher in LTTA schools than in schools that did not practice the LTTA approach. It is noteworthy that none of the achievement occurred until the final year of the study, suggesting these results are dependent on a multi-year involvement in the arts. Students were also more engaged in the various curriculums through the LTTA program, and students found learning easier in all subject areas.

Not all the findings supported the usefulness of the arts in promoting learning across the curriculum (Smithrim & Upitis, 2005). Reading comprehension and writing scores increased only slightly. Also, because the study was conducted in Canada, its applicability to schools in the United States is uncertain. The authors also expressed uncertainty that the rise in scores would continue over a longer period of time.

The next study looked at arts and transfer with students with learning and developmental disabilities. Mason, Steedly, and Thormann (2008) conducted a longitudinal study consisting of 34 focus groups spanning 16 states that focused on the role of arts education as a social, cognitive, and academic learning for students with disabilities. The focus groups consisted of

teachers who taught students from the ages of 3-21. The aim of the study was to find ways in which teachers might find value in arts integrated pedagogy, both academic and social, in the learning of students with disabilities.

The results showed that focus groups spoke positively about the opportunities the integrated lessons gave them to connect with their students, how arts lessons helped their students to communicate in appropriate ways, and to a lesser extent, how the arts helped improve academic skills (Mason et al., 2008). Another finding was that the teachers believed that arts lessons created a need to communicate with others in the group in order to accomplish a task. This provided the need to give and receive information appropriately, but also kept the students engaged in the academic assignment. The teachers also expressed the belief that the arts lessons gave the students problem-solving skills that could not otherwise be taught in the classroom. Additionally, teachers reported that students with autism and emotional and behavior disorders found the most social success through theater lessons. It allowed them an opportunity to think outside of themselves and solve a number of problems that come with that art form: how to memorize lines, build a set, and approach a characters' action, for example.

By integrating the arts into lessons, the school found ways to engage students with disabilities in observation, rehearsal, and critical thinking that will someday make them independent members of society (Mason, et al., 2008). An overall finding of the study was that the social skills gained in an arts integrated classroom were a large part of learning for students with disabilities. A final finding from this study is that teachers of students with disabilities valued photography lessons. Photography engaged students who previously had not been engaged in any form of academics because of their need need to learn how to use the camera and make measurements.

This study (Mason, et al., 2008) had some limitations. One concern is the lack of quantitative data to verify teacher perceptions of growth in a more universal format. Also, as the subjects in the study were students with disabilities, these results may not be applicable in scope to other groups of students.

Arts, the SAT, and Literacy

The scholastic aptitude test (SAT) has long been a benchmark to gauge student learning in the United States. How well or how poorly a student does on this measurement determines which colleges and universities will approve an application. Half of the SAT is based on literacy, which reflects the importance of literacy skills in schools, colleges, and the workforce (Finn, 2009; Fiske, 1999). Are there benefits to arts methods increasing learning on the SAT and in literacy? This section will examine research studies that studied the arts, SAT scores, and literacy.

In a study that collated 12 years of SAT data and answers given on the Student Descriptive Questionnaire (SQR), Vaughn and Winner (2000) found correlations between arts education and higher SAT scores. The focus of this study was to find whether students who took multiple years of arts education scored higher on the SAT. Through the use of a statistical analysis comparing the number of years of arts education taken by the student and the verbal scores, the researchers were able to show evidence of a positive correlation of continued arts education and higher SAT scores. The data from this study showed a significant increase in the SAT scores for each year of arts education taken, and the increase of composite scores climbed steadily for each successive year of arts study.

The verbal section of the SAT, when broken down by years of study, showed the most significant effect from arts training (Vaughn & Winner, 2000). On average, the scores for the

verbal section of the test rose nearly 21 points for each successive year of arts education taken. These gains in scoring were not limited to the verbal section of the test. The math portion of the aptitude test also increased for students with successive years of arts methods, averaging almost 11 points higher. Both the verbal and the math portions showed a significant raise in scores for students with four or more years of training.

Vaughn and Winner (2000) mention several factors that could not be accounted for from pure data streams. There is no evidence that the students reviewed in the data are from an area where socioeconomic status (SES) has influence over the curriculum. A more affluent region, where the arts are as valued as a part of academia, could skew the results. Another concern is that the data analyzed was from the mid-1980s to the late 1990s, and there may be significant differences in the data through replication of this study using more current data streams.

A meta-analysis conducted by Podlozny (2000) examining research findings on classroom drama and verbal assessment skills, focused on drama education as a critical link to academic achievement in literacy. The author found over 200 studies on this topic and selected 80 that best fit the criteria, 38 published and 42 unpublished studies. In an attempt to answer whether classroom drama methods aid in verbal development, Podlozny classified three instructional techniques, each with different levels of engagement, and examined seven verbal outcomes based on the techniques.

Podlozny (2000) found a positive relationship between studying drama and students' long-term ability to remember what they had read. The results of this meta-analysis also showed some reading and writing improvement particularly among students with a lower SES, allowing access to materials in a more engaging way. Another finding was that the type leadership style used by the instructor had a strong effect on literacy learning. A teacher that was completely

involved in the enactments, defined as in-role, or actively participating in the production, provided more gains than a leader who was more detached. Giving the students ample modeling of what they should be doing yielded the highest results in test scores. These findings also mirror reading readiness, oral language development, and vocabulary scores, but in declining significance.

This study is not without its shortcomings (Podlozny, 2000). Specific qualitative evidence was not provided for in this meta-analysis. The author also pointed out that there was a lack of randomization of samples, statistical analysis of data, and an underreporting of results in the studies that may have skewed findings in many of the studies used in the meta-analysis.

On a smaller scale, Gamwell (2005) used his eighth grade literature class as his subjects to see if arts instruction could aid in meaning making in the literacy classroom. Could students who were actively engaged in literacy content come to deeper levels of learning and understanding?

In his case study, Gamwell (2005) used art projects to encourage his students to move to a more metacognitive understanding of story by asking students to use their interpretations of various art forms. Interpretation of poetry through movement or dance, performing written scripts based on short stories, and using dance as a prompt for creative writing were major practice components in the study. The data was collected in an ethnographic style in which students wrote in journals, recorded performances, projected articles, and observed, providing a source of triangulation. Taking the theoretical standpoint that learning is enhanced by focusing on the abilities of the students, and that arts based learning was the best way to cultivate these types of experiences, the author analyzed and codified the data based on the subsections mentioned above to examine the evidence for proof of holistic learning.

Teaching Toward a Better World

Gamwell (2005) found that active engagement in the staging of *Julius Caesar* and the performance of scenes allowed many students to find connections to the text that were previously difficult for them to develop. He found that by placing the students into an enactment of a scene, emotional and aesthetic notions were developed. Students developed contextual memory of the scene and the play that created a deep meaning that they could explain in writing or orally several months later. This meaningful and lasting impression the students found allowed them to create a new reality and empathize with fictional characters that otherwise would have been two dimensional pictures in a really heavy book. Overall, this study found that this complex method of teaching content created a contextual memory of content among students that could be shared and interpreted both individually and as a group, creating deep levels of understanding.

This study has some faults, as well (Gamwell, 2005). The study did not yield any objective data to help verify student learning. This is of particular concern because the researcher was also the teacher of the students in the sample.

The next study looked at arts education from the elementary years through high school, in investigating whether drama teaching methods led to improvement in reading skills such as expression, fluency, and comprehension (Krueger & Ranalli, 2004). This study was completed in middle class schools of mostly homogeneous SES and race. Using teacher observations and student interviews the researchers created an action plan based on the attitudes of students toward reading and the skills that they thought would be most relevant.

Their overall conclusion was that drama methods apply to a wide range of students and the techniques are adaptable to any given situation, even to students with disabilities (Krueger & Ranalli, 2004). Other findings of this study were that by teaching lessons incorporating pantomime, improvisation, and Readers Theater, literacy skills were improved. The literacy

skills all showed an increase after the drama methods intervention had taken place. Expression while reading had the most dramatic effect, as the increase in reading expression after the intervention was 150% of the pre-intervention observations. The areas of fluency, comprehension, summarization, and story sequence doubled their scores after the interventions took place.

One concern of the applicability of these findings to other settings is the homogeneous populations of the sample schools (Krueger & Ranalli, 2004). It is unclear whether the same results would have been found in schools in lower SES neighborhoods, or in districts with a more diverse population. It was also completed at the elementary level, and may not be applicable to the secondary level.

The Arts, Science, and Math

The use of drama methods in the classroom usually revolves around an improvised set of roles to be undertaken by the students in an imaginary context (Anderson, 2004). By allowing students to explore complex scientific concepts in a non-traditional fashion, students gain experience and understanding of what is usually a static picture in a book that allows the student a visual, but not a complete picture of the processes that are inherent in the concept. This section will begin to examine research studies that looked at the arts, science, and math.

Dorion (2009) investigated drama methods in the science classroom, studying five teachers' science lessons in three different townships in the United Kingdom. He chose classes that were middle to high school level in the subjects of chemistry, biology, and physics. The teachers of the classes gained skills in using different forms of drama methods in order to help students learn complex scientific concepts through mime, role-play, and anthropomorphizing the subject.

The study (Dorion, 2009) found evidence that physical simulations performed by students and teachers showed a positive impact on learning analogical reasoning, giving the students a concrete experience to draw from for their deep understanding of the concepts. This not only provided the students a direct analogy for the formal scientific modeling of the concept, but allowed them to transfer, in writing, these features that had some kind of relationship regardless of how complex the system. Movement and complicated structures appeared to have a positive relationship when the use of drama methods was interposed on the population of students.

Overall, the study found that providing discourse and visualizations for learning in a science classroom where these are traditionally not found, created interventions for students to learn complicated concepts and created deep levels of understanding (Dorion, 2009). These multimodal characteristics for learning allow for all students to achieve at high levels in the science classroom. The findings also suggested that drama methods in the science classroom provide visual and non-visual empathies that promote cognitive learning in students.

One concern regarding this study (Dorion, 2009) is that it was conducted in the United Kingdom, and the results could differ upon application in the United States. It also had a relatively small sample size, so measuring applicability to a broad population is untested.

In a study that focused on the photography and chemistry, Kariuki and Hopkins (2010) investigated the impact of arts integration into science on student learning. In this small study, there was a control group that did not receive chemistry lessons, while the experimental group had hands on chemistry lessons as they pertained to photography. Students in the experimental group were not given any indication that they would receive special instruction. They were allowed to see and experiment with the different chemicals in order to produce different results;

testing the hypotheses that this direct experience might give them an advantage over the control group.

One notable result of this study is that the experimental group, which had several students that previously had not performed well on scientific endeavors, spontaneously found themselves as mentors for some of the students in the control group (Kariuki & Hopkins, 2010). This seemed to indicate that their direct experience with chemicals gave students motivation to move forward in the content and create ownership of their education.

This study had some limitations (Kariuki & Hopkins, 2010). The lack of objective data makes it difficult to defend the results. Also, the small sample size makes it difficult to gauge the effectiveness of the methods on a large scale.

Smithrim and Upitis (2005) investigated the effects that arts education has on students through a three year longitudinal study. The study was done in order to examine the effects on student learning in a school-wide, Canadian arts education approach called LTTA. This study found that the mathematics scores showed significant improvement (11 percentile points) on computation and estimation in comparison with schools that did not embrace the LTTA model of schooling. The results were attributed to higher levels of engagement in the LTTA model of schooling. As mathematics knowledge can be extended through paying closer attention to detail and engagement in the task, arts methods provided more a stimulating environment for student learning.

Not all the findings supported the usefulness of the arts in promoting learning across the curriculum (Smithrim & Upitis, 2005). Reading comprehension and writing scores increased only slightly. Also, because the study was conducted in Canada, its applicability to schools in

the United States is uncertain. The authors also expressed uncertainty that the rise in scores would continue over a longer period of time.

Conclusion

The research evidence reviewed clearly shows that arts education supports academic achievement (Dorion, 2009; Gamwell, 2005; Krueger & Ranalli, Mason, Steedly, & Thormann, 2008; Podlozny, 2000; Smuthrim &Upitis, 2005; Vaughn & Winner, 2000). Whether through drama methods, visual arts methods, photography, or the simple addition of multiple modalities to the curriculum, students made more gains in all subjects tested, and not tested, than without arts instruction. The increase in learning in multiple content areas is exhibited in both objective and qualitative data.

Student learning in chemistry, biology, physics, and mathematics all showed improvement when either drama or visual arts instruction were integrated into the learning environment (Dorion, 2009; Smuthrim &Upitis, 2005; Vaughn & Winner, 2000). While there is need for more research in several areas, including how arts education influences mathematics and transfer of knowledge, it is significant that these studies showed considerable evidence that learning, as measured by teacher observation, grades and test scores, increase after the implementation of some form of arts methods. By creating an authentic context, or tangible concrete experience through arts education, students developed their learning in science, math, and literacy (Dorion, 2009; Gamwell, 2005; Krueger & Ranalli, Mason, Steedly, & Thormann, 2008; Podlozny, 2000; Smuthrim &Upitis, 2005; Vaughn & Winner, 2000); and many students gained deeper and more meaningful understanding of the content (Anderson, 2004). The same authenticity found in science and math was created in literacy classes across the board and produced similarly profound results in the realm of verbal literacy on the SAT, as well as

meaning making, reading levels, writing, social skills, and transfer. Students at varied ranges of learning levels, from special education to gifted programs, provided ample evidence in this review of growth in relative subject areas; due directly to the employment of techniques and methods that gave them understanding across curriculums (Brown, 2001).

A key understanding as to why it is important to study drama when linked with science is that drama techniques offer chances for the students to have an active conversation with the content that is otherwise sitting on the pages of a book (Wilson & Spink in Dorion, 2009). The methods of improvisation and pantomime allow for the class to engage in dialogue with the teacher and other students while allowing for student-centered discourse that allows more motivation for students to learn the concepts by feeding their perceptions of empowerment (Somers & Odegaard as cited in Dorion, 2009). These motivations and understandings led directly to the students empathizing with abstract things, such as atoms, and allowing the students to see life from another's point of view.

Arts education created windows and mirrors for students to examine during their learning (Gilbert, personal communication). Specifically, drama methods teach students how to do this in order to make connections that they can comprehend in a direct fashion for students to experience first-hand non-human processes (Dorion, 2009). Students were taught and freely allowed to anthropomorphize concepts and inanimate objects in order to create empathy with the complicated systems of nature. This empathy provided students with an emotional connection to the content that allowed for long term learning, as well as a deep understanding of subject matter (Gamwell, 2005). This controlled, virtual reality (Jaques as cited in Dorion, 2009) provided students with multiple sense memories with which to create their own understandings of complex, complicated systems in the scientific world. Students in the age of information clearly

respond to an educational approach that brings more to the classroom than the traditional and typical rhetoric of old. Arts activities allow students to probe their learning that is personally meaningful and allows them to process the learning in ways that are not found in a traditional setting in a classroom (Gamwell, 2005).

Arts methods created cognitive connections to spatial, kinesthetic, and temporal forms of expression, and were seen by the student as a form of net or foundation from which to construct more knowledge (Brown, 2001). As students continued through school, they began to use higher forms of Bloom's taxonomy—namely synthesis, evaluation, and analysis—in order to create their own transfer of knowledge from the arts to the practical. This form of metacognitive transfer continues until students find an automatic connection to arts methods outside the context of the arts.

The more intangible processes in the arts combined with an interpersonal modality of student-centered learning to create a sense of community in which all students learn together (Dorion, 2009). Providing students with the need to create a small learning community within the classroom, gave students motivation to work together to solve problems (Mason et al., 2008). Because of methods of integration, students found more success both on projects and in aiding other students in their learning; creating more cognitive links to content in both subject and motivation in order to extend their knowledge beyond the nature of the projects (Kariuki & Hopkins, 2010).

Another major finding in this review was that students with a lower SES and students focusing on oral language development gained the most out of enactment instruction; getting on their feet and performing the content in various forms (Krueger & Ranalli, 2004). Whether the instruction was more structured or less structured, these particular bands of students benefited

incredibly from instruction that did not consist of the traditional lecture style classroom (Podlozny, 2000). There may be no better way of closing the achievement gap that is widening in many states in this country than by integrating arts methods into teaching in classrooms across the country (Au, 2009). The employment of non-traditional techniques in the classroom has created growth in areas where many students had formerly been unengaged and unsuccessful. Students who live in lower SES neighborhoods have less access to the tools and resources than students in more affluent sections of the population (Finn, 2009; Johnson, 2006). Arts methods provide opportunities for all students to learn at high levels (Gadsden, 2008), but evidence where students with the least advantage make the most gains should make arts integration a priority for every teacher.

A new style of teaching has been developing in public schools that uses methods from arts education in the classroom, and arts teachers are finding more and more scientifically proven methods of instruction that are revolutionizing teaching and learning. These methods are proven to aid in the education of students across a variety of curriculums and, given the proper attention, can help millions of students gain deep levels of learning and understanding (Moga, Burger, Hetland, & Winner, 2000). By providing enough variety in pedagogy, it is possible to engage all students to deepen their understanding of any given content area, causing a spike in achievement that will satisfy everyone in the current educational climate.

It is the recommendation of this author that future research be conducted in several areas. The first is related direct transfer of knowledge from the arts to other subjects, as well as other subjects to the arts; links to multidirectional transfer are unclear at this time. Secondly, there should be research conducted correlating learning in lower SES to arts methods across curriculum; as the achievement gap continues to widen in the United States based on access to

funding (Au, 2009; Johnson, 2006). Also, there should be research conducted on which methods produce the best results for students of all backgrounds. Finally, there should be much more research conducted in the United States in order to gauge whether these findings are true across cultures. The findings in this review lead to a logical conclusion that transfer of arts learning moves to math, science, reading, writing, social skills, and oral proficiency. It is proven, logically, by the fact that test scores are not diminished, but are improved with more emphasis on learning in the arts (Smithrim & Upitis, 2005). This review should help prove that the arts are not the fat to be trimmed from the heart of the budget, but are a necessity.

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Problem-Based Learning in the Middle Grades

Ingrid Pugh-Goodwin

Abstract

The purpose of this literature review is to examine the possible benefits and realities of incorporating problem-based learning (PBL) into the middle school classroom. Within this focus, the effects of PBL on student motivation, engagement, self-efficacy, and academic achievement are examined. Interrelationships between the aforementioned factors are also examined, as the results of studies on problem-based learning show that motivation, engagement, self-efficacy, and academic achievement are all influenced by one another. Experimental, survey, and ethnographic studies were among the types of studies included in this review. In these studies, data was collected in settings ranging from middle school classrooms to graduate level medical courses in a variety of world-wide locations. Findings indicate that problem-based learning benefits the middle school classroom by increasing motivation, engagement, self-efficacy, and academic achievement. Results show that PBL does this through the use of real-world and appropriately challenging problems, the use of collaborative groupings, presenting opportunities for student choice and control, integrating metacognition, and through providing solid structures for inquiry and fostering comprehension.

Keywords: problem-based learning, motivation, engagement, self-efficacy, academic achievement

Problem-Based Learning in the Middle Grades

Many people within the field of education reform claim that the key to classroom management is a good curriculum (Curwin, Mendler, & Mendler, 2008; Dawson Salas, Tenorio, Walters, & Weiss, 2004; McEwan, 2000). The application of this claim is largely left to interpretation. As a pre-service middle school teacher, I saw several issues arise in my own practice that seemed to come from the intersection of curriculum and management models that did not meet the needs of my students. Though I had worked hard to design a curriculum that would speak to my students, upon further reflection I found several shortcomings in my work. To start with, the content I presented was not relevant *enough* and so I saw a lack of engagement. Because students were not engaged, they had little motivation to complete their assignments in a meaningful way. In addition, the content provided no authentic challenge for my students and the only thing their efforts appeared to get them were grades. Motivation was also lacking for students who thought little of their grades, or little of themselves as students. My students and I were caught in a vicious cycle of low motivation and engagement, perceived self-inefficacy, and low levels of academic achievement. I am not alone in my experience. Many teachers, with preservice to veteran status, face these same issues; many teachers who work very hard to design thoughtful and relevant curricula, as I had done (Beecher & Sweeny, 2008; Dawson Salas et al., 2004; Milner & Tenore, 2010).

Because there is no one-size-fits-all model for curriculum or management design, when educators are looking for classroom solutions, they must sort through a mass of theories and philosophies, some of which have little or no research to back them up. However, in examining issues of student needs, motivation, engagement, self-efficacy, and academic achievement, many researchers have suggested that various aspects present in problem-based learning (PBL) may at

least provide a foundation to build upon in addressing the above classroom issues (Beecher & Sweeny, 2008, Bru, 2006; Bishop & Pflaum, 2005). PBL is also one educational approach that has been well researched, especially recently. Many researchers have found that PBL seems to foster student motivation and engagement, while at the same time improving student selfefficacy and academic achievement (Belland, Glazewski, & Ertmer, 2009; Cerezo, 2004; Downing, Ning, & Shin, 2011; Greenberg, Smith, & Newman, 2003; Hmelo, Holton, & Kolodner, 2000; Pedersen, 2003; Rotgans, & Schmidt, 2011; Wirkala & Kuhn, 2011). The purpose of this literature review is to examine the possible benefits and realities of incorporating PBL into the middle school classroom. More specifically, I will examine the effects of PBL on student motivation, engagement, self-efficacy, and academic achievement. General definitions for these terms as used in this literature review are as follows: *motivation* refers to student diligence, self-discipline, and willingness to exert effort (Downing et al., 2011); engagement refers to student willingness and ability to take on the learning task at hand (Rotgans & Schmidt, 2011); self-efficacy refers more specifically to academic self-efficacy which is a student's belief in his or her own capacity to do well in school (Bandura, Barbarenelli, Caprara, & Pastorelli, 1996); and *academic achievement* refers to student comprehension of academic content, as well as successful completion of school work (Belland et al., 2009; Wirkala & Kuhn, 2011).

While none of the studies on PBL that I used for this review focused on all of the above issues, they all addressed at least one. Prior to the review of literature on problem-based learning, I utilized studies that focused on these classroom issues, without focusing directly on PBL, in order to set up a framework for understanding the interrelationships between student motivation, engagement, self-efficacy, and academic achievement. Overall, I found very few articles criticizing PBL or studies showing PBL to be ineffective. In addition, because I was

specifically looking at ways PBL could benefit the middle school classroom, I chose to exclude such articles and studies from this review. The majority of the studies used in this review are ethnographic studies, yet survey and experimental studies were also used. In order to maintain a global perspective within this literature review, studies conducted outside of the United States have been included. Research on problem-based learning has largely occurred in higher educational settings, specifically within the medical field, and so I chose to include such studies in part due to the lack of studies conducted in middle schools and also because Wirkala and Kuhn (2011) found parallel studies conducted with middle school and adult students to have the same results. Within studies that have been conducted in a middle school setting, the focus has largely been on PBL within math and science classrooms. In looking at how problem-based learning might benefit all middle school classrooms, I will address possible applications of PBL in language arts and social studies within my conclusion.

What is Problem-Based Learning?

Problem-based learning comes out of experiential, collaborative, and inquiry learning approaches that have been advocated for by constructivist reformers for close to a century. Both Kilpatrick (1919) and Dewey (1916, 1938) argued that practical experience was a crucial part of education, while Vygotsky (1978) argued that greater learning could occur in a collaborative environment where students have access to the knowledge and skills of their peers. Dewey (1938) also stressed the importance of scientific inquiry in creating positive learning experiences. The approach he suggested, a cycle of creating and testing hypotheses related to student interests, was very similar to the PBL models being used today.

While each PBL model is tailored to the task at hand (Belland et al., 2011; Greenberg et al., 2003; Sockalingham et al., 2011; Wirkala & Kuhn, 2011), most models tend to fit a general

format. In models presented by Greenberg et al. (2003), Hmelo-Silver (2004), and Stepien and Gallagher (1993), the reader can see a basic structure start to emerge. To begin with, small collaborative groups of students are presented with an ill-structured problem, that is, a problem without a single correct solution. Students then explore their initial understanding about the problem, identify relevant facts, and discuss how they might approach the challenge. During this stage students must also work to identify any pre- or misconceptions they might have about the problem at hand. Students then present their initial ideas, examine various resources, and participate in learning activities designed to help them develop expertise and generate hypotheses about possible solutions. Next, students reflect on what they have learned and identify any weakness in their current understanding and use this information to evaluate their hypotheses. Finally, students present their findings and reflect on the abstract knowledge gained. In all problem-based learning, the role of the teacher and students are transformed (Hmelo-Silver, 2004). The teacher is no longer the dispenser of knowledge, but instead serves as a facilitator to guide students through the learning process (Hmelo-Silver, 2004; Stepien & Gallagher, 1993). It is up to the teacher to familiarize students with the metacognitive questions necessary to reflect on their own learning and to prompt students to use those metacognitive questions in taking responsibility for the problem (Stepien & Gallagher, 1993). Instead of knowledge being passed down to the students by the teacher, students are working collaboratively to construct knowledge (Hmelo-Silver, 2004).

The Interrelationships of Motivation, Engagement, Self-efficacy, and Academic Achievement

It was not a coincidence that I experienced issues in my classroom with motivation, engagement, self-efficacy, and academic achievement all at once. Each of the above issues

influences the others in some way or another. While these factors influence one another, outside factors such as the needs of middle school students and social factors also come into play. Lampert (2001) states that teaching is a complex practice because many of the problems a teacher must address, in order to get students to learn, occur at the same time. Bandura et al. (1996) conducted a research study in Italy with 279 students ranging in age from 11 to 14 years old. Findings suggested that three types of self-efficacy influenced academic achievement, albeit through different routes. The types of self-efficacy were academic efficacy, social efficacy, and self-regulatory efficacy. Their findings indicated that the participants beliefs in their academic efficacy was linked to academic achievement both directly and through its impact on academic aspirations [motivation], prosocial conduct in the form of positive interaction with peers and teachers [collaboration], and through lowering the likeliness of student despondency or discouragement [attitude]. While participants' social efficacy had no direct impact on academic achievement, it had indirect impacts through routes similar to those found in their academic efficacy. Self-regulatory efficacy was found to contribute to academic achievement both directly and indirectly. Its indirect effects were shown to promote academic aspirations and to reduce vulnerability to depression. The solidity of these findings was strengthened by the use of multiple methods of data collection and analysis.

Bandura et al. (1996) claim that intellectual development is imbedded within social relations and interpersonal effects, and so it can not be examined in isolated environment; a claim which is supported by their findings. It is also supported by a 2005 ethnographic study conducted by Bishop and Pflaum. In their study, Bishop and Pflaum found that middle school students identified community and leadership as two social dimensions of the classroom that strongly influenced their academic engagement. The students specifically noted that a genuine

classroom community where everyone had a chance to share and be heard, as well as having opportunities to be leaders, enhanced their academic engagement.

Similarly, in his implications for practical application, Bru (2006) argued that perceived cognitive competence/self-efficacy may be improved through cooperative learning aimed at reducing social comparison and competition. Within Bru's (2006) study, perceived cognitive competence is defined as how well a student feels he or she does at school. This definition shows marked similarities to the definition of academic self-efficacy, a person's belief in his or her capacity to do well in school (Bandura et al., 1996). In a questionnaire study of 3834 Norwegian sixth- and ninth-grade students, Bru (2006) found a strong correlation between perceived cognitive competence and on-task behavior. He also found a strong correlation between perceived relevance of schoolwork and off-task behavior. In looking at on-/off-task behaviors as an indicator of student motivation and at perceived relevance of schoolwork as an indicator of engagement, these results help to illustrate the interrelationship between perceived cognitive competence/self-efficacy, engagement, and motivation.

Literature Review

Problem-based learning positively impacts student learning (Belland et al., 2009; Cerezo, 2004; Downing et al., 2011; Hmelo, Holton, & Kolodner, 2000; Greenberg et al., 2003; Pedersen, 2003; Rebeiro, 2011; Wirkala & Kuhn, 2011). Within this integrative review, I will examine research studies that look at how PBL specifically influences motivation, engagement, self-efficacy, and academic achievement. Due to the interrelationships of these factors, I will address findings related to engagement and self-efficacy as sub-categories to motivation and academic achievement.

Motivation and Problem-Based Learning

In a 2003 case study, Pedersen investigated the aspects of PBL that might enhance student motivation. Pedersen looked at the effectiveness of PBL on motivation through the lens of Paris and Turner's theory of situated motivation orientation, which identifies choice, challenge, collaboration, and control as four characteristics that support intrinsic motivation in learners. The author used this lens because these characteristics are all present in problem-based learning. In Pedersen's study, science students (n=66), taught by the same teacher, completed activities in *Alien Rescue*, a problem-based computer program over the course of three weeks. The participants reflected the ethnic makeup of the whole school, with 77% of the participants being Caucasian, 15% Hispanic, 5% African American, and 3% Asian. There was an almost even split in gender, and no information was presented on socioeconomic status or ability. The setting of the study was three sixth-grade classes in a suburban middle school located in the southwestern United States. The teacher in this study had primarily taught using teachercentered methods and this was the teacher's first time using the *Alien Rescue* program. Ouantitative data was collected via The Scale of Intrinsic versus Extrinsic Orientation in the Classroom, which was administered both before and after students participated in the PBL unit. Qualitative data was collected through student interviews after the unit was completed. Interviews were used to collect data regarding student opinions of learning within the PBL unit, and why the PBL environment might encourage intrinsic motivation.

Pedersen (2003) found that students' post-test scores for orientation towards the intrinsic motivation factors of challenge, curiosity, mastery, and judgment were significantly higher than their pre-test scores. The data from student interviews indicated that control, collaboration, challenge, and choice influenced this shift in orientation. Within the first subscale of the quantitative scoring system – Preference for Challenge vs. Preference for Easy Work Assigned –

the data suggests there was a close relationship between control, collaboration, and challenge in shifting students' orientation towards preference for challenge. Within this unit, students were given responsibility for developing a solution without direction from the teacher. This gave the students more control over their work, and while it increased the difficulty of the problem, it also made it more enjoyable. Due to the complexity of the problem, students were unable to find a solution on their own, and so they turned to their peers for support. Collaboration with their peers was a factor that added to both the complexity of the work and to student enjoyment. Collaboration also fostered choice within the unit by giving students a chance to decide whom they worked with, and freeing students to investigate portions of the problem they found interesting.

Pedersen (2003) noted one possible threat to the validity of the results was the factor of novelty. Participants had not experienced PBL or a program such as *Alien Rescue* before and many students noted that the novelty of the experience kept them interested. A major strength of this study was that it diverged from current research by focusing on general education classes within a middle school setting.

Interrelationships of engagement and self-efficacy within motivation. Bru (2006) mentioned that previous research by Goodlad (1984), Stevenson (1990), and Thuen and Bru (2000) found that a large number of students in western countries find their school work to be boring and of little use in the real world. Proponents of problem-based learning argue that one of its major components, problems with real-world application, makes PBL more engaging for students than traditional learning and increases student motivation (Hmelo-Silver, 2004). This is supported by Bru's (2006) suggestion that placing more emphasis on practical subjects (i.e.

subjects that have meaning to students in the present) may be a necessary step in improving the perceived relevance of schoolwork for secondary students.

Rotgans and Schmidt (2011) hypothesized that student cognitive engagement increased during portions of PBL that supported more student autonomy. The authors devised a measure of situated cognitive engagement consisting of three elements: (1) engagement with the task at hand, (2) effort and persistence, and (3) experience of flow or absorption in the activity. These three elements were measured by four items that were, in turn, scored on a 5-point Likert scale. The Likert scale ranged from (1) not true for me to (5) very true for me. Participants (n=208) attended an applied-science course conducted in a polytechnic in Singapore that used a PBL instructional method for all its modules and programs. Within the polytechnic's approach to PBL, students worked on one problem during the course of the day in small groups and were aided by a tutor. There were five learning phases within the polytechnic's PBL day. These phases were (1) problem definition, (2) initial self-study, (3) initial findings sharing, (4) self-study phase, and (5) presentation and elaboration. Based on their hypothesis, the researchers expected that cognitive engagement would be lower during phases involving teamwork due to constraint on autonomy by peers and tutors.

The questionnaire measuring cognitive engagement was administered after each phase within the 1-day PBL process (Rotgans & Schmidt, 2011). The findings suggest that cognitive engagement was not significantly increased until after the participants were able to collaborate after the initial self-study phase. Another significant increase in engagement took place during the self-study that followed the collaborative phase. The data suggested that cognitive engagement increased over the course of the PBL day, and was not reliant on autonomous work, as the authors had hypothesized. A strong relation was also shown between engagement during

adjacent phases. Based on the outcome of the study, the authors presented the alternative hypothesis that the collaborative process was a foundational piece of student's construction of knowledge. Even though students may have initially felt less autonomy during this phase, it deepened their understanding and lead to greater autonomy and cognitive engagement in the final self-study phase.

Rotgans and Schmidt (2011) conducted their research in a polytechnic using an exclusively PBL approach. While the polytechnic was a place of higher education, this research offered opportunity to collect data that does not include the novelty variable that Pedersen (2003) saw as a weakness in her study.

In a 2004 case study, Cerezo interviewed 14 at-risk students after they had participated in various problem-based learning units. The focus of this case study was to identify changes in students' learning processes and changes in self-efficacy after completing problem-based learning units, as perceived by the study participants. In their interviews, the students exhibited a strong satisfaction with problem-based learning because they saw real-world application for the skills they learned within their PBL units. Students also noted that the problems interested them, they enjoyed being able to work in groups, and that they enjoyed the challenge of problem-based learning. The benefits students found in PBL also contributed to an increase in their perceived self-efficacy. Students indicated that problem-based learning had helped them become better organized, to pay closer attention, to keep on task, and also, that it helped them change their learning processes. The results of Cerezo's study also indicated that students recognized their need to socialize while learning. Students responses showed that they saw working in groups as very beneficial and that it helped them to better utilize all the resources available to them. These

results also align with the claim that collaboration is one aspect of problem-based learning that increases student engagement (Hmelo-Silver, 2004; Torp & Sage; 2002).

The framework and data-collection techniques used in this study would be easily replicable in other settings. The data collected relating to student perceptions around their own learning processes and self-efficacy provides useful information regarding the effectiveness of problem-based learning for at-risk female students. However, this study's small scale raises questions about whether its results would be similar if conducted on a larger scale or within a more diverse population of students and teachers. The author also noted, that another concern was the possibility that teachers chose students they believed would respond well to problem-based learning, which may have skewed the results (Cerezo, 2004).

Downing et al. (2011) conducted a questionnaire study that focused on the effects of problem-based learning on student metacognition in higher education. Participants were first year undergraduate students from the building department at a Hong-Kong university. A control group, who did not use PBL, was used to verify the results. Downing et al. used the *Learning and Study Strategies Inventory* (LASSI) to measure metacognition both at students' entry into the program and at interim stages. Student learning experiences were measured using the CEQ, which consisted of 23 items measuring five aspects of the learning experience. These aspects include teaching quality, clear goals and standards, appropriate workload, appropriate assessment, and generic skills. One additional item was also measured, which examined students' overall satisfaction with the program. Similar to Cerezo's (2004) findings, Downing et al. found that students who participated in a problem-based curriculum had significantly higher levels of overall course satisfaction. Data from the *will* component of the LASSI showed that over a 15-month period the PBL group exhibited a considerable drop in anxiety, an increase in confidence,
as well as a significant increase in motivation. Student motivation was assessed using the factors of diligence, self-discipline, and the willingness to exert effort.

One strength of this study was that it built upon on previous research and had an increased sample size from the original study conducted by the researchers. Another strength was that this study would easily replicable where PBL and non-PBL programs are in operation, using the LASSI inventory. This research also filled a void in the current PBL literature by examining PBL in a non-medical area of higher-education studies.

Academic Achievement and Problem-Based Learning

The next group of studies examined the effects of problem-based learning on academic achievement. In a 2000 research study, Hmelo et al observed and interviewed sixth-grade life science students who participated in an experimental problem-based learning approach called Learning by Design (LBD), developed by Kolodner, Crismond, Gray, Holbrook, and Putambekar (1998). This research study was experimental in nature, but included a case study to provide context for interpreting the experimental results. Two goals of this study were to examine the potential advantages within the LBD approach, and to investigate how this approach could be implemented within a middle school classroom. In relation to implementation in the middle school classroom, the researchers focused on specific questions relating to appropriate challenges, helping students remain focused, covering content, and promoting deep understanding through organization.

The study took place in a suburban Atlanta middle school and the participant students (n=42) were a heterogeneous group of mixed gender, ability, and SES (Hmelo et al., 2000). The participant teacher in the LBD/PBL classes had participated in a summer workshop to learn about using design challenges and how to facilitate in PBL classrooms. Participant students

were administered 12-item true or false pre- and post-tests to measure student learning and identify misconceptions. A subset of students (n=20) was randomly selected for pre- and post-instruction interviews. Acting as a comparison group, students covering the same content in a non-LBD/PBL classroom engaged in the same pre- and post-tests, as well as the pre- and post-instruction interviews; however due to an electronic mishap, the interviews from the comparison group were not available for analysis.

Through the pre- and post-tests, Hmelo et al. (2000) collected data showing that students in the LBD/PBL classroom increased their scores, and hence their conceptual understanding, whereas the comparison students did not. This data was also supported by data collected during the pre- and post-instruction interviews. Student interviews showed LBD/PBL students had better understanding of the content than did the comparison students. The observations made by Hmelo et al. also suggest that in addition to developing academic comprehension, students were also enthusiastically engaged during the unit. These findings relate to one of the initial questions of keeping students focused within the LBD/PBL program.

Hmelo et al. (2000) acknowledged that the design of the LBD program used in this study faced limitations in regards to time restraints and crude experiments and materials. Results show that even within this limited environment, students learned more in the LBD/PBL program than in a traditional classroom and were on their way to developing more complex understandings. This research was strengthened through the use of both quantitative and qualitative methods of data collection, and through the use of a control group. However, it is unclear whether or not the participant teacher instructed the control group, which could have greatly affected the variables present in the data.

Wirkala and Kuhn (2011) conducted an experimental study examining the academic achievement produced by a problem-based learning curriculum versus that produced by a lecture-based curriculum. The authors also compared an individual PBL format to a collaborative PBL format. Wirkala and Kuhn saw current studies in PBL literature as lacking due to factors such as artificial environments and/or a lack of experimental control; because of this, Wirkala and Kuhn sought to design a study that occurred in a natural instructional setting while maintaining tight experimental control. Participants were sixth-grade students from three incoming classes in an alternative urban middle school located in the northeastern United States (n=90). There was a high level of diversity within ethnicity, SES, and academic performance at the participant school, however there was not a special education population present. These demographics were reflected in the participant classrooms. An additional sample group of 94 students was administered a cued comprehension assessment in order for the researchers to establish a baseline understanding of the targeted concepts and equivalency of the two topics covered in the action portion of the study. The sample group was used as a control for the prevention of priming the main participants' use of the targeted concepts or interference with the effects of instruction. The sample group of students did not otherwise participate in the study and the main participants were not assessed for initial comprehension.

For the individual PBL format, classes were lead by three adults and students were instructed to work alone while the adults circulated the room, answered questions, and encouraged students to stay on task (Wirkala & Kuhn, 2011). For the collaborative PBL format, students were randomly assigned to a team, with a team leader who was selected by the instructor based on previous good behavior and focus. The students participating in both the individual and collaborative formats were provided with a scaffolding handout to aid their

problem solving. Because PBL teams exhibited various levels of collaboration, one of the main jobs of the adults within the team format was to remind students to contribute equally and that they could not rely on one or two students to solve the problem. Within both formats, students engaged in identical tasks and classes were conducted the same way. Within the lecture format of the control group, questions, answers, and discussion were integrated throughout the instructional time. This contributed to partially collaborative effort, as students were able to benefit from and build off each other's questions. While students were able to provide their own answers in part, all questions were eventually fully answered by the instructor.

In Wirkala and Kunhn's study (2011), academic achievement was shown through comprehension and application assessments. Two-tiered coding systems were used for all assessments, examining the depth and breadth of student comprehension and application. In comparing the PBL groups with the LD group, data showed that students who participated in a problem-based format were overrepresented at the higher-levels of comprehension and application and under-represented at the lower levels. The opposite was shown to be true for the students who participated in the lecture-based format; with students being overrepresented at the lower-levels of understanding and application and very few students reaching the higher levels. When comparing PBL and LD formats, the PBL format was more effective in fostering comprehension and application. The authors suggested that the results showing greater comprehension within the PBL groupings were especially poignant since the ability to define concepts is expected to be well supported by traditional lecture-based instruction. One unexpected conclusion drawn from the results of this study was that when comparing the comprehension and application levels of the individual PBL results with the collaborative PBL

results, no significant difference was found. This suggests that academic achievement within PBL cannot be attributed to the collaborative nature found in most PBL efforts.

Due to most PBL research being conducted within higher education, one of the strengths of this study was that authors found the results to be consistent with parallel studies that had been conducted with adult students (Wirkala & Kuhn, 2011). This suggests that the findings of PBL research conducted within higher education may be applicable in the middle school classroom. Wirkala and Kuhn's study also was also strengthened by their use of a short, targeted intervention, which reduced possible variables. The location of the study does bring into question some possible weaknesses. While the ethnic, SES, and academic diversity within the participant population strengthened the study, the exclusion of special education students means that the results may not be applicable for schools with mainstreamed special education populations.

Interrelationships of motivation, engagement and self-efficacy within academic achievement. Even though Wirkala and Kuhn's (2011) findings showed that collaboration may not be necessary in producing academic achievement within problem-based learning, most of the research with in this review focused on PBL that occurred within a collaborative environment. Within the problem-based learning environment, collaboration has been shown to increase motivation and engagement (Downing et al., 2011; Pedersen, 2003; Rotgans & Schmidt; 2011) as well as student self-efficacy (Cerezo, 2004). The findings presented by Dowing et al. (2011), Pedersen (2003), and Cerezo (2004) also suggested that PBL increased academic achievement for the participants in their respective studies. This suggests a link between the classroom factors of motivation, engagement, and self-efficacy and the factor of academic achievement in the PBL environment.

Belland et al. (2009) conducted a case study exploring group dynamics within PBL used in classrooms where mainstreamed special education students were present, thus providing some of the information left out by the Wirkala and Kuhn (2011) study. This study took place in a middle school located in a small, low-SES, rural community in the Midwestern United States. The participant school benefited from a federal grant that funded PBL support within the school provided by professors and graduate students from a large, midwestern university.

The authors predicted that the collaborative nature of problem-based learning would be beneficial to mainstreamed students based on previous research that showed cooperative learning to increase the reading and writing achievement of both mainstreamed students and their average peers, significantly more than lecture- and discussion-based learning (Slaving & Slavin, 1995, as cited in Belland et al., 2009). In observing and interviewing members of one PBL group that contained two average students and one mainstreamed student with learning disabilities and ADHD, Belland et al. (2009) found that each member of the group exhibited specific shortcomings, filled a unique role, and focused on specific levels of thinking. While the mainstreamed student did not engage in the same levels of thinking as his average peers engaged in, his contribution helped the group arrive at a viable solution, something several groups comprised of all average students did not accomplish. The student participants also perceived personal benefits from the unit, such as helping them to feel more comfortable talking in front of others and being more engaged during the PBL unit than during teacher lead units. These findings suggest that collaboration may be a necessary component of academic achievement within problem-based learning when PBL is used in a setting where students who receive special education are present.

Because the findings are limited to three individual students, it's difficult to know how personality variables may have affected the findings (Belland et al., 2009). However, this small sample size was purposeful on the authors' parts, as they felt that within PBL literature there was a need for deep description. With a deeper description, readers have the opportunity to compare the findings to similar cases, even though the study itself may not be directly applicable.

Conclusion

Problem-based learning has the potential to benefit the middle school classroom through increasing motivation, engagement, self-efficacy, and academic achievement. It does this through the use of real-world and appropriately challenging problems (Cerezo, 2004; Pedersen, 2003; Rotgans & Schmidt, 2011), the use of collaborative groupings (Belland, 2009; Cerezo, 2004; Downing et al., 2011; Pedersen, 2003, Rotgans & Schmidt, 2011), presenting opportunities for student choice and control (Belland, 2009; Downing et al., 2011; Pedersen, 2003), integrating metacognition (Cerezo, 2004; Downing et al., 2011), and through providing a solid structure for inquiry and fostering comprehension (Belland, 2009; Hmelo et al., 2000; Wirkala & Kuhn, 2011).

Successful Implementation

In order for the possible benefits of problem-based learning to take effect, special attention must be paid to the design of any PBL unit (Downing et al., 2011). Those designing PBL units must provide enough time for students to arrive at possible solutions. Furthermore, Hmelo et al. (2000) suggest that it is more important to focus on fewer units throughout the year, giving students the opportunity to dig deeper into some parts of the content, while allowing them to spend less time on others. Designers of PBL units must also make sure that the problems presented have real-world application for the specific group of students participating in the unit,

targeting students' specific interests (Pedersen, 2003). Without this focus, the students may not be able to see why the content might be important to them at the current moment. Another way to draw students into PBL is to make connections to their work with that of professionals within the fields that their problems are based in (Pedersen, 2003). This helps students to develop an understanding that the class work they do is applicable in the real world. For those designing collaborative PBL units, the need for collaboration must be authentic, in that the problems are too challenging for students to solve alone, but are appropriately challenging when approached with the help of peers (Pedersen, 2003). Scaffolding is also a crucial factor within problembased learning. Appropriate scaffolding can help to remind students of their respective roles within the PBL group, provide a framework for students to follow during the PBL process, and to foster the metacognitive skills necessary to PBL (Belland et al., 2009; Dowining et al., 2011).

Apart from the design of problem-based learning, teachers much also consider how PBL will affect their own practices. In a case study examining the practice of one university professor, Ribeiro (2011) found that several pros and cons arose for the professor in switching from a traditional approach to a PBL approach. First, the professor's classes became unpredictable and he lost control in relation to covering the syllabus within the given time frame. He also experienced fear of being placed in the situation of having to admit to a lack of knowledge and of vulnerability to unfamiliar topics raised by students. Due to the unpredictability and new content, the professor had to increase his time commitment to the curriculum and engaged in constant planning and adaptation. Despite these challenges, the professor noted that his PBL classes were more fun and dynamic for both himself and his students, and that the PBL approach also contributed to the professor's professional development through the exposure to new content,

increasing his knowledge base, and through fostering self-reflection. In the end, the professor felt that he had gained a greater knowledge of his students' interests and of their thinking. In the end, each teacher must weigh the pros and cons for themselves in determining whether or not they wish to use a problem-based learning approach. Several studies also found that it was important to provide teachers with training in PBL to ensure success upon implementation (Hmelo et al., 2000; Pedersen, 2003; Wirkala & Kuhn, 2011).

Problem-Based Learning in Language Arts and Social Studies

The research on problem-based learning focuses almost exclusively on units covering content within math, science, and the medical field. However, the possible benefits for the middle school classroom deem it important to explore possibilities of utilizing PBL in other content areas such as language arts and social studies. It may be possible to integrate PBL into a language arts curriculum by asking students to come up with possible solutions to problems affecting their community. Students might write essays concerning their problems, research people who have faced and solved similar problems or read fictional accounts of such people, read through primary documents, write poetry relating to the problem, and participate in practicing a number of other language arts related skills. While this move away from a traditional English language arts curriculum may be met with resistance, it has the potential to offer students an opportunity to cover the content in more meaningful and lasting ways. Using PBL to access language arts content may help students to see a real-world use for the skills and knowledge they are expected to gain.

There are some social studies approaches that already fit closely with problem-based learning. One such model is Dorothy Heathcote's Mantle of the Expert approach (Torp & Sage, 2002; Wagner, 1988). In this approach, students work with a problem within history and take on

the personae of those involved and work to figure out their own solution. The role of the teacher in the Mantle of the Expert approach is to guide the students' journey, which is one way it differs from problem-based learning, where the teacher's role is to engage in the process as a coinvestigator (Torp & Sage, 2002). In order to move towards a model that more closely resembles problem-based learning, students could use historical content as background information to solve current problems, creating increased relevance for historical knowledge, and decreasing the need for the teacher to guide student journeys.

Recommendations for Future Research

Future studies should not only expand the current literature on problem-based learning in middle school classrooms, but should also explore problem based learning units designed for language arts and social studies curricula. Dewey (1916, 1938), Kilpatrick (1919), and Vygotsky (1978) all presented the principles that support experiential, collaborative, and inquiry learning as universal, not relegated to any one subject of study. While it may sacrifice the ability to control some variables, further research regarding the realities for teachers of designing and implementing PBL within their own classrooms should be conducted. Such research would help to determine the feasibility of PBL in an environment where researcher design or aid is absent. Studies using ethnographic methods or those conducted by teacher-researchers may be the most appropriate types of research to determine these realities.

Based on the current findings, there appear to be multiple benefits of integrating problembased learning into middle school curricula. Though it may require an increased workload, problem-based learning also has the potential to increase satisfaction in their work for both teachers and students. Despite possible challenges, it is recommended that educators, regardless

of content specialties, who wish to increase motivation, engagement, self-efficacy, and academic achievement within their own classrooms, examine effective problem-based learning methods.

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Factors and Conditions that Lead to ELL Student Success

Starr Smythe

Abstract

The demographic of schools in the United States is changing at an exponential rate. Schools are experiencing a growth in culturally and linguistically diverse student populations. Unfortunately. many teachers are unprepared to meet the needs of these students. This literature review examines studies that address the following question: what are the factors and conditions that lead to English Language Learner (ELL) student success? The studies fall under these three categories; SIOP instructional model, different facets of collaboration, and individual teacher practices and attitudes. The conclusion section of this review highlights specific teaching practices that teachers can utilize to inform their practice.

Factors and Conditions that Lead to ELL Student Success

U.S. public schools are experiencing a steady increase in English language learner (ELL) student populations and changing demographics throughout the entire country. Migration patterns are changing therefore many schools all over the country are experiencing a growth in culturally and linguistically diverse students. The rate of change in demographics in U.S. schools is dramatically disproportionate to the rate at which schools and educators are prepared to meet the academic and social needs of these students. There is a shortage of trained ELL teachers, bilingual teachers, and substantially prepared and trained mainstream general education teachers.

To complicate matters further, The No Child Left Behind Act (NCLB) places a tremendous amount of accountability pressure on educators and creates high stakes for ELL students. English language learners (ELL) have the increased challenge of learning content in another language where they may not be proficient. State standardized testing for ELL students is primarily focused on English language proficiency versus content or academic skill knowledge (Echevarria, J., Vogt, M., & Short, D.J., 2004). Standardized tests in most states are biased and in favor of native English speakers who are already acculturated into the United States school system. The results are that language minority students tend to fall behind native Englishspeaking peers. The playing field is far from level.

In many cases, ELL students are placed in mainstream classrooms with little to no support. A growing concern is that general education teachers are not prepared to deliver differentiated instruction for these students. A fair amount of public schools in the United States have a 'pull out' programs for ELL students but many times the focus is only on language development and not content. Expectations are placed on many ELL teachers to teach content, but they can find themselves in a quagmire of isolation and lack of collaboration with general

education teachers as well as administration. Thus, ELL students may experience a fragmented education as well as social isolation from mainstream school culture.

There is also a need to examine larger systemic issues, such as teacher beliefs and perspectives about linguistically diverse students. Teacher perceptions about linguistically and culturally diverse students have the power to perpetuate or dispel myths that are common in regard to language and cognitive development (Karathanos, 2009). The perpetuation of these myths can seriously hinder ELL student success and further promote the dominant school narrative, which has historically been Eurocentric and monlinguistic. Teachers are in a powerful position to deconstruct school norms that contribute to the exclusion as well as marginalization of ELL students (Ligget, 2010).

General education teachers play a critical role in the academic and social success of ELL students; therefore, teachers need to increase their knowledge and preparedness to meet the needs of culturally and linguistically diverse student populations. The assumption is that, in many cases, teachers will have to take the initiative themselves to improve outcomes for students and therefore it is helpful to understand the factors that lead to ELL student success.

My student teaching took place at a dual language elementary school that incorporated the Guided Language Acquisition Design (GLAD) instructional model. GLAD is a professional development model that was developed to train teachers to modify instruction to support English language acquisition as well as learn strategies to increase content knowledge. At that time, it was highly advantageous to experience such an effective instructional model. This experience ultimately provided me with the opportunity to differentiate my own lesson plans and instruction through incorporating methods of the GLAD program. Overall, I was very inspired by the school culture which celebrated bilingualism, supported all students learning a second language, valued

students' home life and culture, encouraged parent participation, and incorporated constructivist pedagogy. Ultimately, this student teaching experience led me toward inquiring about how schools and teachers can better support their ELL and culturally diverse students.

A variety of terms are referenced throughout this literature review. As I reviewed the factors and conditions that lead to ELL student success, the following acronyms are used: ELL (English language learner), ESL (English as a second language), L1 (student's first language), and L2 (student's second language). Other terms, such as "withdraw" services, refer to times when English language learners are removed from mainstream content area classes and placed with an English language teacher. The term "language proficiency" refers to student abilities to speak or perform academically, most often in the English language. Another term that is important to consider is "academic skill knowledge" which refers to student academic performance and knowledge regarding particular subjects and grade levels. Lastly, the term " self-efficacy" refers to one's beliefs about their own abilities. In relation to teaching, Durgunoğlu (2010) suggests that self-efficacy is connected to performance because it affects the levels of effort put forth, staying on task, resiliency, and how one handles stress. Individuals who have high efficacy work very hard and are able to produce positive outcomes, whereas those with low self-efficacy are likely to walk away from a task and not experience success. Self-efficacy is explored in this paper because the implications are directly related to one's teaching practice and ELL (English language learners) academic success.

This review will be structured by categorizing studies under the major themes that surfaced while exploring the research. The following themes include: The Sheltered Instruction Observational Protocol (SIOP) instructional model; teacher, family and student collaboration; individual teacher practices and attitudes. The first category will examine studies that investigate

the implementation of a research-based instructional model, such as the SIOP (Sheltered instruction Observation Protocol). The second category looks at collaboration, such as how it will be used to address academic teaching teams and the importance of connecting with ELL student families. The third category includes studies that examine individual teaching practices, such as scaffolding through questioning, inclusivity and adequate support. The final two studies of this paper will review the ways that teacher attitudes influence ELL student success.

The purpose of this literature review is to explore the following question: What are the factors and conditions that lead to increased academic success for ELL students? This literature review will examine the challenges and highlight the successful factors in developing conditions and strategies where culturally and linguistically diverse students can thrive. This literature review only examines a fraction of the teaching models and strategies that are currently available and being utilized. There are many successful programs not reviewed for this paper but remain worthy of exploring. My student teaching experience enabled me to deepen my understanding of how to better serve ELL students; therefore, I am in strong support of general education teachers who seek out professional development opportunities. When teachers can further their knowledge of strategies for differentiated instruction, they are better able to incorporate a comprehensive language acquisition design such as GLAD or SIOP.

Literature review

Sheltered instruction

Sheltered instruction is an instructional approach where teachers utilize a wide range of scaffolding strategies to assist ELL students in developing content knowledge as well as increasing English language proficiency. The U.S. Department of Education has conducted research through agencies, such as the Center for Research on Education, Diversity, &

Excellence to study the effects of sheltered instruction on the academic achievement of ELL students. SIOP (Sheltered Instruction Observation Protocol) is one model that was developed directly through extensive research using field tests and observations over a seven-year period. As Echevarria (2004), explains:

The SIOP model was field-tested and the protocol became a training and evaluation instrument that codifies and exemplifies the models. The SIOP may be used as part of a program for pre-service and in-service professional development; as a lesson planner for sheltered content lessons; as a training resource for faculty; and as an observational and evaluation measure for site-based administrators, supervisors of student teachers and researchers who evaluate teachers (p. 3).

The following three studies will examine the effectiveness of the SIOP model in terms of ELL student success.

Sheltered Instruction Observation Protocol (SIOP)

Echevarria, Short, & Tutor (2011) conducted research on the SIOP model concerning the effects on academic literacy development of ELL students. This study investigated whether or not academic performance improved when teachers received SIOP training. Participants included nineteen treatment teachers and four comparison teachers as well as ELL students in sheltered classes where teachers were trained in the SIOP model and ELL students, whose teachers had no exposure to SIOP. Students were in grades 6-8 with mixed English proficiency levels. Results from the study revealed that when students had teachers trained with the SIOP model who implemented it with fidelity, they performed better on assessments of academic language and literacy than those untrained teachers. The fact that the participants had mixed proficiency levels may have influenced why students performed better than others so there may not necessarily

been a direct correlation to the implementation of the SIOP model.

In another study, Echevarria et al. (2004) also examined the SIOP model. This particular study took place over the course of one semester and tested the effects of the SIOP model of instruction on content area literacy and language development in science at eight middle schools in a large urban area. Participants were randomly assigned to control or treatment groups. There were 8 teachers and 649 students in the treatment group and 4 teachers and 372 students in control group. A total of 12 teachers and 1021 students participated in this study.

The results of this study revealed associations between levels of implementation and the SIOP program. The more consistently the features were observed and utilized in effective ways, the higher the score for that particular lesson being observed. There were constraints of this study. For example, the overall timeline of the study was rather short and there were almost twice as many teacher participants in the treatment group than were in the control group. It is also important to consider that certain teachers may respond to professional development differently and take more time to implement new instructional strategies with fidelity. All of these variables may indeed have had an effect on the validity of the results.

The third study was conducted by Echevarria, Short, & Powers (2006). This study investigated whether or not the SIOP model improved academic achievement of ELL students in content areas, such as social studies. This study took place in one West coast and two East coast urban public districts. The intervention group consisted of 346 students with 237 from the West coast and 109 from the East coast. The comparison group consisted of 94 students between the grades 6-8. Qualitative data was extracted from written feedback, observations, electronic discussion, teacher evaluations and reflections as well as documentation from journals. Student outcome measures and data collection measured students' academic literacy development over

time using expository writing assignments.

The research revealed positive effects of the SIOP model on student literacy achievement as measured from the IMAGE writing assessment. The intervention group had increased student achievement through out the year when contrasted with the comparison group. The differences between the intervention and comparison groups were statistically significant; therefore, the results indicate that SIOP model holds potential for assisting ELL students to develop academic literacy skills, such as academic writing. When considering the validity of all three studies, it is important to note that Jane Echevarria was the predominate person present in all three studies as well as author of the SIOP book, Making Content Comprehensible. Studies therefore may have revealed positive outcomes for the SIOP model due to the personal agenda and professional investment of Echevarria.

Collaboration

This paper will consider the concept of collaboration as a major factor in providing ELL students with academic, emotional, and social support needed to succeed. The first of these studies showed the value of collaborative team teaching. York-Barr, Ghere, and Sommerness (2007) conducted a case study in which collaborative instructional teams and models were constructed and researched. The study investigated the impact that these teams and models had on the outcomes of ELL students. This study analyzed two cohorts over a period of two years at Washington Elementary, located in an urban school district in the Midwest. During year one, Grades 1 and 2 were assigned four full time general education classroom teachers, two full-time ELL teachers, one full time itinerant general education teacher, and one part time ELL assistant. Grade 2 had a part time ELL teacher for 2 hours a day, full-time special education teacher, and

three case researchers from the local university who served as facilitators for the initial development process. Year two had the same teaching team participants with the exception of one full-time ELL teacher and, during the third year, the models continued while external support was withdrawn

Three types of data were gathered and analyzed to address the five questions guiding this case study. Researchers took field notes of documented meetings and conversations during site visits, workshops, and classroom observations. In addition, perceptual data from teachers in grades 1 and 2 were recorded during interviews. The data created a longitudinal study. Fourteen teachers participated in individual interviews at the end of year one and eleven at the end of year two. Student outcomes were analyzed through qualitative date obtained during group and individual outcomes as well as through analysis of quantitative data from district-wide standardized tests.

Data revealed that it was highly advantageous for students to be in an inclusive and collaborative instructional model, both academically and socially. Teachers reported a greater sense of community among students as well as academic progress. When students received instruction in the inclusive and collaborative models, both cohorts made considerable academic gains in reading and mathematics. Overall, teachers from both years reported positive outcomes from the inclusive and collaborative instruction.

Through analysis of qualitative and quantitative data, this study showed what worked well and where some of the problems may exist. Results demonstrated positive changes in teaching as well as learning when the curriculum was coherent and cohesive through instructional design and the associated assessment, materials, and aligned staff schedules. Positive outcomes occurred within a collaborative school culture. Meanwhile, some of the

challenges reported included a loss of instructional and decision-making independence and a shift in roles as well as confusion about how to share instructional responsibility. The validity of the overall findings may be at issue due to the small sample size of that study and the context is localized with no comparative analysis from other schools. It might be useful to conduct a similar study at another elementary school and compare results.

Another importance aspect of collaboration includes models where schools and teachers collaborate with the families of ELL students. This study examined the barriers to ELL student academic success and the implications of collaboration. Good, Masewicz, and Vogel (2010) conducted a study based on the perspectives of teachers and parents in order to obtain insight into the following question: What are the barriers to improving the academic achievement of Hispanic ELL students as perceived by their parents and teachers? The setting took place in a rural community located in the Rocky Mountains within a school district that has a total of 2,500 students; 65% were identified as Hispanic with 36% ELL. The first focus group included four female (3 Hispanic, 1 Caucasian) and 1 male (Hispanic) ELL teachers with at least three years teaching and fluency in both English and Spanish. The second focus group two included eight Spanish speaking Mexican mothers who had immigrated to the United States within the last five years.

This research used a qualitative methodology with interviews of two focus groups, parents and teachers. Participant responses were analyzed inductively to identify emergent themes and relevant meaning. Transcript analysis and inquiry were framed through two theories while conducting this research: Critical and cultural-ecological theory. Good, Masewicz, and Vogel (2010) suggests that critical theory includes reflection as well as action to create a more just and freer society, and that cultural-ecological theory considers societal and school effects as

well as the dynamics within minority communities. Data revealed five themes from parent and teacher responses that illuminated barriers to Hispanic ELL student achievement and success. These barriers included: gaps in communication, culture clashes, lack of systematic plans for ELL students, lack of teacher preparation in multiculturalism, language acquisition, and ELL instructional strategies as well as a lack of support systems for families transitioning to a new environment and new culture

The lack of teacher collaboration in many school settings may have implications on ELL student success. Such research has revealed the marginalized status of ELL teachers and students based on language within many public schools. Liggett (2010) examined ways in which English Language teachers experienced marginalization within their school communities. This study also explored ways in which ELL students experience this marginalization and the obstacles that hinder teacher abilities to assist ELL students within particular school communities. The participants included six white female English Language teachers, who were K-12 certified. Two of the rural schools utilized "pullout" services for ELL instruction with tutoring sessions during reading, writing, history, and grammar. The other rural school observations took place during language arts, reading, writing, social studies, and mathematics. Three urban school settings included: an average of eight students per class, observations that took place during language arts, reading, writing, social studies, and mathematics.

Qualitative research was utilized to obtain details about thoughts and feelings regarding English language learners and how it may have that hindered their ability to assist ELL students. This was accomplished through structured interviews as well as classroom interviews. Liggett (2010) collected data that included class subject, number of students, country of origin, classroom arrangement, student response to the material, and teacher responses to students. In

general, teachers encountered obstacles that made performing their jobs more difficult due to the school exclusion and marginalization status of English Language teachers and students. There was a clear division among general education teachers, administration, and English Language teachers.

Findings indicate that, from a sociopsychologic perspective, students may have experienced a marginalization status as part of a larger systemic and structural issue. This most often occurred when English language teachers were unable to facilitate student academic success. With that said, it would not be appropriate to take qualitative data from such a small sample size and generalize the entire school.

Individual Teacher Practices and Attitudes

Scaffolding through Questioning

This next study examined an effective teaching practice and the positive impact it had on ELL students. Kim (2010) examined scaffolding for ELL students through questioning at the upper elementary school level. The focus of this study was to explain how various discourse strategies led to ELL students participating in meaningful ways, motivation to use emerging language skills and express their thoughts, ideas, and understandings. This research sought to observe the connection between teacher questions and student ownership of newly learned language skills.

This study was conducted over three years of classroom observations. During those three years, Kim recorded the instructional practices of two ELL teachers. Data presented in this study was taken from one school year through weekly observations. Observations were recorded through notes, audio and video recording. Data analysis came from the following sources: Observation notes, audio/video recording from general and ESL classes, student assessment

results, student oral language samples, student work samples, teacher reflections, and observation notes and audio recording of meetings.

Data analysis was conducted on two different levels. The first level focused on the degree of teacher responsibility. Questions were divided up into three categories: coaching, facilitating and collaborating. The second level analyzed the overarching theme of instructional goals. Coaching questions tended to be used at the beginning of the year in order to assess student knowledge of key words in text and general understanding of what they learned. Teachers seemed to use coaching questions the most in order to guide students toward instructional and behavioral objectives, thus providing students a degree of ownership though their responses.

Classroom observations revealed that teachers, who used the facilitating questions, had a moderate level of responsibility among the three types of questions. Teachers acted as facilitators of student learning by inviting student input while also encouraging active participation and thinking in the activity as well as greater ownership in the learning process. Collaborating questions seemed to encourage dialogue about personal experiences, represented the least degree of teacher responsibility. These types of questions were found to focus on student experiences, which manifested as opportunities for students to share their ideas, acknowledge their background knowledge of the topic, practice oral language skills, and exercise ownership of learning.

Another portion of this study looked at the effect of teacher questions on student learning through overall student reading gains and participation. The teaching practice of the two ELL teachers was successful based on student performance of the Qualitative Reading Inventory assessment results, which indicated student progress related to reading levels. Analyses of teacher questions show that the two teachers provided scaffolding that promoted student

participation. Student engagement was qualitatively different between the months of October to March. This development revealed that, by the end of the year, teachers were not the center of the classroom conversation but, instead, had become facilitators. They collaborated and shared equal responsibility for participation in the classroom community. Students were participating meaningfully in class discussion therefore developing ownership in language learning.

This study was limited in that it drew from observational data from two ELL teachers and could be made stronger if it increased the number of participants. Yes, these specific styles of questions can easily be utilized by teachers in order stimulate higher cognitive demand, motivation and participation for their ELL students. Teachers can implement coaching, facilitation, and collaborative questioning techniques in order to improve teaching practice and learning outcomes.

Inclusivity and Adequate Support

In an observational study, Chen (2009) examined the broad objectives to ensure inclusivity and adequate support for emergent bilingual students in mainstream classes. The study presented five teaching scenarios in mainstream schools with support for English as an additional language (EAL) in the UK. Participants included three children, ages 8 to 11 years old. Two of the participants were observed in two different learning environments, one that accommodates all linguistic backgrounds but without any focused support while the other provided support. Other participants included two mainstream teachers within their classes and an EAL teacher.

The study used an ethnographic approach that included field notes, student diaries, and interviews that described the student experiences. Observations were focused primarily focused on teacher and student interactions within two contexts in the general education classroom and

supplemental instructional support. Findings indicated students may some instances benefit most by receiving focused support outside of the general education classroom. Analysis suggests this was primarily due to the lack of available inclusion and language support. This may result in a reduced sense of self- confidence. In contrast, ELL students who were provided with supplemental instructional support had a much different experience. This may have been to the fact that students had opportunities engage with teachers as well as peers in a safe and supportive learning environment.

This study highlighted many important aspects of ELL emotional and academic experience in mainstream classrooms with minimal inclusivity and language support. Research has shown the objectives that need to be in place for the two contexts to ensure inclusivity and adequate support for ELL students. This study was based on five 'snapshots' of classroom interactions. It may have benefited from a larger sample size, and perhaps an increase in observations over an extended period of time.

Incorporating Native Language

Extensive research repeatedly indicates a correlation between valuing and incorporating ELL students' native language into curriculum and resulting success. In one study, Karathanos, (2009) investigated mainstream teacher perspectives concerning the theory and practice of integrating ELL students' native language with instruction.

Participants were drawn from pre-service and practicing teachers taking an ELL course through a Kansas university. Survey data was collected and divided into the following three target teacher groups: 100 pre-service, 117 untrained, 110 trained. Of the teacher participants, 55.7 % were elementary and 40.4 % secondary teachers. A majority of the participants were female with a native language of English. This study utilized a questionnaire to include twelve items intended

to explore participant perspectives on incorporation of native language in instruction with ELL students. The questionnaire consisted of statements that the participants were rated using a seven point scale.

The results of the study revealed variations of support among teachers. Untrained secondary teachers tended to show significantly less support than the elementary teachers for the practical implementation of native language use in instructions. Meanwhile, pre-service elementary teachers showed the least support, unsurprisingly, teachers who received training displayed the most support for this practice. At the secondary level, trained teachers also showed significantly more support. Results suggested that teaching experience was a factor in the increase of mainstream elementary teacher support for the practical implementation of native language within instruction. Though this was not a factor at the secondary level, data suggested that ESL preparation courses were clearly associated with mainstream teacher support of native language being incorporated within instruction.

Teacher Preparedness and Self-Efficacy

Durgunoğlu, (2010) conducted a study that examined self-efficacy, attitudes, perceived preparedness as well as pre-service teacher knowledge regarding the teaching of ELL students. This research was conducted by conducting two studies in order to assess self-efficacy. The first study included sixty-two pre-service teacher participants from a Mid-western university. During the study, pre-service teachers completed a survey on their attitudes, beliefs, and knowledge of ELL issues. The survey included a Likert scale accompanied by a series of open-ended questions focused on terminology and concepts specific to ELL education. Participants completed a test inquiring about thier perceptions regarding how they will teach ELL students. The focus of the questions were created in order to bring forth the following constructs: 1) Self-efficacy regarding

ELL students 2) attitudes toward ELL students: 3) attitudes toward parents of ELL students: 4) perceived knowledge: and 5) perceived preparation

Another portion of the study included self-reported efficacy and preparedness scores with qualitative observations of the four pre-service teachers who are student teaching in a high school. The observations evaluated the following; teacher use of additional resources, classroom activity alterations, and personal modifications used to aide the ELL students. Observations included a sixty one-item observation checklist used to document specific teaching strategies, content delivery, assessment procedures, and language strategies incorporated into lessons. Researchers also took detailed notes about the lesson plan and throughout the observation.

Results from the first study showed participants had somewhat positive attitudes toward ELL students and parents. The perceived preparedness and self-efficacy ratings indicated that the participants possessed neutral views about their preparedness and effectiveness regarding ELL students. Researches viewed neutral more negatively due to the fact these teachers had completed the training and were still not feeling confident. The second study's observations indicated that mentoring teachers were not providing any guidance about ELL teaching strategies.

All four participants had relatively positive attitudes toward ELL students and parents. The perceived preparedness and self-efficacy rating were low. Across the 10 observations, three themes surfaced: the usefulness of peer support, the importance of mentoring by supervising teachers and the prevalence of instructional neglect of those students. Observations revealed that pre-service teachers did not interact directly with ELL students and the students did not call attention to themselves. In fact, Peers were observed provided the most support to ELL students.

Teacher attitudes toward their students had a direct effect on how these students were

served. This study highlighted the need for teachers to examine their attitudes as well as their perspective regarding their ability to meet the student needs. It might be useful to continue the study of survey pre-service teachers after a year of teaching to see if their self-efficacy had changed with more experience. Further studies may include larger sample sizes to compare and contrast data of pre-service teachers from other university teaching programs.

Overall, this literature review analyzed studies that addressed the factors and conditions that support ELL student success. Sheltered instruction, collaboration, individual teacher practices as well as attitudes were all areas where these factors and conditions were explored. The SIOP instructional model was examined but the GLAD model was not included, as mentioned in the introduction, in reference to my student teaching experience. Currently the GLAD model is conducting research so that data will be available in the future. The conclusion section of this paper will explain how these studies can inform classroom practice.

Conclusion

I chose to analyze research that examined factors and conditions that lead to ELL student success because I wanted to know specific steps I could take to better inform my teaching practice. Specific factors and conditions that were reviewed include school wide programs, various forms of collaboration, classroom activities, teacher attitudes, and self-efficacy. These factors and conditions cover a broad range of what teachers need to consider in order to better serve their ELL students. Research suggests promising and useful methods that have been proven to increase ELL student achievement.

I felt it was important to explore specific teaching practices that I could implement into my future teaching practice. Kim (2010) explains that scaffolding through questioning increases engagement and inspires students to be active participants in the classroom community. Other

approaches include modeling how to participate in classroom conversation, capitalizing on students' strengths and prior knowledge, providing frequent opportunities for classroom interaction between the teacher and the individual student. Research also suggests that ELL students benefit from sharing and discussing ideas in small cooperative learning groups, thinking aloud in order to model cognitive processes, and students choosing alternative projects to demonstrate knowledge as being effective teaching practices.

The teaching practices mentioned above are interconnected with certain philosophies that are equally important to implement. Karathanos (2009) suggests the importance of teachers incorporating ELL student native language and how it increases academic outcomes for ELL students. This includes valuing an overarching educational philosophy that advocates for bilingual and bicultural classrooms. Studies show the positive outcomes of creating a positive, inclusive, and supportive classroom community that values linguistically and culturally diverse students. These philosophies would ultimately be expressed though the implementation of good teaching practices.

Durgunoğlu (2010) suggests that self-efficacy, as well teacher attitudes towards ELL students and their families, has a direct influence on the classroom culture and student outcomes. Teachers, who are well prepared and confident in their abilities as well as having a positive view of their culturally and linguistically diverse students, will ultimately have a positive impact on their ELL students. Within the research, ELL students were receiving support through peers as a result of teachers lacking the confidence and ability to meet their needs. These sorts of findings show how teachers can actually capitalize on positive peer interaction, such as incorporating peer tutoring within the classroom.

Studies show that instructional collaboration is a way for teachers to build relationships

among colleges, feel supported, align curriculum, and creates opportunities to provide useful feedback to one another. Research reveals parent collaboration as a key factor in ELL student academic achievement and success. This includes teachers building bridges that connect students' family and culture to the classroom. Collaboration also entails providing parents with opportunities to participate within the classroom as well as engaging in dialogue about their children's learning. Peer collaboration was also found to be extremely beneficial in ELL student social, emotional, and academic success.

Research conducted by Echevarria (2004) demonstrates that teachers trained in sheltered instructional models such as SIOP, are able to provide effective and successful instruction for ELL students. Ultimately, it would be ideal for districts to incorporate research based instructional models such as SIOP and GLAD as a way of solving the ever increasing challenge of meeting the academic needs of ELL students and supporting teachers in improving their practice. Even if a district or school is not incorporating instructional models such as SIOP or GLAD, in many cases, teachers will have to take the initiative and inform their own teaching practice through research and professional development opportunities.

Nearly all of the factors and conditions that lead to ELL student success were present during my student teaching. I had direct experience with the GLAD instructional model and was immersed in a school culture that valued bilingualism. It was particularly powerful to participate with professionals that collaborated regularly thus providing information and support to one another. I witnessed teachers with positive attitudes and with high levels of self-efficacy. In conclusion, it is possible to meet linguistically and culturally diverse students academic as well as social needs. School demographics are rapidly changing; therefore teachers need be willing to invest the time and energy it takes to inform their practice.

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The Benefits of Interactive Instructional Methods at the Secondary Level: Games, Simulations, Computer Explorations, and Practicum Experiences

Kasinda Starmer

Abstract

Achievement is a major pressure in the modern classroom. Interactive forms of education—such as games, simulations, computer explorations, and practicum experiences—are one suggested method of assisting students to academic success through extending student learning. This paper will review the literature on interactive forms of education. Games provide instructors an opportunity to create a shared experience for students and assist students with their academic achievement across educative tracks and learning styles, foster positive attitudes toward learning, and aid in the application of abstract concepts. Simulations allow students to interact with material through their bodies and assists in concept transfer and engaging with reality in new and creative ways. Computer explorations can develop student language learning through reinforcement of traditional literacy practices and reduction of communicative anxiety. Practicum experiences create context-embedded learning experiences that allow students to adapt to open-ended situations. Students report a preference for these methods over traditional instruction. Using such methods will assist instructors to provide their students opportunities for success. Following the literature review are suggestions for further research.

The Benefit of Interactive Instructional Methods at the Secondary Level:

Games, Simulations, Computer Explorations, and Practicum Experiences

With the current administrative emphasis on student performance amidst practitioners bemoaning a lack of student participation and engagement, it would follow that ways to encourage student participation and learning would be in the forefront of educational research. Au (2009) suggests many schools are struggling to reach No Child Left Behind's mandated 100% of students passing Annual Measureable Objectives by 2014. Too often, the solution is for top-down, direct instruction to combat the onslaught of the testing craze rather than pursuing alternative, more interactive means. Disengagement is rife as a result, evidenced by dropout rates bordering on 25%, with higher rates for Latino and Black students (Burrell, 2010), but little is done to engage students within traditional classrooms. Numerous writings (Salas, 2004; Curwin, Mendler, & Mendler, 2008; Vaughn, Bos, & Schumm, 2011) on classroom management argue that engaging curriculum is the best way to maintain classroom order, including such interactive methods as the ones discussed in this paper. In spite of all this, research in the realm of interactive instruction is minimal (Huizenga, Admiraal, Akkerman, & gen Dam, 2009). More difficult to find are studies that utilize these strategies at the secondary (6-12) grade levels (Ajibade & Ndubaba, 2008).

Davis, Dukes, and Gamson (1981) defined interactive instruction with the following: "By interactive mode, we mean one in which the student is actively involved in performing some task—be it playing a game, interacting with a computer, participating in a field experience, collecting original data, or other analogous activity" (p. 314). The authors continued by breaking these into sections: games, simulations, computer explorations, and practicum experiences—the areas upon which this particular paper will focus.

There is limited need for further research on student preference for these techniques over traditional instruction (Davis et al., 1981). Students repeatedly report that they enjoy gaming activities over other methods of instruction. Research must focus instead on how these methods affect student thinking and performance. While student preference for these methods has been established, research is still meager on how these modes help improve student performance—and it is 30 years after this study was originally published. The question then becomes this: can interactive forms of education, particularly games, simulations, computer explorations, and practicum experiences, be beneficial to secondary student learning?

Interactive instructional methods have many implications for students at all levels of education. However, this paper will focus particularly on the impact that these methods have on student learning at the secondary level. Searches within the Educational Resources Information Center (ERIC) yielded few articles. Therefore, some of the articles quoted in this paper deal with English Language Learners (ELL) from countries other than the United States. Some articles are case studies, offering qualitative data rather than quantitative. The articles deal with topics across a wide spectrum: language learning, history, driver's education, computer programming, science, drama, and documentary filmmaking—but all articles state the implications that using these forms has for student learning.

Literature Review

This review of research on interactive instructional methods is organized into four separate sections: games, simulations, computer explorations, and practicum experiences. Each section will include an introductory and summative paragraph. Each article will be discussed using the following format: introduction, findings of the study, and limitations of the study.

After the review, there will be a conclusion that discusses the overall findings, followed by recommendations for further research.

Games

This section will review research on games in schools. Games offer a unique platform for student learning. When a student is engaged in an activity that they consider fun, they often do not realize that they are learning. Games can also create a shared experience upon which an instructor can later build upon. Games can take many forms in the genres of non-digital or digital. Digital games offer opportunities for less vocal students to become engaged in ways that they might not engage in an actual experience (Vaughn et al., 2011). One article deals specifically with non-digital games; the rest focus upon computer games.

Ajibade and Ndubaba (2008) tested the hypothesis that students learn a second language better through games. Nigerian students aged 14 to 18 participated in an experimental study in which one group of students played word games, sang songs from their home culture in their native language and English, and listened to culturally relevant stories while a control group received traditional instruction. Results were measured through student test scores.

The authors (Ajibade & Ndubaba, 2008) found that students who received the experimental instructional methods did much better on their English proficiency exam than the students who did not. The researchers found that these methods were more motivating to both male and female students than traditional methods. The researchers also found that students perceived that stories were the most engaging and instructional of the experimental methods. This study (Ajibade & Ndubaba, 2008) had some methodological shortcomings. The authors concluded that students preferred learning English through stories. However, the authors did not ask students to contrast the three employed methods—stories, songs, and games—to traditional

instruction. Another weakness is that the authors did not provide data of conclusions to compare younger and older secondary students.

Two researchers (Sardone & Devlin-Scherer, 2009) conducted a study using teacher candidates to investigate the effects of using computer games as learning tools. The candidates were from the United States and were between the ages of 20 and 22. Observations, questionnaires, and focus groups were used to determine the candidates' ideas about how students learn from playing educational games.

Sardone and Devlin-Scherer (2009) found that having teacher candidates learn to use games as learning devices facilitated a greater understanding of the teacher as a facilitator of learning rather than the source of knowledge. This led teachers to think about things such as student-centered learning and its effects on instructional strategies, resources, and values. Many candidates also found that their own perceptions of the games were often not the same as their students' perceptions of the games. For instance, games that the candidates did not enjoy were often games that the students found the most enjoyable. This study also found that games could engage students, foster positive attitudes toward learning, enhance focus, and encourage collaboration, competition, and involved discussions.

This study is not free from limitations (Sardone & Devlin-Scherer, 2009). The sample for this study is small: only 24 teacher candidates. The open-ended aspect of the questions makes it difficult to quantify the data in an objective way. This study also focused on the teachers' perception of what is happening with students rather than asking students directly for their own perceptions.

Huizenga et al. (2009) performed a study on secondary students aged 12 to 16 in Amsterdam to measure motivation and learning through games. The study included developing

and using a game that engaged students in teamwork using mobile-handheld devices. The researchers contrasted the motivation and achievement of these students' with a control group of students who received traditional education through an examination. The data was collected through observation and students' exam scores.

The authors (Huizenga et al., 2009) found that motivation for the subject studied, history, did not vary significantly between the control and game-play groups. However, learning was significantly higher for the game playing group. Students who played the game scored higher on their in-class examinations in the knowledge aspect: 60% of the questions on their exams were correct on average, as opposed to 36% of the control group. Students who participated in the game consistently scored better across tracks than their peers who received traditional instruction. To clarify, students from the college-bound track did better after game play than the vocational students. However, students with little to no historical knowledge did better than students with more.

Methodological concerns include the fact that the study group received much more exposure to the knowledge in question than the control group did (Huizenga et al., 2009). Also, the researchers did not discuss the impact of prior student game experience on learning. The length of the game was not substantial enough to track changes in motivation accurately. Another concern noted by the researchers was that technical difficulties often contributed to how much information students were capable of gathering in one day.

Two researchers (Chen & Ismail, 2005) investigated student learning in experiential learning simulations. Using a sample drawn from Malaysian driver's education students between 15 and 18, they used test scores and questionnaires to measure student response to a new learning environment: virtual reality simulated driving experiences.

Chen and Ismail (2005) found that virtual reality learning yielded the highest positive results across learning styles, but only when paired with guided exploration. The results indicated that when a learner receives a large portion of new information, they are not able to process all of it at once. In an instance such as a game, a student focuses more on learning the rules of the game than on learning what the game has to teach. Without the guided exploration, students did not succeed above the levels of students who received traditional instruction, and the discrepancy among learning styles remained intact.

This study (Chen & Ismail, 2005) had a few shortcomings. One was that the article did not describe the method used in the virtual reality instruction. Without this, it was difficult to attribute if the method was responsible for the results or if it was the actual virtual reality.

Wang and Chen (2010) studied the impact of games on learning computer programming on a sample of Taiwanese students aged 11 to 14, and used test scores a questionnaire to track learning and motivation. The game utilized a simulated experience wherein the user had to have the correct programming term to further progress, such as moving a train along a track using the appropriate code. The researchers also inserted a matching-game into the simulated experience to benefit concept clarification.

The authors (Wang & Chen, 2010) found that interrupting game play with the matching game decreased student motivation and disrupted game flow, but also increased student performance later. Therefore, a negative correlation existed between game flow and concept clarification. Early in the study, students were asked to list their favorite games and why they liked them. From this question, the researchers divided students into two groups: challenge-preference and other-preference. All students reported engagement from game play, regardless of gaming style preference. However, matching learners' game preferences to the style of

gaming used was not indicative of student performance. For instance, the students who preferred challenging games did not actually do better on their final project than the students who did not prefer challenging games.

A few concerns exist in this study (Wang & Chen, 2010). No comparative data exists from which to contrast this study's results because there was no control group. Knowing a comparable group's achievement would help to strengthen this study's validity.

To summarize the findings on games and learning from the research reviewed above, games are useful to student learning. Students found games motivating even at the uppersecondary level and did better with them than traditional instruction (Ajibade & Ndubaba, 2008). Games engaged students, fostered positive learning attitudes, increased focus, encouraged collaboration, and enhanced discussions (Sardone & Devlin-Scherer, 2009). Learning through games increased student knowledge regardless of educative track (Huizenga et al., 2009). Discrepancies based on learning styles were not present in game-based learning (Chen & Ismail, 2005). Abstract concepts were easier to apply when learned through games (Wang & Chen, 2010).

Simulations

This section of research will focus on on simulation experiences and their affects on student learning. Simulations allow students to interact with ideas through their bodies. Simulations can include use of manipulative materials, model creation, or drama-type activities (Vaughn et al., 2011). This section will focus on drama-type activities. These kinds of simulations offer students the capability of creating and transferring abstract concepts and developing critical analysis skills.

A researcher (Dorion, 2009) observed several United Kingdom science classes to focus on the ways that improvisational drama exercises could affect a science classroom. Students were between 14 and 18 and simulated various physical and social situations. The researcher used observation, interview, and discourse analysis—an analysis of conversation—to track results.

Dorion (2009) found that using drama increased social interaction, fun, and humor—all of which participants stated are not present in traditional classrooms. Therefore, students found this form of education to be engaging. Dorion also found that students developed ideas and connections fluently. Students found these activities more accessible and that the physical activity made the abstractions of science more concrete. This made it easier for students to transfer their understandings to other circumstances. In addition, students perceived these activities to be a way of democratizing the classroom: the activities created a community that developed an understanding together rather than separately.

Methodological concerns about this study include that there was no numerical data with which to verify the validity of the researcher's claims (Dorion, 2009). Also absent was a list of the teachers' objectives and how the drama activities met them. The author did not describe the activities, making the replication of these results difficult.

Gallagher and Lortie (2005) wanted to observe if drama could counteract the effects of increased surveillance on students. The researchers staged critical dramas with students aged from 14 to 18 from Toronto and New York. A critical drama is an improvisational activity in which the premise mirrors the oppressive circumstance of the participants. The researchers observed and analyzed the drama, and the reflection activity that followed it, to track student

response. The critical drama was adapted from Paulo Freire's concept of critical literacy by Augusto Boal (Boal, 1974/1985).

The authors (Gallagher & Lortie, 2005) found that students' awareness of their own reality included the implications of increased surveillance on themselves as inner city, at-risk youth. Critical drama offered a cathartic outlet that mirrored reality and offered realistic ways to resist without being submissive or aggressive. These methods offered students new and creative ways to interact with their oppressors and their reality: it improved their critical thinking and interactive skills.

This study still has methodological shortcomings (Gallagher & Lortie, 2005). The authors focused on critical pedagogy theory rather than their own research. In addition, the researchers only documented a singular critical drama when more would lend this study strength.

This review of the literature on simulations concludes that simulations are beneficial to student learning. Simulations assisted students in concept transfer and engaged them with not only the material, but also each other (Dorion, 2009). Students were better able to explore their own options within their respective realities through simulations, engaging their thinking in new and critical ways (Gallagher & Lortie, 2005).

Computer Explorations

This section focuses on the ways that utilizing computer explorations benefit student learning through language development. Computers can be useful tools for language growth (Vaughn et al., 2011). Technology is a major factor in students' lives. Many use the internet daily for various purposes. This section will use the term computer explorations to mean any computer-mediated communication method. The first article will focus on why utilizing computers and new literacy is relevant, while the second will focus on how to utilize this resource to maximize student learning.

A researcher (Berg, 2011) developed an observational strategy to see how adolescents' literacy adapted to information and communication technologies (ICT). She selected students from a mid-sized United States town between the ages of 11 and 18. The researcher observed and analyzed students talking around computers in the Young Adult section of a public library.

Berg (2011) found that adolescents used ICT in five ways consistent with traditional literacy: text as reference, text as authority, text as experience, text as expression, and text as instrument. In other words, students referred, cited, engaged, exemplified, and accomplished using internet materials. This study also found that computer use and literacy should not occur in solitude, but rather as a group activity consistent with the social nature of language development.

However, there are still drawbacks to these conclusions (Berg, 2011). This study relied entirely on non-digitally recorded evidence from a solitary observer. Therefore, it is possible that the study incorrectly identified what was occurring in the adolescents' interactions.

Satar and Özdener (2008) observed several Istanbul, Turkey, English classes to measure alternate methods to increase student language proficiency and lower student anxiety about foreign language learning. The researchers selected participants from a sample of females between the ages of 16 and 17. The students were broken into three groups: one used voice computer-mediated communication (CMC), another text CMC, and the final group acted as the control. The study utilized questionnaires and test scores to track results.

What the study found was that both the voice and text chat groups improved their speaking proficiency over that of the control group (Satar & Özdener, 2008). Students reported

significant decrease in speaking anxiety only when part of the text chat group. The voice chat group felt the strongest that their speaking skills had improved, whereas the text chat group felt the strongest that their writing skills had improved. Most students from both the voice and text groups found that working with someone they knew helped them to communicate.

Satar and Özdener (2008) stated some of the methodological drawbacks of this study. All subjects were female. Also, one of the researches was also the English teacher of all the students in the study. Another feature that might have lent strength to this study would be a group that used both voice and text chat to track measure if both methods were mutually beneficial to student learning.

To summarize the reviewed literature on computer explorations' benefits to student learning, computer explorations can facilitate student learning through language development. Students used computer-mediated literacy in ways that were consistent with the literacy they learned in school, including referentially, authoritatively, experientially, expressively, and instrumentally (Berg, 2011). In other words, computers assisted students in developing traditional literacy practices and in transferring those skills to a different medium. Computers facilitated language experimentation and growth in new areas and lessened communication anxieties (Satar & Özdener, 2008).

Practicum Experiences

This section will deal with articles about the effect of practicum experiences on student learning. A practicum experience is an outside of the classroom learning experience in which a student learns items in context. Much like games and simulations, these experiences create a shared basis for learning, but the difference is that these situations are the learning (Davis et al., 1981). This section only includes one article dealing with these types of experiences.

Goodman (2010) observed several New York City students who repeated the eighth grade more than once and the effect that producing a documentary had on upon them. The sample students were between ages 15 and 18 and at a high risk of dropping out. These students needed new ways to interact with the necessary materials as normal classroom practices and traditional methods were not assisting them to success. The study utilized observation and discourse analysis.

The author (Goodman, 2010) found that students learned much better in context. Students learned discourses outside their own in both reading and writing. Students were motivated because they were allowed to choose the topic of the documentary. Students developed new literacy practices such as questioning, predicting, synthesizing, and summarizing. They also developed skills in determining importance and inferring. The practical situation in which the students were working allowed for a context separate from traditional schooling and more relevant to reality. This context required them to deal with shifting variables and openended problems, not dry and inapplicable problems from a book.

This study (Goodman, 2010) is not without fault. As a case study, there was no numeric data to draw from. The sample group for this study was very small—only eight—and is not directly applicable to a target audience. In addition, there was no prior data about the students from which to contrast their progress.

To conclude the review on learning and practicum experiences, practicum experiences are beneficial to student learning. Students learn in new information in context and it is flexible and open-ended (Goodman, 2010). Students learn problem-solving strategies that are necessary for real-world interactions.

Conclusion

The findings from the previously reviewed literature on games, simulations, computer explorations, and practicum experiences illustrate that these methods are beneficial to student learning. Students find games motivating, prefer them to traditional instruction, and benefit from them on their exams (Ajibade & Ndubaba, 2008). Games assist students with engagement, discussion, and a positive attitude toward learning (Sardone & Devlin-Scherer, 2009). Students from both high and low tracks do significantly better with game-learning (Huizenga et al., 2009). All learning styles do well with games (Chen & Ismail, 2005). Even difficult and abstract material becomes more applicable through games (Wang & Chen, 2010). Students are also more capable of transferring ideas and concepts learned through simulations (Dorion, 2009). Simulations encourage students to expand their thinking in new and creative ways (Gallagher & Lortie, 2005). Computer explorations help students to expand upon literacy practices (Berg, 2011). Computers offer students the opportunities to experiment with language use (Satar & Özdener, 2008). Practicum experiences, or in-context learning experiences, facilitate the development of relevant problem-solving strategies (Goodman, 2010).

With so many affirmative responses to interactive forms of instruction, it is a wonder that teachers are not implementing them as much as they could. As Au (2009) illustrated, teachers are trying to get their students to pass their tests, but students are not succeeding. If using these methods does indeed increase test scores—as the information presented demonstrates—teachers should begin to implement these methods as soon and as often as possible. Instructors can incorporate both digital and non-digital games into the curriculum as a learning activity, including games they designed themselves or games that others have already created. Teachers can also use drama activities both improvisational and planned. Students can participate in

social simulations, physical simulations, and critical drama simulations to increase their likelihood of knowledge transfer. Instructors can also allow students time in class to communicate through computer technology to help improve their language development. They can also utilize students' online text use to create curricular connections, such as recognizing illreputed sources. Finally, teachers can also venture out into the community and develop opportunities for students to learn a new skill in context outside of the classroom.

Much more research is needed on of the impact these methods have on student motivation, classroom management, engaging disenfranchised students, or absence rates—all areas that could be positively affected with these forms of learning. In addition to researching these segments of the effects of interactive instruction, researchers will also need to pay attention to income and racial statuses of their test subjects. Most of the studies cited in this review deal with Caucasian students. As dropout statistics show, Caucasian students are graduating more often than students of color, especially Black and Latino students (Burrell, 2010). To see if these methods are effective for all, research must study how these methods affect students of color. Another factor of concern is exposure to technology. Wealthier students have more exposure to computers, digital games, and handheld devices than lower-income students. More research is needed to see if this predisposes wealthy students to being more successful with these forms. Classroom leaders will need to keep themselves abreast of new research in this field, but will be able to reap the benefices of using interactive instructional methods with their students quickly, and their students will enjoy those methods more as well.

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Sociomathematical Norms and Practices that Help Support and Develop Mathematical Understanding for All Students during Mathematical Discourse

Emily R. Statler

Abstract

Conducting mathematical discourse in the classroom is a strategy suggested by the National Council of Teachers of Mathematics to engage, motivate, and include students in their mathematics education with the goal to strengthen mathematical understanding for all students. Yet this seems to be quite a challenge. This literature review addresses the question: what sociomathematical norms and practices help support and develop deeper mathematical understanding for all students during mathematical discourse? The three themes that emerged from the literature and are explored in this study are sociomathematical norms, teacher practices, and student practices. Studies were drawn from international and United States research, elementary to college students. Most studies included populations of diverse students, some with a majority of English Language Learner students. The findings of these studies indicate that mathematics discourse requires a culmination of reform based beliefs, practices, and intentions on behalf of both the teacher and students. Sociomathematical Norms and Practices that Help Support and Develop

Mathematical Understanding for All Students during Mathematical Discourse

While student teaching in a first grade classroom, I experienced feelings of being overwhelmed, under prepared, and sometimes at a complete loss about facilitating meaningful discourse that would support my students deeper mathematical understanding. I worried about my many ELL students. Could they hold or understand discussions in English around mathematics? I was concerned about my students who came from cultures that expected children to be seen and not heard or that felt discussing their ideas might be perceived as bragging; how on earth could I get them to express and share their knowledge or questions? What if a child gets pointed out or made fun of by their peers for not knowing the answer? What does it even look like to have a classroom discussion around mathematics in elementary school? Who does what? I found that I am not alone in these feelings, as I attended after-school math workshops with other teachers who expressed the same thoughts. I also broached this subject quite often while working with my mentor teacher and our first grade team.

The National Council of Teachers of Mathematics (NCTM) states that "all students need to learn a new set of mathematics basics that enable them to compute fluently and to solve problems creatively and resourcefully" (2000a, p. 1). Although teachers are well informed of the desperate need for math reform, the time constraints, attending to the different cultures represented in the classrooms, and mandated curriculum can leave one feeling like they would rather just hand out a worksheet and help kids as they can.

Teacher beliefs can deeply influence classroom norms established. The NCTM (2000) asserts that students are deeply impacted by the teaching they encounter in schools; it affects their mathematical understandings, flexibility, and their personal feelings of mathematical

competency. The achievement gap will continue if basic skills continue to be the mark of mathematical understanding. Low academic mathematical success of African American and Hispanic students is related to their experiences in their classroom (White, 2003). Therefore, until teachers reflect on their own practices and ask themselves if they are guiding *all* their students toward flexible thinking around numbers or if they are the leaders of teacher-centered math lessons, there will not be much growth for teachers or their students.

Probing through the research, I discovered that mathematical classroom discourse id one of the cornerstones to bringing students to higher mathematical understandings. The NCTM Principles and Standards (2000) state that the successful execution of mathematics education reform calls for teachers to significantly change traditional teaching practices, and create a discourse community in their classroom. However, I heard many conversations in the staff lounge and during Professional Learning Communities [PLC's] that group work and classroom discussion was impossible to do in elementary school where basic academic skills need to be the primary focus. There was much discussion about the time involved with class discourse. I heard comments about how creating math-talk communities was not the way they had ever taught mathematics so they were not the problem (the students and/or their parents were) and that students of low socio-economic-status or ELL status could never wrap their heads around the higher level of thinking needed to engage in discussion. The NCTM also addresses this issue in their Principles and Standards stating: "The vision of equity in mathematics education challenges a pervasive societal belief in North America that only some students are capable of learning mathematics" (2000, p. 12).

The assertions from the NCTM do not seem to make this issue any less daunting to tackle; therefore, the question I set out to answer in this literature review is: what

sociomathematical norms and practices will help support and develop mathematical understanding for all students during mathematical discourse?

Mathematical discourse for the purpose of this paper will be defined as: connected, meaningful discussions, that are mainly teacher facilitated but are mostly student-to-student talk, that elicits student ideas, questions, misunderstandings, and conclusions based on mathematical thought.

The studies suggest that productive sociomathematical norms, teacher practices, and student practices are the core to creating a venue for meaningful and productive discourse that serves all students. While many of the following studies do discuss discourse patterns, questioning techniques, and levels and components of discourse, the emphasis of this paper is to highlight the aforementioned core of classroom discourse strategies: classroom sociomathematical norms, teacher practices, and student practices in each article. For the purpose of this paper *productive* sociomathematical norms will be defined as: The sociomathematical norms that are heading in the direction that current math education research literature suggests support student thinking, reasoning, and self-efficacy. For example, when a teacher asks for a student to explain their thinking, but accepts a list of steps, that would not be a *productive* sociomathematical norm. If the teacher insisted on that the explanation including reasoning and justification, we would consider those classrooms as having a *productive* sociomathematical norm around the phrase, 'explain your thinking' (A. Lenges, personal communication, (February 21) 2012).

Math-talk, discourse, and discussion will be used interchangeably throughout the paper. Teacher practices will be defined as the roles, beliefs, and work the teacher takes on to facilitate

classroom discourse. Student practices will be defined as the roles, beliefs, and work the students are expected to put into the classroom discourse.

As stated earlier, there are many techniques in facilitating effective math discourse that will lead students to deeper mathematical meaning. Many of the following studies include important elements of mathematical discourse worth knowing and practicing. But the focus will be classroom sociomathematical norms and teacher and student practices that support productive discourse. The studies are listed within the aforementioned subtopics.

The studies reviewed here range from elementary to college level mathematics classrooms and span different regions of the United States, to Canada, to French-speaking Switzerland. While my emphasis is American Elementary Students, I believe that wherever students live, whatever the age, relevant lessons can be gleaned from attempts to elicit mathematical discourse.

Literature Review

Sociomathematical Norms

This literature review will begin by looking into four research studies that describe sociomathematical norms, as productive sociomathematical norms are central to developing productive classroom discourse, and will examine how these norms are developed, integrated and pursued for mathematical discourse in particular. By first examining sociomathematical norms, I establish the features of a classroom culture that are necessary to support high-quality discourse. Then research studies that explicate the role of the teacher in establishing discourse communities will be examined. Finally, the student roles in effective mathematical discourse communities will be inspected. The paper begins with the study by Kazemi and Stipek (2001)

who clarified the differences between sociomathematical norms and standard social norms of the classroom. This study lays the foundation of the mathematical norms that need to be established for students to attain deeper mathematical understanding.

In their research study, Kazemi and Stipek (2001) carefully contrasted classrooms to learn subtle differences in "press for learning" between classes that seemed to implement inquiry pedagogies and how teachers can foster student participation in a classroom where conceptual understandings are appreciated and developed. Their study focused on four sociomathematical norms: 1) students description of their mathematical thinking; 2) students comparison of the mathematical concepts around different strategies; 3) student consensus through group discussion/mathematical argument while holding themselves individually accountable for participation; and 4) students and teacher use of mathematical errors as a gateway to discussion furthering deeper mathematical understanding. Distinctions were made between high-press and low press classrooms. High press classrooms were those that demanded students to use mathematical explanations, justifications, and argument. The sociomathematical norms in lowpress classrooms did not insist upon mathematical explanations, justifications, or arguments. These classrooms utilized norms of students describing their thinking, students providing multiple ways of solving problems, learning from mistakes, and student collaboration – without mathematical reasoning.

The participants of this study were four teachers of fourth and fifth grade classrooms from schools in a large, ethnically diverse, urban setting in California. All taught the same lesson on adding fractions with fair-share multi-step problems. These lessons allowed students to grapple with equivalence and addition of fractions. Kazemi and Stipek (2001) began with a quantitative methodology of videotaping lessons then coding them using a scheme steered by

research on productive motivational techniques for engaging students in their lessons. The four teachers were selected according to their high score on this scheme with subtle differences. Then they used qualitative techniques for the completion of this study, which involved analysis of videotaped teaching for a period of two days for an hour a day. The focus of taping was group work.

The researchers found that sociomathematical norms such as expectations around mathematical thinking, engagement, and student interactions are more effective than basic social norms for students to attain mathematical understanding. Basic social norms are not as sufficient for engaging students in mathematical exploration.

The study did not seek to demonstrate how the sociomathematical norms were established, which is essential for understanding how one can go about building these kinds of community math-talks in their own classroom. However the authors do show what it looks like when sociomathematical norms are in place in a classroom and what positive affects that had on students' mathematical understandings.

This research implies that practitioners who understand the difference between sociomathematical norms that drive high press classroom discussion vs. sociomathematical norms that do not press for mathematical explanations, justifications, or argument may hold one of the keys to guiding students to deeper mathematical understandings. But how are these sociomathematical norms constructed and how do they vary from one classroom to the next? The next article addresses this issue.

Allal and Lopez's (2007) looked into how individual classroom communities develop their own, distinct microculture and how *that* microculture influences the teaching and learning that happens within its classroom. The two aims of the article were 1) to present the

sociomathematical norms recognized in a year-long study of problem solving in two third grade classrooms, which demonstrated how these norms acted as a structure within the microculture of each classroom; and 2) to present and deeply examine how sociomathematical norms were parleyed during group discussions and the implications for the regulation of students' problem-solving activity. Researchers observed two instructional sequences. They analyzed field notes, audio recordings of group discussions and interviews with teachers, and student worksheets. The participants consisted of two teachers and 34 students (17 in each class) who came from a range of socio-economic status, no students had any known learning disorders.

This research is significant to understanding how classroom community and norms directly influence the quality of learning activity that happens within its walls. The key research findings were that shared meaning-making involves a multitude of experiences that require a great deal of time and conversations between the students and the teacher. Students will develop deep mathematical understanding through conversations, which takes time. Multiple, lengthy conversations are valuable when trying to achieve this goal that the NCTM has laid out. The norms of mathematical discourse involving students and teacher affect the outcome of group mathematical discourse such as student understandings and preferred procedures. It has to involve students' thoughts, questions, puzzlement, etc. with proper and appropriate support from the teacher. The researchers made inferences about student thinking around the impact of group mathematical discussion without any input about it from the students, as they were not interviewed. This is problematic for the question of how they felt supported in their development of deeper mathematical understandings.

This study highlighted the importance of sociomathematical norms and how heavily these norms can affect the discourse within the culture of the classroom. It leads one to consider if

these norms will have to be taught to each new group of students, as they all might come from different experiences and might not know how to involve themselves in math-talk. Are there specific sociomathematical norms that will help guide and encourage students to participate in discourse in a natural and meaningful way? What specific norms help with the flow of discourse? The next article digs quite deeply into a specific sociomathematical norm that might help facilitate the natural flow of discourse.

Research by Clements, Dixon, and Egendoerfer (2009) questioned if the traditional norm of having to raise one's hand to engage in discussion was necessary for productive discourse in a mathematics classroom. Does attending to that norm hinder the flow of natural conversation? The questions they sought to answer were 1) whether there were effects of student centered dialogue on whole class discussions and individual written work when students didn't need to raise their hands before speaking; 2) if students provided mathematical explanations and justifications during these whole class discussions; and 3) was there improvement in student's written explanations.

The participants were a veteran second grade teacher and a heterogeneous group of sixteen second grade students: nine girls, seven boys; ten were Caucasian, two Hispanic, one Asian, one African American, and two of "other ethnic backgrounds." There were four ELL students, five various, undisclosed Individual Education Plans, and one gifted student. This study used qualitative methods of research. Students participated in individual videotaped interviews at the beginning and end of the study. Videotaped discussions in classroom for three weeks, dialogue was also observed, then the new norm of not raising hand was implemented, then classroom interactions were videotaped for four more weeks. Teacher journal, classroom

observations, video recording, and student daily journals were all analyzed. The study looked into only one classroom and their particular reaction to changing the pre-existing norms.

Clements et al. (2009) found that the quality of student-to-student talk improved with the new norm of not raising one's hand to speak. Students were able to alter their way of thinking as they explored mathematics with their peers. Student's ownership of ideas was evident in social interactions and written responses. The students' mathematical explanations and justifications also increased, providing evidence that their mathematical thinking skills were developing to a deeper level. While this was effective for this class, more research is necessary to predict if this would be effective for all classes. It also does not go into detail about the work involved to change these established norms.

This study (Clements et al., 2009) underscored the importance of teachers and students setting up classroom norms, specifically *sociomathematical norms*, which they referred to as "normative understandings of what counts as mathematically different, sophisticated, efficient, and elegant" (p. 1068). This gave the class a common ground from whence to start and proceed in perpetuating their mathematical ideas. This study also devoted much attention to teacher practice. The teacher learned to see themselves as facilitators of discourse, not leaders. This might have contributed to the enhancement of students' mathematical thinking, justification, reasoning, and conceptualization. Teachers payed attention to students' errors; in essence when students are incorrect; it is an opportunity for exploration that will lead to deeper understanding. Clements et al. (2009) also found that teacher beliefs are critical in effective mathematics classrooms. They found that teachers who were deeply rooted in pragmatic beliefs allowed students more prominent roles in their learning and make time for student-to-student discussion and working on problems as a group. Student roles were also discussed. The researchers stated

that students had become accustomed to the idea that their teachers would not be delivering their education; they would have to be active participants in it. The teacher stepping out of typical behaviorist style role leader to facilitator significantly improved student ownership, participation, and mathematical understanding for all students. Quality discourse can be scaffolded by developing or altering typical classroom norms that help engage, incorporate, and motivate students in becoming quantitatively literate.

The concept of rethinking typical American classroom expectations is very intriguing and the study findings call for attention to that issue; however, there is still the matter of mathematical argument. Some kids might be frightened or intimidated by the notion of having to argue and provide evidence that their mathematical positions are valid. It is possible that some students might consider arguing as an act of misbehavior. This poses the possibility that productive and meaningful argument is something that should be taught which leads to the research conducted by Wood, who looked into this issue.

Wood (1999) investigated the interrelationships among context, student learning, and the role of teaching. Specifically, she examined teaching characteristics that led to students resolving mathematical disagreements through argumentation. The participants of this qualitative study consisted of one teacher and her second grade class. The researcher observed 50 videotaped lessons of one teacher, who was participating in professional development sessions (NCTM compatible). She collected over eighteen months of data in the teacher's second grade classroom, which served as the data source for interpretive procedures. There were two sets of data used. The first set included lessons that took place during the first four weeks of the year, and bimonthly thereafter. The second set of data included lessons that occurred during the second half of the previous school year that incorporated instances of confusion or disagreement

during class discussion. Each lesson was videotaped, logged, and transcribed. A set of coding categories was used in each lesson log that was also taken as field notes.

Wood (1999) found that children were involved in learning what others expected of them in terms of participation as well as learned the content of lessons. The students learned how to behave in a new and possibly quite foreign mode of discourse. The study also outlined three types of expectation statements that the teacher used to set up classroom norms of argumentation: "Pay attention to what others say," "listen and try to understand," and "listen to see if you agree or disagree." Also outlined were three types of questions teachers and students used during class discussions: questions that asked students to provide information (i.e., "How did you do it?"), questions that asked students to give the reasons behind their thinking (i.e., "Why do you think that?"), and questions that asked students to justify their thinking (i.e., "Can you prove it?").

Wood's (1999) study supports the notion a teacher who establishes sociomathematical norms with their students can help them feel comfortable in engaging in the cognitive struggle that comes with classroom discourse that aspires for deeper mathematical thinking. The demographics of the classroom studied were not detailed in this study, which would have been helpful in understanding how these practices reached all students.

The studies up to this point explored the impact that sociomathematical norms had on productive mathematical discourse in the classrooms studied. The next section of research studies addresses the teacher practices that are involved in acting out these norms. The following three articles helped answer the question of what teachers need to know and do as practitioners to help support and develop number sense in all students during mathematical discourse. These teacher practices follow the category of sociomathematical norms because they discuss the

practices that teachers ensue while operating within productive sociomathematical norms. This section will begin with Caulfield, Harkness, and Seffen-Morrone (2004) who explored how teacher practices affected their students' conception of mathematical inquiry. Followed by two more studies that examine the practices teachers should consider when trying to implement discourse that supports and develops number sense for all students.

Teacher Practices

Caulfield et al. (2004) were interested in learning how discourse patterns related to students' mastery goal theory—an approach to learning with a focus on gaining new knowledge. They conducted a case study of 28 elementary education students in a *Mathematics for Elementary school teachers* class, examining "how does the instructional discourse in a social constructivist college mathematics course influence the perception of mastery goals in the classroom?"

The participants consisted of 28 elementary education students enrolled in an experimental mathematics course, *E495 Mathematics for Elementary School Teachers*, at a large urban university in the Midwest. The researchers conducted a qualitative analysis of coded text data from observation, experiment, and interviews with students that were videotaped and transcribed. The article relies heavily and bases all arguments on social constructivist theory and achievement goal theory.

Caulfield et al. (2004) found that social constructivist teacher practices promoted mastery goals through instructional discourse that supported students as they moved toward higher-order mathematical thinking. It is possible the reason the social constructivist practices were successful for meaning making, was because the practitioner *believed* that that students needed to be active participants in their learning and that students learned best through discussion with

their peers whether they were more experienced or not. This might have helped to stretch, deconstruct, and/or rebuild what they already knew. The teacher based their practice and role within the classroom and the discussions to carefully guide their students to deeper meaning through their own means.

The researchers also found that scaffolding, pressing for understanding, and higher-order thinking instructional patterns realized higher-order mathematical thinking. The teacher prepared proper questioning techniques that were well thought out and meaningfully constructed to guide students to deeper understanding. Teacher beliefs and practices were structured around a student-centered classroom, the teacher was flexible to their needs and questions as opposed to their own agenda, which might have been a catalyst in students being active and engaged through meaningful discourse with their teacher and their peers. Most student comments about the course were positive but several students complained of feeling uncomfortable about the "vagueness" of the class; they never received concrete affirmation that they reached the right answer.

The last key finding was that classroom discourse is helpful to student understanding, and in order for discourse to work productively; this study suggests that students first learn their roles and their teacher's role that function within the classroom norms.

While this research was about the change in college students' beliefs and perceptions about mathematical understanding, their point of view about their success and their struggles can be applied to what elementary students may feel. Especially those who feel they need concrete, black and white procedure and answers. This research also provided a successful pattern of instructional questioning and discourse procedures that were used which led to higher levels of thinking on behalf of the students, which leads another question about leading affecting class

wide math-talks: is there a place where a teacher can comfortably start that will guide them to further their student's mathematical development in a step by step process? The following article studied and provided a framework that might help to accomplish this.

Fuson, Hufferd-Asckles, and Sherin discussed levels and components of math-talk learning communities in their 2004 research that studied how a teacher, along with her students, went about establishing the sort of classroom community that could enact reform mathematics strategies. The participants of the study were two male and two female teachers, two of which were Latino and two were European American and their classes of first, second, third, and fourth grade students (one of each). The school they attended is a Catholic elementary school located in a working-class, Latino section of a large American city. Ninety-eight percent of students received scholarships toward their tuition. The majority of students spoke Spanish as their primary language and English as their second language. The study focused most closely on the third-grade classroom, and the class's second-year, bilingual, female teacher. This class was made up of 25 students, all of whom spoke Spanish at home.

The study used qualitative methodology; the researcher video recorded or audio taped classroom observations and bi-monthly teacher meetings. The second phase of analysis consisted of a case study of the third grade teacher, Ms. Martinez. This involved an analysis of classroom discourse, teacher interviews, and teacher meetings based on verbatim transcriptions of videotaped and audio taped recordings. Transcriptions from recordings described as accurately as possible, all spoken words from classroom observations. In addition to dialogue, the videotaped transcriptions contained descriptions of behavioral contexts.

Fuson et al. (2004) described levels of trajectories that could serve as a guide for practitioners trying to implement a math-talk community that strive for practices that adhere to

mathematics reform: To move from level 0 to level 1, the focus was more on students' mathematical thinking as they arrived at answers and less on the answers themselves. To move from 1 to 2, there has to be an increase of expectations of students to take on substantial roles in the math talk learning community, and teachers must assist students in learning these roles. Moving from 2-3, involved increasing expectations on teacher's part that students would take central roles in the math-talk learning community; teacher gave them the space that they needed to take ownership of the roles, then teacher coached and assisted them as they became major participants in the math talk.

The researchers found that discussion of mathematical ideas presented opportunities for the class to reason, defend, and prove their conceptions to one another. Fuson et al. suggested that the framework presented in the study guided teachers to listen to their students, to draw out students' ideas, and encouraged students to listen to each other. The findings of the this study also implied that effective math-talk community can be developed in diverse, urban classrooms, even with students who are still learning English as long as class norms, teacher roles, and student roles were well laid out and supported throughout the trajectory of levels. This framework calls for a great deal of teacher preparation, belief in student ability, and action for teachers to provide their students with reform-based mathematics education that will deeply impact their mathematical understandings. The teacher in the case study portion of this study was able to make incredible gains in a complicated domain, which required a wide skill-set. It might lead one to believe that this work is easier than it seems.

This framework suggests that teachers do not have to start off as experts who know exactly what to do. Part of teacher practice is learning how to move from one level of discourse to the next. But teachers might want to know what kinds of questions they can ask that will

inspire student engagement and natural inquisitiveness. Will these questions be different than what a lot of teachers grew up with such as: "Who can come up and solve this problem on the board using the algorithm we have been learning?" or will it look quite different, are there questioning techniques they can learn to use?

Changing questioning tactics to elicit student autonomy was explored in an a study by McConney & Perry (2011). The researchers took the following questions into account: 1) how often do the teachers in the sample, using a traditional curriculum, employ discourse practices that could provoke intellectual autonomy in their students; 2) did the frequency of such discourse practices change as each teacher moved from a traditional curriculum to a reform-inspired curriculum; 3) what did this change look like; did the change reflect the suggestions advanced by the NCTM standards?

The participants were four female, fourth grade teachers in four different classrooms in three different schools: two in one (Foster and Jewel), one (Cross) in another, and then one (Silver) more in another in urban elementary schools. Three of the teachers were Caucasian, one was African American. Foster and Jewel's school demographics: 77% White, 17% Black, 2% Hispanic, and 4% Asian. Cross' school demographics: 90% White, 2% Black, and 8% Asian. Silver's school demographics: 44% White, 15% Black, 29% Hispanic, 11% Asian, and 2% Native American. The research was conducted using qualitative methods of coding schemes based on 38 videotaped lessons observed. The lessons were about equivalent fractions taped four or five consecutive days of each class's initial lessons.

This study defined student autonomy as students elaborating on their answers, justifying or challenging others' mathematical ideas, making conjectures and mistakes, creating alternative problem-solving procedures, applying math concepts to everyday events, and engaging in
discourse around mathematical concepts. The selected examples of communication between two teachers and students showcased the difference in teaching practices and questioning techniques when using reform based curriculum vs. traditional curriculum.

McConney & Perry (2011) found that the four teachers studied significantly increased the amount of autonomy-granting behaviors they employed in their classrooms when using a reform curriculum. This research suggests that these teachers, in attempting to align themselves with the curriculum, changed the way they questioned their students and allowed these students to navigate the material. Reform curricula can be a viable first step in changing the dynamics of a mathematics classroom, where teachers are encouraged to initiate and promote intellectual autonomy in their students though mathematical discourse. The researchers recommend that the focus on discourse techniques is paramount in achieving results outlined by the reform based curriculum they are attempting to enact. The researchers did push for the use of *Math Trail Blazers* curriculum, which is set up around the NCTM guidelines. Teachers may or may not be able to utilize such a curriculum in their practice so the questioning techniques observed in this study might not be so nicely laid out for them in their required curriculum.

Teacher beliefs, motivation, and practices are essential to reform in mathematics. Adopting reform based curricula can act as an excellent starting point in achieving this goal. Changing the dynamics of the typical math classroom is also important in bringing students in the United States to true mathematical understanding. Classroom discourse that is undermined by teacher's determination to bring all their students to deeper understandings is possibly a catalyst to change. But what about the students? What role do they have to play in all of this? Here the paper will move into its final section of Student Practices. The studies in this category

emphasize what practices students can partake in that will develop and deepen their number sense.

Student Practices

The following studies speak to all three components of sociomathematical norms, teacher practices, and student practices. But these three spoke to the importance of the role of the learner. What might the learner expect from themselves, their teacher, and their peers? What actions, beliefs, and expectations can they utilize to help develop their own number sense? More specifically, what does a teacher do when they want a discussion to end at a certain place while still being student centered?

O'Connor's (2001) research on mathematical group discussion examined how the birth of mathematical ideas in students was guided by class discourse around specific content. This study investigated the complex dynamics between the students and teacher and honed in on how a teacher responds to her student's needs with flexibility while keeping her end goal the focus of the discussion. This study looked specifically into discourse about fractions being turned to decimals but it is relevant to any mathematical content area, as the complexity of the teacher's role in group discussions and student interaction were the key emphasis.

This study's participants were a teacher and her 25 fifth grade students with the following demographics: 60% ELL, 85% low-socioeconomic status (S.E.S.) in a Project Challenge Classroom ("an intervention to help support higher mathematical understandings in students ELL or low S.E.S.). The research conducted was a qualitative case study of class mathematical discussion that was videotaped for three days.

O'Connor found that a "position-driven discussion" had a myriad of effects of student's abilities of thinking around mathematics including to think critically of mathematical claims,

questioning peers' techniques in problem solving, and making and revising mathematical definitions to sharpen a claim. O'Connor surmises that this kind of discussion speaks to student's inherent desire to take or reject a mathematical position. This exemplifies many of the expectations of student practices that help make mathematical discourse more effective. Students in this study were actively engaged, listening, able to argue their point-of-view, and also adapted their thinking to make room for or replace other mathematical conclusions or procedures.

Teacher practices that led to student responsibility were also discussed in this work. O'Connor suggested that teachers will have preparatory work to do before trying to facilitate a discussion with their students. Teachers who become well acquainted with the content they will be teaching can anticipate the questions, misconceptions, and possible positions students will take in exploration of mathematics. This study showed how the teacher considered how they were going to lead their students to explore the mathematical content via examples and counter examples. O'Connor stated that content acquisition and preparation of class discourse is timeconsuming but should be considered a prerequisite for guiding students to autonomy.

The establishment of sociomathematical norms was not described, which would have been useful to understand how the students learned to follow expectations of their practices or what would be appropriate or inappropriate arguing strategies with their peers. It does not give inside information about what students said they believed their roles to be or how they felt about their role. It did underscore the implications of successful classroom discourse leading to deeper mathematical understandings for ELL and low S.E.S students. The next article also addresses the needs of diverse students, as O'Connor's article did, in their article White (2003) continues the conversation about how students can be drawn into their mathematics lesson and why it is

important for them to participate in math talk in order to come to deeper mathematical understandings.

White's research (2003) focused on teachers who had used classroom discourse to support diverse students in their mathematical learning. This article specifically addressed the issues of diverse students in a math-talk community. The research set out to discover the nature and focus of teacher's classroom discourse and how teachers used whole class discourse to meet the academic needs of their diverse students. White used qualitative research methods that consisted of observation via audiotape and passive observer stance and individual interviews with teachers. The participants were two third grade teachers and their 49 racially and socio-economically diverse students in a large, urban school district.

White (2003) found that in order to help close achievement gap and to raise a generation that is quantitatively literate - which is a "habit of mind, competency, and comfort in working with numerical data" (American Association of Colleges and Universities [AACU], 2012) teachers can practice mathematical discourse that engages their students by a) valuing student's ideas, b) exploring student's answers, c) incorporating students background knowledge, and d) encouraging student-to-student communication. She suggests that the climate of the classroom affected the mathematic achievement of African American and Hispanic students and that norms that are carefully set up to do so will help.

White (2003) also found that some components to address when constructing sociomathematical norms are allowing students to be active in their learning, teaching them to avoid making evaluative statements about each other's thoughts/work, allowing them to incorporate their past experiences and culture into class discourse, student-to-student talk, and encourage student's to take a position based on critical thinking. The norms set up in this class

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required the teacher to keep her focus student-centered, not teacher-centered with repetitive tasks, remedial work, and conformity to specific strategies. The norms of discourse required students to engage with other students respectfully, remain focused, and bring their everyday lives and experiences with them into the discussion. This article gave examples of successful discourse strategies that help students take ownership of their learning, challenged them, and included them on the journey to deeper mathematical thinking, which in turn might help close achievement gap. This study was conducted by one researcher and it did not break down how the teachers involved made sure all students were included and participating, but the researchers asserted this was the case. Also, the researcher did not interview the students, which would have been helpful for the reader to make sense of what students thought their own roles in their own learning truly were.

So far the previous two articles in this subtopic of student practice discussed what the researcher(s) had assumed happened for the students, as they were not interviewed. However the next and final article gives insight into what students are feeling and thinking about their roles in classroom discourse, specifically their role as listener.

Hintz (2011), a Canadian based researcher, wrote an article about understanding the necessity and importance of the role of listening during mathematical discourse. The research began with the following questions: 1) what are the mathematical and interactional demands that students experience during mathematical discourse; and 2) what are the demands for a student in the role of listener? The participants for the study were a fourth grade class at an elementary school in a large district in the Pacific Northwest during the 2008-2009 school year.

Hintz used qualitative research methods for this study with 26 videotaped lessons, videotaped individual interviews with focal students, transcripts, and a collection of artifacts and

documents. This study also pinpointed on a particular student's experience as a listener with a micro-case study. This article is useful for practitioners who want to take the student's perspective and their specific role as listeners into account. The article does not describe how ability ranges were determined, nor does it explain how class discourse norms were established, which needs to be known in order to better understand the student's experience.

Hintz (2011) found that a range of mathematical and interactional demands occurred for students as listeners during mathematic discussions. The researcher also found that listening was an important form of participation; they suggested that just because a student was not leading or even contributing with talk, did not mean they were not learning from what their peers were saying. The student might have been engaging in a way that the teacher could not hear. It might be helpful if teachers believe that listening is a type of active participation in mathematic discourse.

Finally, the research of this study found that sometimes students may take on the role of listener in order to mitigate the risks of making public their misunderstandings. Teachers who are trying to facilitate mathematical discourse, might consider how many students are not comfortable publicly exposing themselves with errors. A productive sociomathematical norm can be built around the exploration of errors which will help students feel that even though their conclusions were incorrect or different, it is a starting point for mathematical exploration, not the end of the road. The information in this article can help teachers to better support students' access to equitable participation and can guide them to better orchestrate discussions that are mathematically productive for all students.

Conclusion

This literature review examined ten research studies about mathematical discourse. The research studied a variety of pedagogical practices and examples of mathematical discourse to see if they could identify differences and/or developments about what teachers did to guide students to deeper levels of thinking in mathematics. All of these studies sought to find mathematical discourse practices that inspired, engaged, and honored all students' mathematical ideas. Three subcategories were pulled out of these studies that I felt addressed the beliefs and actions educators and students can put into action to achieve productive mathematical discourse. These three subcategories attend to the question of this literature review which was: What sociomathematical norms and practices can help support and develop mathematical understanding for all students during mathematical discourse?

Research findings illustrated what teachers might consider carefully and conscientiously while setting up sociomathematical norms in their classrooms that will include and motivate their students. Pressing for mathematical explanations, justifications, and/or arguments are a component in guiding students to deeper mathematical thinking (Kazemi & Stipek, 2001). Research also found that teachers who were prepared and willing to practice lengthy episodes of discourse often had more success in helping their students fully engage in student-to-student meaning making (Allal & Lopez, 2007).

Another facet of sociomathematical norms examined in the research is that some norms typical in classrooms may need to be examined. Classrooms that allowed students to speak amongst one another without having to be called on by the teacher to share, showed that student's ownership of ideas improved as did their ability to alter their mathematical thinking

(Clements et al., 2009). Finally, students can learn how to behave in new and different modes of discourse if they are taught how to do so (Wood, 1999); which suggests that this is a practice that can be implemented in all classrooms, if the teacher sets the sociomathematical norms appropriately.

Three studies lay under the umbrella of *teacher practices*. These three studies suggested that teachers who embraced the role of facilitator with well planned questions were more inclined to follow NCTM recommendations that benefit all students (Caulfield et al., 2004; Fuson et al., 2004; McConney & Perry, 2011). One of the studies found that scaffolding, pressing for understanding, and higher-order thinking instructional patterns realized higher-order mathematical thinking (Caulfield et al., 2004). Another study examined how teachers and their students established the sort of classroom community that could enact reform mathematics strategies. Teachers who facilitated, rather than lead, discussions and slowly allowed their students to take more responsibility for discussing amongst themselves, presented opportunities for their students to reason, defend, and prove their conceptions to one another (Fuson et al., 2004). Further more, teachers can implement questioning tactics that can inspire student autonomy (McConney & Perry, 2011).

Finally, the literature review highlighted student practices that foster more effective mathematical discourse. Students who expected to interact during group discussion and were guided by "position-driven discussions" naturally felt inclined to engage and learned how to think critically, question peers, and sharpened their mathematical claims (O'Connor, 2001). Research also suggested that diverse students are best engaged when classrooms value their mathematical ideas, explore their answers, incorporate their previous knowledge, and encourage student-to-student communication. Hintz (2011) provided an inside perspective of a student who

embraced the role of listener in mathematics discourse, this research suggested that listening is more complex that it may seem. While a teacher might assume that students who do not partake in conversation are not learning, they might consider that the student is participating by taking in new knowledge and that the "participation" might be happening in the students mind as they are reconstructing their mathematical ideas.

Abstract

The findings of research in this paper have helped me to formulate ideas of navigating mathematical discourse strategies in the classroom to best serve all students. Beyond this literature review it would be important to learn how a new teacher learning the ropes of this practice might receive support from more experienced colleagues. Would a mentorship inside the classroom be helpful while learning how to facilitate mathematics discourse? Also, because many studies in this review discussed the use of reform-compliant curriculum, it would be helpful to know how to implement questioning techniques and discourse practices while maintaining compliance with district mandated curriculum that was not reform-based. Finally, a look into more research studies that interview and take the student's perspective into account so that a teacher may better plan for the frustration or misunderstandings that might ensue around classroom mathematical discourse would be beneficial to all. More research in these areas would help teachers become the facilitator of mathematical discourse that will support and develop deeper mathematical understanding for all students.

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What are Effective Teaching Strategies that Support Students' Motivation toward Learning?

Katrina Stern

Abstract

This literature review examines the question: What are effective teaching strategies that support students' motivation toward learning? The strategies that surfaced within the studies are organized into two broad themes: social interactions and instructional practices. The general findings of the studies reviewed indicated that the development of positive social interactions among peers, with teachers, and the greater school community all support students' motivation to participate in school activities and in their own learning. It was also found that instructional practices that foster student autonomy, self-efficacy, decision-making, and personal connections to the curriculum would raise students' motivation for learning and in some cases academic success. Tasks that challenge students and demand inquiry-based skills also contribute to student motivation. This review of literature is concluded with a discussion of how these practices can effectively be utilized by teacher and implemented in the classroom.

Currently, high-stakes testing is driving the environment of our education system. This has put an incredible amount of pressure on schools to perform "well" on state mandated tests as the threat of loosing funding increases. Local autonomy in terms of curriculum, educational practices, and even hiring decisions are at risk. With such high stakes at hand, the pressure rises for both teachers and students alike. In turn, an atmosphere of anxiety surrounds classrooms and schools. Findings of a study that explored effects of different instructional approaches on early learners reported that students who were in programs that focused more heavily on achievement had higher anxiety and fear associated with school (Stipek, Daniels, & Milburn, 2005).

While student teaching, I encountered a number of students that through conversation and observation indicated that they simply did not care or have motivation for what they were learning, and they did not want to participate in associated activities that were expected of them. These students were also the ones in their class who scored lowest on the Accelerated Reading and grade level math assessments. I also witnessed and heard many stories of teachers who gave instruction on rote skills and tasks with the goal of increasing test achievement. I believe this focus on memorization for testing leaves students with negative associations with learning and that this type of instruction seriously deters students from having motivation towards the pursuit knowledge.

For the purpose of this literature review motivation is defined as ones' own personal desire to learn and understand or know how to do something in order to fulfill a desire or need. Everything we do in life is driven by motivation. It is what pushes us to work hard, to seek knowledge and understanding about our environment, to challenge others and ourselves, and it reminds us of our aspirations. Motivation comes from our desire to pursue goals and then utilizes our natural human capacity to direct energy, attention, concentration, and imagination

towards achieving them (Ginsberg, 2005). When we see the possibility for personal success in one form or another, we can access that motivational energy and channel it towards learning.

As a future educator it is my goal to find ways of navigating our education system in such a way that students are still supported and encouraged to be self motivated and interested in their own learning while gaining the skills that are needed to perform "well" on necessary standardized assessments. In the following literature review I will explore the question: What are effective teaching strategies that support students' motivation toward learning?

From the research I reviewed, the two main trends that surfaced included social interactions and specific teaching practices or models. I will discuss the findings of 10 research studies that range from 1993 through 2008. Each study offers various teaching strategies within the context of the trends that appeared. Discussed in each review are the aims of each study, the participants included, methodologies used, findings, and any limitations that arose. In the conclusion, the implications for teaching will be discussed as I hope this will benefit my own as well as others' teaching practices.

Literature Review

Social Interaction

A number of the research studies suggested the development of social interactions as a necessary component of accessing student motivation for learning (Battistich, Solomon, & Delucchi, 1993; McCaslin, 2008; McQuillan, 2005; Ryan & Patrick, 2001). The term social interactions refers to the way in which students communicate and participate in their school environment; with teachers, peers, and their school as a whole. The studies I reviewed explored the effects and connection between student motivation and social interactions. Social interactions explored include interpersonal validation, cooperative learning groups, social

efficacy, autonomy, and sense of belonging within the school community. I will discuss these factors further as I describe the studies and their findings.

In a longitudinal study, Ryan and Patrick (2001) examined students' perceptions of their social environment in connection with changes in motivation and engagement when students moved from seventh to eighth grade. Participants of this study included students from 30 different math classes taught by 15 teachers. This study followed 233 students from three ethically diverse middle schools through their transition from seventh to eighth grade. Participants included 55% African American students and 45% European Americans. The schools described their students as coming from primarily working class families, with 40% receiving free and reduced lunch.

Participants of the study were given surveys in two waves: one during seventh grade in the spring and the other during the fall of the students eighth grade year. Four dimensions of social interaction were used as the measures for this study: 1) teacher support, which was characterized as providing care, friendliness, understanding, dedication, and dependability; 2) promoting interaction, referred to the extent that a teacher encouraged interactions such as students sharing ideas, small-group work, and peer help-seeking and giving; 3) promoting mutual respect, which was described as establishing and maintaining a level of safety and comfortability surrounding social interactions and making mistakes; and 4) promoting performance goals, which is explained as the perceived emphasis placed on academic performance. Along with the four dimensions of social interaction were aspects of student engagement and motivation that were used as measures of the survey. These included social and academic efficacy, selfregulated learning, and disruptive behavior.

The findings showed no measureable difference in motivation and engagement from the transition between seventh and eight grade. Also, prior achievement, gender, and race were not a factor in the variations found in the results. In terms of teacher support, when students perceived their teacher to be caring and supportive this raised students' level of confidence, promoted selfregulatory learning, increased social-efficacy, and lessened off-task as well as disruptive behaviors. Students' academic efficacy was however not indicated as being connected with teacher support. When teachers encouraged social interactions among students this did improve motivation and engagement factors. It was also found that when providing learning activities that included social interactions, the level of disruptive behavior did not increase. Students' academic efficacy and self-regulation of schoolwork increased when students perceived their teacher to foster an environment of mutual respect where their ideas were respected and where their teacher discouraged students making fun of one another. Looking at performance goals, the findings indicated that when students' performance was compared with others, there was a greater likelihood that students would engage in disruptive behaviors. Students also reported having low academic efficacy when an emphasis was place on performance goals.

One of the limitations of this study was that the method consisted of a two-part survey given once at the end of the participants seventh grade year and then again at the beginning of their eighth grade year. This may have been a factor in the lack of change that was shown in the findings from one year to the next. The study may have had greater change in results had there been a follow up of the survey later on in the students eighth grade year. Also, it would have been beneficial to include an observational component to examine social interactions. The use of a survey relies on individuals to rate their own feelings, actions and behaviors, which may or may not have provided accurate perceptions.

Teaching Toward a Better World

In another study regarding small-group learning experiences and their relationship to various social and academic outcomes, Battistich, Solomon, and Delucchi (1993) examine the frequency and quality of students' cooperative interactions. Participants included both students and teachers from 18 fourth through sixth grade classrooms from four different schools within two districts in the San Francisco Bay area. One of the districts was set in a suburban area and consisted mainly of white, middle to upper-middle socioeconomic status families. From this district, there were five teachers and 107 students from sixth grade classrooms who participated in this study. An urban area housed the second district, which was ethnically and socioeconomically heterogeneous. The participating schools had populations that ranged from 50% to 70% Hispanic students. Altogether, 264 students ranging from fourth through sixth grade and 13 teachers participated in this study.

The measured outcomes were obtained through questionnaires that were administered to the participants. Measures included social values, relationships with peers, and perceptions of the school environment. Results of reading comprehension and standardized achievement tests were also used to measure academic achievement. In conjunction with the questionnaires and achievement tests were classroom observations, which aimed to investigate students' participation within small-group interactions in terms of their frequency and quality.

Over the course of one school year, observers made unannounced visits to each of the participating classrooms periodically. Each visit lasted approximately two hours. Observers spent time watching small-group work and rated their interactions based on four characteristics: 1) friendliness within the group, which was indicated by the presence of pleasant conversation, smiling, laughing, affectionate gestures, and a lack of negative behaviors; 2) how helpful students were with each other, demonstrating that students checked to make sure other group

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members were understanding the materials and task; 3) collaboration among group members, which was indicated when groups were working together toward a common goal; and 4) showing concern for one another, demonstrated by supportive, appreciative and encouraging behaviors.

The findings indicated that the quality of group interaction influences the effectiveness that cooperative learning has on students. Simply providing group-work experiences did not lead to positive outcomes in both social and academic outcomes. Group interactions that were considered to be high-quality were associated with an environment that raised student enjoyment of school, indicated greater concern for others, showed stronger self-esteem, and increased intrinsic motivation. In high-quality group interactions members supported one another by being friendly, helpful, showing concern for others, and working collaboratively. It was also found that high-quality group interactions were associated with greater achievement on standardized tests.

The authors of this study suggested that students who experienced low-quality group interactions might have had teachers who did not have the skills to support components of high-quality group work. The data from this particular study did not support this claim. However, it was a possible consideration as to why groups exhibited low-quality interactions.

Social interaction also includes dynamics of community building. Looking at the impact that the school community has on students', Battistich, Solomon, Kim, Watson, & Schaps (1995) explored the research question: what are the relationships between *(look this up)* students' sense of school community, poverty level, and student attitudes, motives, beliefs, and behavior among elementary schools? Four questionnaires were administered to students and teachers over the course of a year. There were 24 geographically and ethnically diverse elementary schools, grades three through six within six school districts that participated in this study. Schools were

from suburban, large, and small communities spanning from the West Coast to the South, Southeast, and Northeast areas of the United States. Overall, participants were 48% White, 22% African American, 21% Hispanic, 7%Asian, and 2% Native American/Alaskan Native. The mean percentage for low socioeconomic status, based on the number of students who received free and reduced lunch, was 27% across all schools ranging two to 95%.

Student questionnaires looked at three domains of school as a community: 1) academic attitudes and motives; 2) social and personal attitudes, motive, and behavior including concern for others; 3) academic performance. Teachers from each of the participating schools also completed questionnaires that included three components of questions: 1) caring and supportive interpersonal relationships in the classroom; 2) caring and supportive relationships throughout the school; and 3) student autonomy and influence on classroom norm setting and decision-making.

This study found that schools with a high-poverty population who demonstrated a sense of community showed greater levels of attitude and motivational outcomes along with a held set of values with the support to maintain them. The measured outcomes were not greatly significant. However, it is possible that with a stronger instrument of measure or through the use of multiple methods the outcomes could have shown more significant findings.

The values that were displayed consisted of showing mutual care, concern, and respect for others, valuing and providing opportunities for individuals to make contributions, and each member of the community being invested in the group as a whole. It was also showed that establishing a caring community may offer compensation for the lack of support and status that exists for students outside of school and may help develop motivation and guidance that might not otherwise be available, especially to lower socioeconomic status students. The authors of

this study suggested that fostering school, as a community is a useful tool for improvement on multiple levels. The emphasis of social relationships and feeling of belonging supports motivation, performance, and academic achievement of students.

Instructional Practices

In the following section I examine studies that look more specifically at particular instructional practices and education programs that were effective in supporting student motivation towards learning. Studies range from specific models of instruction such as educational reform and using a project-based approach to specific strategies that teachers could implement into their instruction such as linking student interest to curriculum, providing choice with learning activities, encouraging critical thinking, as well as providing tasks that are challenging for students. All of these methods are shown to improve student motivation and learning.

In a qualitative study, Hertzog (2007) explored the implications of implementing gifted program pedagogy using a project-based approach within a high-poverty school setting/general education setting. Hertzog states that over the past 20 years, gifted education pedagogy has promoted learning that connects content to students' interests, allows opportunity to pursue personally meaningful topics, and fosters critical thinking and creativity. The project-based approach was based off of the work of another researcher but is used by Hertzog to describe a set of characteristics used in this study. These characteristics include, students asking questions and pursuing answers using firsthand resources, interpreting and analyzing data, and sharing knowledge of what was learned with an audience that is authentic. The use of these strategies were suggested as tools to engage students in deep thinking and problem solving that would

allow them to gain basic skills in a meaningful way rather than learning them through rote drill practices.

The participants of this study included two first-grade teachers; one who had over 20 years experience and the other was in her eighth year of teaching. The two teachers worked in the same public school and collaboratively planned and taught many of the same lessons. Each teacher had 18-20 students in their classroom. The population they worked with was primarily students from low-income families (90.8%) and consisted of 54.8% African American students. There was also a high mobility rate. Because the school had the greatest percentage in the district of low-achieving students, many parents, and in particular parents of White students, avoided this school and opted to send their children to historically higher achieving programs. This prompted the school to be required to plan and implement options for different curriculum to offer families as incentive for attending. Thus, this study was also a benefit to the school.

In this study, instructional methods that were used in a private gifted program for early childhood were transferred and replicated into a general education classroom within a public school setting serving a high-poverty population. The implementation of the gifted program pedagogy consisted of three components: curricular and instructional changes, the use of strategies for documenting assessment, and professional development trainings. Hertzog aimed to discover both the benefits and the challenges that arose throughout this process. The study lasted throughout one academic year.

Hertzog served as the researcher as well as the facilitator working collaboratively with the teachers. He supported changes to instructional practices and observed how this in turn shifted the teachers' views of their students. The data sources for the study included observations, interviews, documents related to teaching activities, and products of student work.

The findings of Hertzog's study (2007) indicated that when the project approach was implemented, behaviors which had been used to identify gifted students were observed in the children who typically did not exhibit them. Specific behaviors included motivation, curiosity, interest, and engagement. Positive outcomes were associated with the replication of gifted program pedagogy and the use of project-based instruction.

Due to constraints of district and school curriculum requirements and due to personal beliefs teachers had about what their students were capable of, teachers reported only implementing gifted-program strategies into science and social studies curriculum. It would be interesting to explore what would happened if teachers had greater flexibility, freedom, and willingness to implement gifted-program practices and the project-based approach in all areas of instruction.

In another study, Stipek, Daniels, and Milburn (2005), examined the effects of different instructional approaches on preschool and kindergarteners' achievement and motivation. A set of basic skills achievement and motivational variables were used to measure the effects on children within didactic versus child-centered programs. In didactic programs, direct instruction was used and worked specifically on gaining a set of skills often related to achievement of tasks or testing. Set in contrast with didactic approaches was child-centered learning, which focused on the needs of the student's along with their abilities, interests, and learning styles. In child-centered learning the teacher is a facilitator rather than the director of learning.

In total, 227 children from 32 different classrooms participated in the study. Participants included an ethnically and economically diverse group; 28% Latino, 24% African American, 6% Asian, and 41% White; 42% came from low-socioeconomic families and the other 58% were from middle-class families. In didactic programs there were more students from low-

socioeconomic families than there were in child-centered programs but students from middleclass families were more evenly dispersed between the two programs. Also, there were more White children in child-centered programs, more African-American children in didactic programs, and Latino and Asian children were mostly dispersed between didactic and childcentered programs.

The methods used for this study consisted of two to three hour observations within each of the 32 classrooms that were rated using a measure of 47 items broken down into six dimensions used to differentiate between didactic and child-centered programs. The six dimensions included: child-initiative, teacher warmth, positive control, basic skills, performance pressure, and evaluation stress. Students were also interviewed during a 20 to 30 minute sessions. Children were asked a series of questions that related to academic assessment, perceptions of ability, expectations for success, enjoyment of school and school-like activities, preference for basic skills task, preference for challenge, dependence, pride in accomplishment, and anxiety.

The findings revealed that in didactic programs achievement on skill-based tasks and standardized tests were higher than those of child-centered instructional approaches. Students in didactic programs also showed higher levels of anxiety about school, greater dependency on authority, and demonstrated fewer social skills. In child-centered programs children scored lower on standardized test. It was also indicated that students demonstrated less dependency on adults, pride in their accomplishments, had high expectations for school success, and were able to interact more effectively with peers in social settings.

These findings concluded that there were both positive and negative effects that arose in didactic and child-centered programs. From my interpretation of this study I can infer that

achievement in terms of standardized assessment seemed to be higher in didactic programs while students in child-centered programs showed greater levels of motivation and social interactions.

In the following study, Yair (2000) investigated the factors that effect mood, motivation, and sense of success. In this study, 12 sites were selected that were distributed geographically across the US in urban, suburban, and rural locations. These sites are representative of both elementary and secondary schools and were meant to incorporate variations in race, ethnicity, and labour force. From the twelve sites, 28,193 experiences were documented using questionnaires, which included 865 students, spanning across 33 schools. Students were selected at random from grades six, eight, ten, and twelve using class lists and then stratified by race, gender, and ability level.

The method used to collect data for this study was called the Experience Sampling Method. They used questionnaires that were given to students at random throughout their day and asked question about the task they were engaged in, their mood at the time of the beep, and their level of engagement. These questions were assessed based on mood, motivation, and sense of success. In order to measure the responses provided in the questionnaires regarding students' learning experiences, four dependent variables were used: 1) authenticity of the learning activity; 2) the skill level required to complete the activity; 3) Is the learning activity challenging; and 4) do the students have some choice in the activity they are doing?

The findings of Yair's (2000) study indicated that both mood and motivation were positively correlated when students were given choices, learning activities demanded skill, and content was authentic. However, challenging activities were not related to students' intrinsic motivation. All four dependent variables were positively correlated with students' sense of success. This indicates that when students are engaged in activities that allow choice, demand

skill, and offer authentic connections their motivation is increased, their sense of success is greater, and their mood is improved.

Another study conducted by Crow (2000), explored the question: What are the experiences in the lives of upper-elementary school children that foster an intrinsic motivation to seek information? The participants for the study were selected through a survey administered to fifth graders in three diverse schools all set in Colorado Springs. From eight different classrooms, 100 students participated in the study. The specifics of the demographics were not indicated so there was no further information regarding what was meant by the term diversity in regards to the population that was selected for the study.

Students from participating schools were given questionnaires that asked a series of questions based on motivational factors for exhibiting certain behaviors. Out of the 100 questionnaires, nine of the participants were selected as meeting the criteria for intrinsic motivation. These nine students were then interviewed where they were asked a series of questions that ranged from broad to more specific examples of intrinsic motivation and information seeking. Drawings were also used to illustrate students lived experiences and looked specifically at two topics: "what makes a good day for me," and "a time when I sought information" (p. 7). The drawings were analyzed and interpreted by the researcher along with a certified elementary art teacher. This method was used only at certain sites. Data collected from the interviews and drawings were used as the basis for analysis.

Based on the interviews of the nine selected participants it was shown that students demonstrated an affinity for play, a tendency toward creativity, and the disposition of noncompetitiveness. Interviewees indicated that they used a variety information-seeking styles and that when students had anchor relationships such as a parent, teacher or other consistent family

member in their lives, this cultivated students' intrinsic motivation for information seeking. One of the common responses to questions asked included "because they are funny" (p. 10) indicating that a sense of humor was important to them in their relationships and when seeking out information. With the exception of one student, all of the participants interviewed described some activity or experience they enjoyed doing that involved creativity. In terms of noncompetitiveness, this characteristic of the participants was identified mainly by the lack of certain comments related to winning or competition. Students rather discussed their enjoyment they get from participating in specific activities in their lives.

Based on the interviews and their questionnaires students reported experiences of information seeking ranging from examples at-home, experiences with friends and in school examples. Six of the nine examples given included involvement of an adult in their lives. The drawings of participants showed illustrations that represented similar information provided in their interview. Pictures displayed activities that involved play and leisure.

Although this study was geared towards school librarians, the findings have implications that are relevant for teachers as they could be able to incorporate intrinsic motivators that encourage information seeking. However, taking into account the small sample size for this study it also should be noted that although there were some variations present all of the students used in this study came from a similar positions of advantaged—wealthy, white, high achievers, with parents who support their success and provide assets necessary to do so. This indicates that the findings are limited in their reach of whom this may apply to.

Looking at a case study, Hannel (1990), explored the scenario of an eight year old girl who was considered to be gifted and highly intelligent yet significantly underachieving in math in relation to her peers. The subject, Sophie, was described as motivated and excited to do

classroom tasks. Her parents and teachers became concerned when they observed seemingly confused and struggling behaviors such as unwillingness to do work. Calculations that were done with ease by most of her class, she was unable to complete independently and was very slow.

It was shown through assessment given by the researcher that Sophie had high achievement motivation. She cared about her performance and success in school. Based on interview questioning, it was shown that Sophie held certain beliefs about achievement: 1) "'hard' work was the work she could not do, 'easy' work was the work she could do:" and 2) "clever people can do 'hard' work, 'stupid' people can do 'easy' work" (p.21). By this standard Sophie had decided that she was stupid and could not do hard math. Her self-efficacy was dropped in respect to math tasks and she became unmotivated to participate in math tasks.

Drawn from Sophie's assessment, she had some complications with her reasoning skills. Problems that were considered easy she was more hesitant with but as the problems grew more challenging she completed them with greater confidence. It was discovered that Sophie thought that in order for math to be hard it had to have a hidden component of complexity. "It is, of course, intellectually quite sophisticated to realize that questions can have several 'levels' of meaning, and to search for the deepest, most abstract level of interpretation. However, when the question is intended to be answered at its simplest and most superficial/concrete level, then this search for complexity works against the child" (p. 22).

After Sophie received support Sophie's misunderstandings about task complexity, she began to show improvements and progressed to higher modules. While she preferred math that required complexity rather than computations, she demonstrated a rise in self-efficacy in relationship to math. She was able to work more independently and showed an increase in

initiating math related activities. This case study demonstrates the importance of students believing that they have the ability to learn and achieve. Without this they may become unmotivated to attempt at all.

Stipek, Salmon, Givvin, Kazemi, Saxe, & MacGyvers (1998), aimed to link achievement motivation practice theory and research with recommended practices made by mathematics educators. Also explored in this study were the associations among teacher practices, student motivation, and mathematics learning within the real classroom setting. This study used a set of five motivational objectives: 1) focus on learning; 2) self-confidence; 3) risk-taking; 4) enjoyment; and 5) positive feelings. In order to provide consistency in the findings, all teachers were observed teaching a unit on fractions. Although the instructional activities varied between classrooms, the same mathematical ideas such as part to whole relationships, equivalence, and reducing and adding fractions remained consistent.

Participants in the study consisted of 24 teachers and 624 students from fourth, fifth, and sixth grade classrooms. The teachers selected for this study ranged in experience between one and twenty years. They came from several large, urban, and ethnically diverse areas serving primarily low-income students. Eight of the classrooms also served over 25% English Language Learners, who were predominantly Spanish speaking. Each teacher had approximately 32 students per class.

Teachers were differentiated into three groups. Two of the groups included teachers who were committed to teaching reform-oriented instruction during and in particular for the duration of this study. One of these two groups were also involved in intensive intervention designed to support teachers in using reform practices. The third group of teachers had no interest in using reform-based instruction but rather preferred traditional teaching practices.

Of the 624 student participants, there were approximately equal numbers of males and females represented. Over half the students were Latino, less than 25% were White, and less than 10% African American and Asian students. The ethnicity of remaining students was undetermined.

Three methods of data were used to investigate teacher practices. Methods included videotaping, observations, and teacher questionnaires. Teachers were videotaped teaching lessons in their classrooms. The videos were used to focus on practices teachers utilized for mathematics instruction. Practices were then rated using nine categories, which included: an emphasis on student effort; encouragement of learning, understanding, and mastery, emphasis on performance; student autonomy in the classroom; frequency of social comparisons related to student performance or participation; negative or positive affect of teachers; teacher enthusiasm; environment type or support of risk-taking; emphasis on completing tasks quickly.

In conjunction with the videotaped lessons, at least two observations were conducted of teachers providing instruction on fractions. Observers used a scale that was similar to and based off of the same measure used to rate the videotaped lessons. A questionnaire was the final method used to gather information about teachers' practices. Teachers were asked questions about their strategies for assessing student learning.

Students also completed questionnaires, once at the beginning of their school year and again at the end of the fraction unit. The questions stayed the same for both testing phases. Student questionnaires included six categories that were scaled and measured. These included, students' perceived ability, mastery, performance, help-seeking, positive emotion, negative emotions and enjoyment. Students' behaviors were also rated as a whole group using the math lesson videotaped.

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Students reported that when teachers showed positive emotions while teaching lessons about fractions, they provided an environment that encouraged risk-taking, they too had positive emotions, were more likely to seek help when needed, and were more attentive to their own learning and understanding. Students were more likely to enjoy learning about fractions when their teachers placed high expectations and focused the attention of the class on learning and understanding. Students also had positive feelings associated with teachers who supported their efforts and provided autonomy within classroom and on specific learning tasks.

The results of teacher assessments indicated that students had the least amount of positive emotion when they received a grade or number correct and error answers. Students showed somewhat higher response of positive emotion when check marks were given check marks indicating completion or mastery of work. Finally, when teachers provided written feedback on their assessments, students had more positive feelings associated and showed greater mastery of content.

It was indicated that depending on the level of motivation and possible experience that a student already carries about math directly affects a students' current level of motivation. Findings showed that past motivation towards math, which was revealed in the pretest at the beginning of the year correlated with and showed similar results when students were retested after the unit on fractions. Students' perceptions of their ability and competence impacted their motivation. Those who indicated they were more competent in math also reported enjoying math and gave more attention to their learning. In contrast, students reported less positive feelings associated with math when they believed they were less competent in their ability to do math.

The component of teacher practice that showed the greatest impact on student motivation was the affective environment of the classroom. When students had positive associations with learning math and specifically fractions, they felt supported in taking risks, and they were comfortable asking for help. This greatly increased students' motivation.

In a case study that explore three dimensions of students empowerment: academic, political, and social, McQuillin (2005) compared two schools that used methods to support student empowerment. Although empowerment is on a somewhat different vein than student motivation, many of the findings regarding strategies are the same. This particular study therefore seemed relevant to the topic and is being used to demonstrate that student empowerment is yet another strategy for supporting student motivation.

As describes above, McQuillin investigated three dimensions of student empowerment. Academic empowerment was describes as having the ability, confidence and motivation that will lead to academic success. Political empowerment refers to students understanding that they the ability to influence their school community and eventually their society. Social empowerment relates to the level of safety and comfortability that students feel in sharing their ideas. This also refers to issues of social status and experiences that student have within the institutional structure of the school.

Both schools were observed over the course of two years and ethnographic data was collected based upon weekly observations. One of the two schools used in this study included an ethnically and racially diverse urban high school. This school served free and reduced lunch to 70% of their approximated 1,000 students. This high school developed a program called the Essential School, which functioned using set of guiding principles. This program within the larger school consisted of 100 students. Town meetings were one of the strategies implemented

in the Essential school. Also, creating leadership committees and having a student body selected through student elections.

Some issues arose with the implementation of this program and included challenges with teachers sharing decision-making power and students not being able to take responsibility or initiative over their own learning. There seemed to be some discrepancies with students taking advantage of a system that was designed to allow for a great deal of flexibility and freedom. Teachers also reported not holding students accountable and said that they had begun to lower expectations for student work in order to allow a passing grade. The structures provided to support student empowerment seemed to fizzle out throughout the five years that this study was being conducted.

Results indicated that students were skeptical of the decision-making power they were given and overall the Essential School was unsuccessful. It may have been possible that both students and teachers were not adequately trained or supported in fully implementing the principles of the program. It seemed that students did not truly have decision-making power or rather it was inconsistent. Had teachers held higher expectations of their students there could have been more successful results. I think it may have been possible that if the adults had guided students through making decisions and accepting responsibility for their actions by receiving appropriate consequences, the program could have a greater success. Based on the finding of this study, supporting student empowerment was an unsuccessful method of improving achievement or promoting student engagement.

The second high school that was used as a comparison to the previous school housed primarily students from affluent families. It's racial demographics included 98% White students, 7% Latino, and 4% African American. This school was provided as an alternative to other

schools. When considering school-wide issues, the entire school community is part of this collaboration. Teachers participate in regular professional development opportunities and leadership is a shared responsibility dispersed among staff. Instruction was child-centered and frequently guided by the students. This particular school had developed vision statement that incorporated five guiding principles: cultural diversity, democratic learning community, high expectations for all students, excellence in student learning, and personalization.

In this high school, supporting academic empowerment was viewed as gaining and investigating multiple perspectives and dimensions of knowledge. The teacher was a facilitator guiding students in constructing knowledge. Political empowerment was enacted through eliciting student input in creating policies and decision about the school. This took place during voluntary school meetings. Social empowerment at the second high school used three particular strategies: 1) students were to be recognized and have some form of a personal connection and relationship with every child at the school; 2) students were encouraged and provided many opportunities for students to support each other; and 3) reflections of students' learning experiences were utilized by teachers as components for improvement.

Initially, teachers wanted students interests to be the guiding factors in their curriculum design. However, teachers had a challenging time eliciting students' input as they seemed uninterested in the process. To them, school and personal interests to not overlap. Also, the school struggled to allow student choice because when it was given in some cases it was also misused. In order to solve this dilemma, opportunities to truly incorporate a model of empowerment were limited.

Both schools reported difficulty in incorporating and maintaining structures to support student empowerment. The second case study school provided greater support and opportunity

for students to learn how to use power. They were not simply given free reign but rather were given avenues for exploring their ability and relationship with decision-making and accountability. I question whether this is truly student empowerment but it does offer a starting point. Due to the demographic differences between the two schools this may have been a factor the varying results. Changing power dynamics is a challenging task. Indicated by this study, supporting student empowerment also means letting go of certain practice and beliefs that may be more comfortable for teachers to hold onto. This type of shift is not easy and it was indicated that this would take a considerable amount of time and support in order for it to be effective.

Relevant aspects of this previous study to the topic of student motivation include the ideas: that when students have opportunities to make decisions; they are provided with tasks that are challenging to them; and when their voice and interests are integrated as a component of their learning, they will in turn feel motivated to engage in their own process of learning.

Conclusion

In this literature review I examined research-based teaching strategies that support students' motivation toward learning. In the section on social interactions, findings indicated that when students feel a sense of autonomy, belonging within the school community, and they are supported in building social and academic efficacy their motivation towards learning increased (Battistich, Solomon, & Delucchi, 1993; Battistich, Solomon, Kim, Watson, & Schaps, 1995; and Ryan and Patrick, 2001). Other findings suggested that students have greater motivation when teachers promote mutual respect, shared classroom values, and building and maintaining positive social interactions. When teachers supported a sense of care, this was also associated with motivational outcomes.

Findings that investigated instructional practices included using a child-centered learning approach and provided authentic connections between content and personal experiences. Along with providing topics that are of interest to students, allowing choice on academic tasks, offering learning that demands skill, encourages inquiry, and incorporates feedback rather than simply providing grades on student work indicated stronger motivation toward learning (Crow, 2000; Hannel, 1990; Hertzog, 2007; McQuillin, 2005; Stipek, Salmon, Givvin, Kazemi, Saze, & MacGyvers, 1998;Yair, 2000).

These findings have many implications for teaching practices. It is clear that there are a variety of research-based practices that foster students' motivation to engage in deep learning. However, just as each of these studies aimed to examine a particular strategy it would be wise to also recognize these findings, not as absolutes, but as potential tools that could be accessed and utilized to support student learning. Since many of the studies reviewed targeted particular demographics, certain strategies may be beneficial to implement with specific populations of students. Not one of these instructional approaches is the key to what will benefit students' motivation towards learning. They are all valuable instructional practices that can be further explored within the classroom setting.
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Deconstructing Gender Stereotypes in K-12 Science, Technology, Engineering, and Mathematics

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Abstract

In the 21st century, the global economy increasingly relies on students in the fields of science, technology, engineering, and mathematics (STEM). These fields are competitive, lucrative, and highly specialized. They are at the backbone of research and development, and they carry with them a great deal of status and social influence. Demographically and historically speaking, these fields are also dominated by men. Men are more likely to pursue a graduate degree in these fields, men are more likely to be employed in these fields, and men are more likely to teach in these fields at the college level. In an attempt to better understand this gender gap, this literature review will examine recent studies around gender and science education while attempting to answer the question: what social and classroom factors do K-12 teachers have to be aware of in order to ensure that girls are supported and encouraged in their pursuit of science. technology, engineering, and mathematics? The studies focus on K-12 education in a variety of cultural and economic settings, with a primary focus on students between the ages of 7 and 16 in the United States. The studies examine when the gender gap begins to develop, what home and classroom factors influence student identification with science and mathematics, and what classroom practices teachers can implement in order to strengthen the confidence and performance of girls in these areas. The results of the studies suggested that gender associations with content areas can begin in early primary grades; a variety of home factors can influence student achievement; and that several teaching styles and pedagogies can be successful in fostering success and interest in STEM fields.

Deconstructing Gender Stereotypes in K-12 Science, Technology, Engineering, and Mathematics

Science, technology, engineering, and mathematics are very powerful social, economic, and political forces. Our day-to-day lives increasingly rely upon developments in these fields, and it is important that they see equal representation to ensure they are working toward everyone's best interests. Scientific and mathematical literacy are two of the most important components of being a 21st century citizen, and it is essential that everyone is provided equal access in a democratic society. Because of the status and influence associated with careers in STEM fields, it is important that women are granted access to and encouraged to pursue these careers. As an elementary school teacher, I believe it vitally important to evaluate classroom methods that help all of my students become more capable mathematicians and scientists. My time working in public schools has shown me that gender can have a dramatic influence on learning, socialization, and self-identification. This is made apparent in the books we suggest, the behaviors we encourage, and the kinds of thinking we elicit from our students. Studies indicate that teachers need to be aware of the home and school factors that may influence girls' achievement in mathematics and science, and they need to present the curriculum in such a way as to make it accessible and engaging for boys and girls alike.

Social values, school norms, and classroom culture can all have an impact how girls interact with science and mathematics. Data shows that gender stereotyping of academic content areas can start at least as early as second grade (Cvencek, Meltzoff, & Greenwald, 2011, p. 11), with girls more strongly identifying with/being identified with reading, while science and mathematics are considered "boy" subjects. Even the use of computers, a skill that is practically indispensable in the 21st century, is an activity more strongly explored and encouraged for young

boys than it is for girls (Vekiri & Chronaki, 2008, p. 8). Unfortunately, many students may learn to consider mathematics, science, and technology as primarily male-oriented content areas from a very young age.

Students inherit or overcome these stereotypes based on a variety of factors. Historically speaking, very few women are depicted as role models in science and mathematics curriculums. This is something that a proactive classroom teacher can address directly. Family expectations and parent endorsement of stereotypes can influence student achievement (Tomasetto, Aparone, & Cadinu, 2011, p. 5), as can the pedagogy and personal support by the classroom teacher. Teachers need to develop an awareness of holes in the curriculum, expectations students bring in from outside the classroom, and blind spots regarding the relationship between gender and classroom activities.

In examining the relationship between gender and science and mathematics education, it became clear that different populations produce different data. There is a tremendous amount of interplay between culture, ethnicity, age, socioeconomic status, gender, and school. For example, in predominantly white, middle-class schools, female students were often experienced in negotiating power and classroom resources (Cervoni & Ivinson, 2011, p. 12). They knew when and how to use the teacher for leverage and to negotiate power in their groups. It is important to recognize that every classroom, culture, and community is inherently framed by its own existing gender frameworks to work within. It must also be recognized that while science, technology, engineering, and mathematics are so often lumped into the STEM acronym, each represents its own content area with countless volumes of research on effective teaching methods. In seeking relationships between these fields, no one field fully receives the attention it could be paid.

A definition for gender must also be established. In most of the studies in this literature review, gender is defined as biological sex. Two of the studies ask the students to self-identify with a gender as a component of the survey, and the rest do not explicitly define gender. This is an important limitation to keep in mind as recent research around gender identity is considerably more complex than just biological sex. This is a particularly complicated issue when dealing with students of the ages in these studies, so it is somewhat understandable that most of the researchers chose to rely on biological sex to define gender.

A lot of the research on the gender gap in STEM fields is focused on university and graduate level studies. There are also a number of studies that may point to biological differences to explain the discrepancy. As an elementary teacher, I chose to trace students' success and enjoyment of science and mathematics throughout their public school career in order to ensure that they receive the best education and opportunities possible. While there are numerous studies based around cognitive strategies, the literature reviewed will not necessarily consider biological differences in learning styles. Instead, these studies are focused more largely on student, social, and classroom factors that foster gender stereotyping in STEM fields.

Literature Review

Because the interplay between gender and education is so complex, this literature review will attempt to examine the gender gap from three different perspectives. First, it will present studies that quantify the gender gap in science and mathematics as well as suggest when these gaps begin to develop. These studies are cited to raise awareness concerning how gender can influence academic performance in K-12 schools. Next, the review will look at studies that review influences from home environments, communities, and classrooms for possible developmental contributors to this gender discrepancy. By looking at the parental beliefs, school

structures, peer expectations, and teacher pedagogy, patterns in science and mathematics achievement can be seen. Finally, this review will present studies related to methodologies and classroom practices that try to ensure equitable science and mathematics education. These studies offer real-world examples of what K-12 teachers can do to help improve the interest, confidence, and performance of girls (and all students) in these subject areas.

Quantifying the Gender Gap

There have been countless studies on the gender gap at the undergraduate, graduate, and professional levels of science and mathematics. This begs the question: how wide is this gap, and when does it actually start to appear? As is the case with so many aspects of education, it depends on where you are and who you are teaching. Some of the studies in this review took place in slightly different contexts; thus, they produced slightly different data. However, all of the studies contain interesting implications that emphasize equitable education for K-12 teachers.

Some of the studies described students applying gender stereotypes to perceptions of curriculum from a very early age. In a study of 247 American students between six and ten years old, it was suggested that students as young as second grade receive internal and external reinforcement of gender stereotyping in mathematics (Cvencek, Meltzoff, & Greenwald, 2011, p. 11). These students were from public and private schools around Seattle, Washington in the United States, and they primarily came from middle- and upper-class families. Students volunteered with parent consent to take Implicit Association Tests and explicit self-reports. The tests themselves consisted of a variety of association-based problems. Students took tests individually at a computer following the completion of a variety of simplified differentiation measures to ensure students understood the process. For example, the student would be asked to sort a list of academic subjects and objects into two separate columns: one for boys, and one for

girls. A similar association test was given to allow students to self-identify with subjects and school tasks. It should be noted that outliers in response time, namely those students who answered extremely quickly or very slowly, were eliminated from the final data. The researchers claimed that the absence of gifted and struggling students provided data that was less skewed, (Cvencek et al., 2011, p. 6), but it would be interesting to know precisely which way the inclusion of this data may have shifted the results.

In comparing ways that students self-identified with mathematics and how they perceived genders to perform in each subject, the study found that both genders were more likely to associate boys with mathematics and girls with reading. It is also very interesting to note that the study tested for how strongly each student identified with his/her own gender. Findings indicated that, the more strongly the student identified with the female gender, the more likely they were to align with the gender stereotypes around mathematics (Cvencek et al., 2011, p. 10).

Some limitations have already been mentioned, including the specific middle- to upperclass population being tested. The removal of statistical outliers from the data may also be an important consideration. Though this study is not proof of a gender gap in science achievement in elementary school, it does provide evidence that many students may apply gender stereotypes to content areas from an early age.

It is important to differentiate between students applying gender stereotypes to content areas and gender interest in content areas. Are girls also less interested in science than boys? In a 2007 study of 1008 rural students from New Mexico in the United States, no significant relationship was found between gender identity and science interest at any of the age levels tested (Sorge, 2007, p. 5). Different groups of students across six elementary schools and three middle schools were tested over a three year period at the start of each academic year. The

students were given a 10-question science attitude survey, including questions addressing how students felt about science. The testers were primarily interested in measuring student interest in science against two variables: age and gender. While boys and girls showed no significant difference in their professed interest in science, girls and boys alike saw a dramatic drop in science interest during the transition from elementary to middle school (Sorge, 2007).

While the size of the sample is significant, it is important to note that this study is focused on a very particular population. The area around these schools included a population that is 43% Latino and 10% Native American, both of which are rates much higher than the national average. Culture may be associated with a significant influence in shaping science attitudes. The study was also completed at a rural school in an area of higher than average poverty. Many students found the transition to middle school challenging for a variety of reasons, and the study did not measure student interest in other content areas or school itself.

Other studies have focused on data specifically relating to student achievement in science. One such study found that as early as third grade, gender, ethnicity, and poverty all demonstrated a statistical relationship with student achievement in science (Lin & Chu, 2010). Simply put, this study indicated that girls, students of color, and students from poverty are not receiving equitable science education in this country. In fact, this study was one of many that examined relationships between gender, ethnicity, and socioeconomic status. Being a female, in combination with other factors of poverty or non-white ethnicity, only worsened the average score (Lin & Chu, 2010).

Lin and Chu evaluated the assessment data of 7,437 3rd grade students. This data was pulled from the National Center for Education Statistics (NCES), which used a multilevel sampling plan to assess performance, motivation, and learning opportunities for students in

science. The relationships of gender, ethnicity, and poverty were all measured against this data. The students used in the study were 59% white, 19% Hispanic, 10% African American, 7% Asian, and 5% other (Native Hawaiian, Pacific Islander, American Indian, Alaskan Native, and multiple ethnicities). Of the students examined, 19% were reported as living below the poverty line, and 81% were living at or above the poverty line. The tests included Likert-scale questionnaires, surveys, and performance tasks (Lin and Chu, 2010, p. 5).

The findings of this study showed a more significant gender gap than is seen in other large scale studies, such as the Nation's Report Card. Some of this difference may be accounted for in the use of different performance assessments. It is difficult to determine the accuracy of a single assessment of science performance, and the test provided by the NCES is no exception. Considering the age of the students, the diversity of the students, and the lack of an interview process, it is very possible that some test elements were misinterpreted. The data in the study was also extrapolated with the intention of examining specific populations, which is another possible contributor to score gaps.

Social Sources of the Gender Gap

In order to best make science and mathematics education equitable, it is necessary to examine ways that the gender stereotyping of subject matter might be passed on to students. Findings indicated that teachers may need to attend to multiple influences, including the classroom and curriculum as well as the school culture, student culture, and community. Teachers may even possess their own misconceptions about gender that, in turn, influence their lessons and students' perceptions of themselves. The following studies will examine student life for possible social influences related to a gender gap in science and mathematics achievement, identity, and interest.

By examining life at home, studies suggested that social influence may have an effect on gender identity. It should come as little surprise that family expectations shape personal identities, and this seems to hold true in the areas of mathematics and science. In a 2011 study by Tomasetto, Cadinu, and Alparone, researchers attempted to look for a relationship between parent stereotypes about mathematics and their children's performances. A group of 145 primarily white, middle-class, kindergarten to second grade female students were given ageappropriate mathematics performance tasks. In addition, the students completed Likert-scale questions that addressed mathematics gender stereotypes as well as their own feelings about mathematics. 134 mothers and 128 fathers of the girls also filled out a questionnaire that included two Likert-scale questions asking about gender associations with content areas. The overall goal of the study was to determine how prevalent gender stereotyping was, and whether or not there was a significant statistical relationship between parental stereotypes and their daughter's performance. As a second variable, one group of students was given mathematics tasks that activated gender identity, such as stories about playing with dolls, using make-up, or following feminine characters in a story problem. Meanwhile, the second group of students received more gender neutral tasks.

The study found that, on average, parents do not strongly endorse gender stereotypes around mathematics (Tomasetto, Cadinu, and Alparone, 2011). In fact, the girls were shown to be quite unlikely to consider boys or girls better at a particular subject, even if their parents believed that math was a male domain. Both of these findings bode well for students, as they suggest that men and women are beginning to see mathematics as a gender neutral field. However, the study did highlight some particularly interesting statistically significant relationships. For one, girls whose mothers believed that boys were better at mathematics were

more likely to perform worse on the advanced portions of the test (Tomasetto et al., 2011, p. 4) and girls who had their gender identity emphasized in the tasks also performed worse. Meanwhile, girls whose mothers firmly rejected such stereotypes performed just as well as their male peers, and girls whose gender identity was not emphasized actually performed better than those who perceived strong messages about gender identity.

The implications of the study are somewhat skewed by its limitations. For starters, the population tested is almost entirely white and middle-class. The location of the study was not specified, which leaves cultural and regional variables unexplored. The parents of the students were also only responding to two questions related to gender stereotypes in mathematics, which provided limited insight to complex gender dynamics. This study was also focused on early primary grades, so it would be interesting to review a similar approach with older students.

A 2003 study by Lalonde, Leedy, and Runk also examined the prevalence of parents, teachers, and students holding content-specific gender stereotypes. In total, 74 students, 133 parents, 35 mathematics coaches, and 14 general education teachers from urban and rural parts of Kansas were tested. It is important to mention that these students were participating in a regional mathematics contest, so the interest and ability level of most students was above average. All participants were given a Likert-scale questionnaire asking about the interplay between mathematics and gender and the importance of mathematics in school and society. Additionally, students were given questions about their expected levels of support at home as well as their general self-confidence in mathematics. The goal of the study was to look for a consensus of existing gender stereotypes related to mathematics, while also identifying implications for student achievement.

Teaching Toward a Better World

The research found that while most girls and mothers adamantly rejected the stereotype of mathematics as a male domain, fathers and boys were much more likely to uphold this narrow view (Lalonde, Leedy, & Runk, 2003). The researchers described several unsolicited comments on the tests left by girls and mothers, who angrily denounced the sexist nature of the questions (Lalonde et. al, 2003, p. 7). This pattern indicated that at least some girls and women found the suggestion that mathematics is a male domain to be offensive. The study also found that parents who had boys were more likely to consider men naturally better at mathematics, while parents of girls reported no such bias. Mothers and fathers even reported different opinions on the role of mathematics in society. Mothers were more likely to describe the function of mathematics as a language or tool for science. The study also compared teacher and mathematics coach responses. It found that the teachers who worked as mathematics coaches were much less likely to consider boys naturally better at mathematics in society at mathematics than girls.

The foremost limitation of this study is its subject sample as they clearly have strong personal associations with mathematics. The data sets are also relatively small, particularly for the teachers, considering the kind of survey response data being collected. It is also important to note that this study focused entirely on mathematics, while not touching upon domains of science or technology.

Research has also been completed to examine how gender stereotyping of content areas impacts a child's access to the content. It was found that parents often underestimate their daughters' interest in science. As a result, girls can have limited access to science texts at home (Ford, Brickhouse, Lottero-Perdue, & Kittleson, 2006). Teachers tended to make science reading resources available in the classroom and used a variety of strategies for encouraging their

use. The school library was also found to be a good source. Over 90% of the parents reported that large book stores were a primary source of books for their children, and these stores tend to offer a limited selection of science texts. The public library also proved to be a good resource for science texts, though only 52% of families surveyed said that they utilized the public library as a source of books for their daughter.

Girls were also asked about their interest in certain genres of books. Non-fiction books about animals were the most popular category and they were explicit in separating the genre of animal texts from science texts. Around 48% of the girls interviewed said that they enjoyed science texts, but, interestingly, 86% said that they enjoyed books about animals. Through interviews, the researchers determined that the expository style associated with textbooks was the reason most cited for student disinterest in science texts (Ford et al., 2006).

The study was conducted through interviews with 45 third grade girls, 29 of their families, and 6 teachers from the eastern United States. The studies took place in one urban classroom which was 64% white, 24% African American, 8% Asian, and 2% Latina, and one suburban classroom that was 75% white, 11% African American, 9% Asian, 3% Latina, and 3% multi-ethnic. The associated teachers were highly experienced and were described as placing a strong emphasis on scientific literacy while the students were forthcoming about their reading preferences, habits, and book selection methods.

The exact location and socioeconomic status of the schools is not disclosed, and the teachers in the study are highly qualified science specialists. The schools in the study may not be an accurate representation of the science texts and the teaching typically available in a public school classroom. The sample size is also somewhat small, considering the size of some of the researchers' inferences. It could also be argued that the interview methodology and student ages

could result in leading questions, as the girls reported positive responses to almost all genres and styles.

Even the use of computers and technology displayed a gender bias from an early age. Vekiri and Chronaki (2007) found that for fifth and sixth grade students, boys use computers more often than girls. Boys were also more likely to feel supported and encouraged in the use of computers. They responded more positively regarding the value of computers and felt more confident in using computers. Boys were nearly twice as likely as girls to report using computers every day, and were also more likely to discuss their experience with their peers. Not surprisingly, regardless of gender, students were more likely to use computers regularly when they felt strongly supported and encouraged to do so at home. In fact, parental support was the largest single factor in student self-efficacy with technology (Vekiri and Chronaki, 2007, p. 9).

The study was conducted with 340 fifth and sixth grade students from seven public elementary schools in metropolitan areas of Greece. About 58.5% of enrolled students were in a technology infusion program while remaining students used the standard curriculum. The students came from diverse family backgrounds, with 23.5% from upper-middle class, 29.1% from middle class, and 47.4% from low SES families. The students were given Likert-scale questionnaires where they ranked six multiple-choice questions about access to computers, experience with computers, friends' computer use, support with computers, and their self-efficacy toward computers. Students completed questionnaires in their regular classrooms.

The most prominent limitations of this research stem from its cultural encapsulation. Since the study took place primarily in Greece, a more intentional multicultural lens would help examine the interplay between culture and gender expectations. The questionnaire also focused on how students identified with technology and not necessarily on a performance gap in its

utilization. Future research might include an examination of how well girls and boys utilize technology for personal and academic purposes.

Deconstructing the Gender Gap

In order to ensure that students have equitable access to science, technology, engineering, and mathematics education, teachers need classroom strategies that engage and empower. This includes developing their lesson plans, classroom culture, and self-awareness in a way that makes all students feel competent and included. Since STEM fields are a driving force in the world economy, a great deal of research is being conducted around how to make students competitive in these fields. This section of the literature review will examine pedagogical and methodological practices of teachers teaching these content areas.

Different school environments, teaching styles, and curriculums produce students that develop different strategies in science (Cervoni & Ivinson, 2011). In an international study of three schools in Wales in the United Kingdom, and one classroom in the United States, each classroom context provided students with exposure to different approaches to problem solving. While each classroom contained girls that succeeded, there were variations concerning how girls responded to the curriculum. Different subject matter also appealed to different genders as did different types of activities. As mentioned in the introduction, girls in middle-class schools were actively defying attempts by male peers to take control of the activities. These students had learned to utilize the teacher as a resource for leveraging power (Cervoni et al., 2011).

The researchers spent time in five different classrooms: four in Wales, UK and one in the Northeastern United States. All of the students in the study were between 7 and 8 years old. The schools included two working-class, inner-city schools, and two middle-class suburban schools. The teachers observed three science lessons by an individual teacher in each school, and used

multimodal research to examine a variety of factors. The researchers examined the teacher's pedagogic discourse and the way that children interacted with the curriculum. They looked at how the classroom was laid out and whether the children could move freely around the room or not. Researchers also looked material culture of the classroom, the gender valence and complexity of the science activity, and the availability of materials. The researchers then performed follow-up interviews to gauge students' level of engagement, their understanding of the learning goals, and their self-efficacy with science learning.

The limitations were similar to those found in many such ethnographic, observational studies: a significant portion of the research is based on subjective observation. The findings were largely based on the observations and interpretations of the researchers as they made broad generalizations about each classroom. This tends to be a commonality amongst this kind of observational research, but a classroom's level of engagement and cooperation can easily change on a week-to-week basis.. Finally, even though the United States and the United Kingdom share many cultural similarities, there are still differences when considering the broader application of these ideas in the United States.

In a previously mentioned study, it was found that girls receive less encouragement to use technology than boys (Vekiri & Chronaki, 2008). With an acknowledgement of this social bias, a 2008 study by Cady and Terrell attempted to implement an eight-week technology infusion program in an effort to increase self-efficacy among girls in the area of technology. The study found that students who participated in the technology infusion curriculum significantly increased their confidence and personal connection when compared to students who experienced the standard curriculum. The study provided an example of an instruction model that covered existing content standards while also implementing the use of technology in a way that tended to

be affirming for female students. At the culmination of the study, students with more exposure to technology not only performed just as well on content understanding, but also revealed higher aptitudes and confidence for utilizing technology in school and their day-to-day life.

For the experiment, two fifth-grade classrooms were chosen at a Florida elementary school. One classroom was exposed to a technology-enriched program, and the other was taught with the standard curriculum. Female students from the two classrooms served as the sample population in the study. Both classrooms spent the same total amount of time on science and technology instruction, but one classroom focused on inquiry-based science and exposure to a wide variety of hardware and software types. The technology-infused classroom also included the creation of multimedia presentations and picture and video editing as mandatory components of the curriculum. Prior to the study, both sets of students were administered *The Young Children's Computer Inventory* to evaluate student feelings toward computers. The same test was given at the end of the study and female student responses were compared.

In some respects, the findings seem rather obvious: students who have more hands-on exposure to technology will be more likely to strongly identify with it. The study only examined student enjoyment of technology and their feelings about its usefulness. Other limitations are also apparent in the small sample size of a population with nonspecific demographics. We know nothing of the school's poverty level, cultural diversity, or teacher training. In order to have the resources to infuse such a considerable amount of technology, it is important to consider the fact that for many schools the problem is not advocacy for technology, but access to it.

One of the more dramatic solutions posed to gender equity in education is the separation of boys and girls in school. A 2011 study by Johnson & Winterbottom examined the impact of peer- and self-assessment strategies in a girls-only class. The goal was to examine whether self-

and peer-assessment tools would help support student motivation in science, with the added layer of looking at its implications in a girls-only classroom. The implications of the study were somewhat difficult to discern. Researchers claimed that there was some evidence that the selfand peer-assessment strategies reviewed could improve girls' motivation in science (Johnson & Winterbottom, 2011). Interestingly, following this study, girls were more likely to consider girls-only lessons and activities as a beneficial tool for their learning. In fact, girls' comments on the experiment were largely positive, citing reasons from like feeling less pressure, feeling more confident in asking questions, and getting along better with their teachers (Johnson & Winterbottom, 2011, p. 7). As a contrast, girls actually showed a decrease in science motivation and some even considered the class less fun without their male peers. Once the 22 weeks were over, 13 of the 28 girls still reported that they considered science a male domain (Johnson & Winterbottom, 2011, p. 9).

Johnson & Winterbottom conducted the study under very specific conditions. They worked with 28 girls over 22 weeks. The girls were between 15 and 16 years of age, and were located in a rural school in the United Kingdom. The students were also considered highachieving for their school; though, as a whole, the school had noted that female achievement in science was lagging behind that of their male counterparts. The school worked with the researchers to develop a peer- and self-assessment curriculum in a gender segregated classroom. The researchers examined videos of lessons, used Likert-scale surveys and questionnaires, and held interviews with students to gauge their feelings toward the science curriculum and how they felt about the new classroom atmosphere. Data was collected over the entire 22-week period, culminating in exit interviews.

To many, this study might seem an extreme example of methodology to address a gender gap in science achievement. Admittedly, few teachers may be presented with an option of having a gender-segregated classroom. It is also limited due to the small sample size, rural location of the school, and students' high-achieving academic status. Additionally, the students involved had little experience with self- and peer-evaluations, so this may have limited the effectiveness of the course.

In addition to experimentation with new classroom models, the 21st century has also raised emerging discussions of constructivist teaching. Constructivist teaching exists in contrast to the classic instruction model by focusing on group work, inquiry, and finding multiple paths to the same solution. In a 2007 study when teachers taught subtraction problems to fifth and sixth grade girls and struggling students, it was found that constructivist teaching methods were more successful than direct instruction methods (Timmermans, Van Lieshout, & Verhoeven, 2007). In fact, girls in the constructivist instruction group showed better accuracy, more confidence, and utilized additional problem solving strategies than groups taught via direct instruction. Meanwhile, they displayed no drop in their performance on speed tests.

The researchers started with 151 fifth and sixth grade students. These students were given progressively more difficult performance tasks in addition and subtraction, including tests that examined accuracy, speed, and approaches to problem solving strategies. Of the 151 students initially tested, 40 students who showed signs of struggling with subtraction were chosen to take part in the study. Both the constructivist group and the direct instruction group received explicit training: direct instruction students were trained in a single strategy, while constructivist students were encouraged to develop their own strategies. The researchers also videotaped students taking the tests, interacting in the classroom, and working in groups. Then,

pre- and post-tests were given to all students and scores were compared across instruction style and gender.

This is another study of a fairly small population sample with limited information concerning the location or students' socioeconomic status and ethnic and cultural backgrounds. The limited classroom observations also provided a narrow perspective, as individual teaching styles, classroom cultures, and student social dynamics can make it difficult to directly compare results across two classrooms. The study reported that constructivist teaching methods only led to significant improvements for low-performing girls. It is also important to consider the myriad of methodologies that fall under the umbrellas of constructivism and direct instruction and, in this case, only one specific interpretation of each was observed.

Conclusion

Addressing the gender gap in STEM fields requires an examination of our public school system as well as our social norms and values. The articles in this review attempted to examine when the gender gap forms, what influential forces help create and uphold it, and what teachers can do to promote the success of female students in STEM fields. In looking at the data around science, mathematics, and technology achievement in K-12 schools, it is clear that a gender achievement gap begins to develop in terms of both self-efficacy and performance as early as second grade. A variety of school, family and social influences seem to contribute to this gap. The final group of studies suggested that students, teachers, and families can encourage young girls to pursue and be successful in the fields of science, technology, engineering, and mathematics.

Several studies cited family influence as a major contributor to student success and selfefficacy. It is not enough to supply girls with access to science and mathematics at school;

teachers need to reach out to parents and families to support their understanding that all fields of academia are accessible to all students. Deconstructing gender stereotypes at home and in the classroom is an essential component toward helping female students to see themselves as the chemists, rocket scientists, and systems engineers of the future. Teachers can reach out to families by sending letters home that preview upcoming work, invite families into the classroom, and help families see their daughters as capable and excited learners. It is essential for families to perceive girls and women as successful in traditionally male-centric domains, and that they realize how important it is to encourage and support girls in these pursuits. Excplicit dialogue about the gender gap in STEM fields is necessary to address the important contributions of women and other minorities to the scientific community and the world.

Beyond reaching out to families, teachers have to reach out to their students. The classroom provides considerably more variables that are within teachers' control. Constructivist teaching models have lead to success for girls struggling in mathematics (Timmermans et al., 2007) while alternative models of assessment also showed promise under some circumstances (Johnson & Winterbottom, 2011). Technology infusion was another major component of student success, as well as designing tasks and curriculum according to student interest. Fostering a sense of self-efficacy with science, mathematics, and technology should be a major goal in a classroom that aims to makes these areas accessible to all students. And, as many of the studies indicated, teachers should use self- and peer-assessment strategies.

Historically, science has largely been told through a white male narrative. By teaching STEM curriculum with a multicultural perspective, teachers may make the material more accessible and engaging to all students. This includes emphasizing the diversity of mathematics and science achievement, viewing problems from multiple perspectives, and finding ways to tie

student life to the curriculum. By shifting the fairly exclusive narrative away from white males, female students can more easily identify their own personal connections to the material.

Even in areas where gender stereotypes influence student interest, teachers can link content to existing student preferences. For example as girls in one study reported a strong interest in texts about animals, teachers can make clear connections to life sciences and biology and then develop other extensions into related content areas (Ford et al., 2006). Whereas a standard curriculum may largely use expository texts with a limited perspective, effective curriculum design would allow for the integration of student interest.

Beyond addressing student interest, teachers also have to prepare students for future content. All students need to know what to expect during the transition from elementary to middle school. Many students enter middle school feeling discouraged and incapable after encountering mathematics and science (Sorge, 2007, p. 5). By better preparing, teacers can ensure that more students are adequately prepared to face an increasingly rigorous curriculum. In particular, girls need to be encouraged to experiment with finding their own problem solving strategies, to transition successfully to more challenging mathematics and science, and to promote self-efficacy and enjoyment of the material (Timmermans et al., 2007). Additional studies designed to examine effective methodologies would benefit from longitudinal design as students progress through elementary, middle, and high school.

Unfortunately, there is no simple classroom accommodation that will lead to attracting more girls to the STEM fields. There are several adaptations that have shown positive implications for select populations, but selecting appropriate classroom practices that will empower female students will require further research. Students from different cultures, ethnicities, and economic backgrounds can be faced with varying gender expectations. Clearly

no single classroom approach can work for all students. It is not enough to locate methodologies that improve girls' performance as teachers need to be concerned with methods that provide equal access. The goal, then, is to find universal methods of accommodation that make the curriculum more accessible and engaging for students of all backgrounds and learning styles.

The scope of this literature review was limited to a very brief overview of several content areas. While science, technology, engineering, and mathematics are all inherently related, each represents its own set of challenges and strengths in generating student interest and success. Teachers need simple and effective ways to integrate these subjects into everyday student life. Making these connections is ultimately the key to creating the next generation of scientists, technology users, engineers, and mathematicians. As families, teachers, and society all learn to encourage girls to pursue these fields, delivering the content in an engaging way becomes far less challenging. When half of your students perceive negative gender stereotypes related to subject matter, it may be difficult to keep those students engaged. However, once those social stigmas are abandoned, then the content is suddenly brought into reach. As more and more girls and women are pushed into the fields of science, technology, mathematics, and engineering, it will become easier to point to powerful examples of women in these fields as role models. The hope, then, is to get that ball rolling by helping girls to see the value in these fields while providing the support and encouragement owed to all students in a society that lauds itself on equal access and opportunity.

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Embracing the Messy: Exploring Critical Literacy and Reader Response Approaches

Jody A. Tahja

Abstract

The performance of adolescent readers has become a national topic of concern. This is especially evident with the increase in standardized testing, pressure from educational policy and growing global literacy demands. Students are asked to demonstrate complex skills, such as prior and in-text linking, reader resiliency, critical thinking and cultural engagement. Meanwhile, traditionally prescribed strategies and hierarchical reading tasks are proving to be less effective. In response, this review of the literature attends to the question: "What literacy strategies best serve struggling readers within the global and text-based landscape of the 21st century?" As suggested by recent qualitative and post-structural studies, Critical Literacy and Reader Response approaches may encourage readers to make connections among varying texts as well as global perspectives. In addition, these approaches assist both mainstream and linguistically diverse readers with critical thinking and metacognition. Academic and social access for all readers may be within reach if teachers can support students toward redefining characteristics of text while also exploring innovative literacy practices. Embracing the Messy:

Exploring Critical Literacy and Reader Response Approaches Sell your cleverness and buy bewilderment. (Rumi)

Growing literacy research and educational policy attest that students should not only master reading skills like summarizing and making connections among texts (United States Department of Education, 2011), but they also need to develop important global literacy and critical thinking skills (Rong Zhang, Hui-Yin Hsu & Shiang-Kwei Wang, 2010). As a future English Language Arts educator, I cannot help but perceive this union of national and global literacy goals to represent daunting and polarizing tasks. This especially seems true in approximation of high-stakes testing and classroom practices that tend to treat reading as a set of hierarchical tasks. However, as evidenced by the collection of peer-reviewed studies used for this literature review, fixing reading failure should not solicit some scientific prescription (Luke, 1992). Instead, the instructional practice of literacy requires a broader integration of social and cultural contexts in addition to an investigation of systems of power (Johnson, 2001). In consideration of such findings, the purpose of my paper aims to further investigate how Critical Literacy and Reader Response approaches, including the use of multicultural literature, enable classrooms to move beyond scholastic remedies and cultural reproduction. The use of global and critical paradigms may provide active roles for teachers and students to become social and cultural producers (Pennycook, 1990).

The prominent theoretical framework for this review of the literature is Lewison, Flint and Van Sluys (2002) Critical Literacy definition: "(1) disrupting the commonplace, (2) interrogating multiple viewpoints, (3) focusing on sociopolitical issues, and (4) taking action and

promoting social justice" (p. 382). This theoretical framework is not a seminal definition but instead represents an authorial synthesis of Critical Literacy definitions over the last thirty years.

In addition, Reader Response may help readers to interrogate multiple viewpoints. Thus, my literature review will incorporate Rosenblatt's (1978) evidence-based observations of Reader Response: "The selection and organization of responses to some degree hinge on the assumptions, the expectations, or sense of possible structures, that he [or she] brings out of the stream of his [or her] life...built into the raw material of the literary process itself is the particular world of the reader" (1978, p. 11). Rosenblatt also emphasizes the importance of the Reader Response being "an active, self-ordering and self-corrective process" (p. 11) to draw upon readers' prior knowledge and schematic linking. These two frames of thought, allow teachers to understand how Reader Response can be a nonlinear process in which the mosaic of experience-based elements are constantly conditioning each other. Reader Response not only considers the reader as an active agent, but the very act of reading becomes a co-rising event enveloped by textual and historical detail.



Figure 1. *Context*. Symbolic examples of text include books, gestures, art and verbal communication. In this image, the word "Context" is defined by the simultaneous interaction of varying forms of text (Syrett, 2012).

As literary scholarship is analyzed, it is important to reconstruct an understanding of *text* and *effective reading*. This better equips teachers to recognizing student demonstrations of effective reading. When defining text, it is helpful to analyze the function of text. With this in mind, I will summarize Hartman's (1995) definition of text: (1) text is basically any sign (utterances, gestures, art, etc.) that communicates meaning, (2) text can be intangible, such as a memory,(3) text can also be any size ranging from a long story to a single gesture, and (4) text is always composed of other texts. Based upon decades of research findings, McKenna & Robinson (2006) identify text as initiating an interactive process between a reader's prior knowledge of the subject and the purpose for reading the specific text. In addition, text activates a key reconstructive process concerning word forms and meanings. If successful, the reader's reconstructed meaning will resemble the author's intended meaning—without being completely constructed by the appeals of the author.

There are many scholastic facets, benefits and considerations about how Critical Literacy and Reader Response approaches equip students to become effective readers while also encouraging them to consider multiple perspectives. For example, Maine and Wailer (2011) explain how literary reflection helps readers reconstruct meaning and utilize empathy while Critical Literacy practitioners Lewison, Flint, Van Sluys, (2002), and, later, Locke and Cleary (2011) reflect on how multicultural literature can reposition marginalized students while also deconstructing class status.

There is also much discussion, which analyzes reader interpretation of multicultural literature. This especially pertains to classrooms and readers who do not share relevant cultural

experiences. Reflecting on this form of cultural disconnect, Rice (2005) and Henly (1993) offer insight pertaining to scaffolding strategies such as Reader Response, journaling and discussion.

In addition, schematic linking and the social repositioning of linguistically diverse readers is discussed in literacy research. Hartman (1995) explains how proficient readers reconstruct their prior and in-text experience. Later, Enciso (2011) sets up conversations to address how oral story structures can help linguistically diverse students utilize their cultural knowledge. Lastly, while investigating innovative and contemporary literary practices, Hayik (2011), Reid (2011) and Sanders (2009) redefine text-based practices to give social access to both invisible and marginalized students.

As with all research, there are numerous limitations to consider. Due to time constraints--a short project timeline along with additional program requirements--I was only able to locate research that used qualitative methodology. In addition, much of the research I examined had small sample sizes—often only including two specific case studies. However, I have found that these foundational qualities have inspired a thoughtful examination concerning the subtle complexity of effective reading performance.

Literature Review

The first aim of this paper is to synthesize a series of theoretical paradigms and data concerning the implementation of two strategies: Critical Literacy and Reader Response including the use of multicultural literature. While examining educational studies, two main themes emerged. These themes qualitatively assessed the effectiveness of both strategies. The first theme explores empathy as a way of fostering critical thinking within the classroom while the second theme investigates the significance of socio-cultural frames concerning text. In addition, I have applied socio-cultural frames across three subcategories, to include: discourse

stances, Reader Response, and storytelling tradition among linguistically, and culturally diverse students.

The second aim is to review evidence-based literacy activities that incorporate visual art, drama and computer-mediated communication. My intent is to compliment and extend scholastic discourse with engaging practices that can be used in the classroom. Though the focus of this literature review will be secondary English language arts classrooms, the frameworks and strategies can be applied in many classrooms and subjects.

Empathy as an Intellectual Process

When asking students to respond to text, teachers often rely on empathy to encourage students to relate to a particular character's perspective. Most often, empathy has several textual connotations. Typically, it includes psychological elements of emotions combined with the humanistic sharing of feelings. Although, such components are important to an understanding of empathy, I also emphasize the associated intellectual processes when referring to empathy in literary context. Empathy is, in fact, a cognitive process of identification that is largely based upon a reader's prior experience. Empathetic identification, in association with culturally authentic work, helps to activate a reader's schemata while also helping him/her to consider the unique characteristics of lived experience (Sanders, 2009).

In a recent Reader Response based study, Maine and Wailer's (2011) discussed the importance of a two-way relationship with the reading process. This two-way relationship allows the reader to, not only, bring their prior experience to a specific text, but also take something away that may affect or even change them. Researchers investigated how five ten to eleven-year-old readers and five adult readers interpreted the classic English story *Swallows and Amazons*. Over the course of six weeks, Maine and Wailer transcribed reader dialogue taken

from a series of individual interviews and of each group's book club meetings. While evaluating case study evidence, researchers were able to identify and discuss the importance of implementing visualization and other sensory responses as well as empathy during reading. In addition, their findings demonstrated that empathy emerged as a key element of understanding and social identification. This was largely apparent by how readers identified with two of the main characters and associated events.

Another theme that surfaced in Maine and Whaler's research addressed how resilient readers remained as they worked to comprehend unfamiliar features of text. Success was identified when readers were able to accept levels of dissonance when faced with unfamiliar terms. This acceptance helped readers to remain engaged with the plot of the text. In addition, individuals, with prior experience pertaining to particular language, were more able to empathetically identify with the text. Maine and Whaler suggested that educators should guide students to use empathetic identification to unlock the intertextual secrets and identify the cognitive changes that readers may experience after reading. Findings indicated that, when readers were cognizant of such changes, they continued to take new information and apply it to their everyday life.

One curriculum practice that teachers may use to encourage empathetic responses from students includes the use of relevant multicultural literature (Locke & Cleary, 2011). In a twoyear New Zealand study, which tested the effects of Critical Literacy in seven visibly diverse multicultural English programs, Locke and Cleary (2011) argued the importance of empathetic identification. They found that relevant multicultural literature engaged students. In a poststudy questionnaire, Maori and Pasifika students expressed interest and engagement with texts that they had a specific cultural connection. Researchers transcribed student dialogue concerning

text reading and discussion while also collecting survey-based evidence. After reading the short story titled "Te Manawa" which described a Maori female who received a heart transplant, one Maori student commented "That's cool miss...are there more like that...you know with stories about our stuff in them?" (p. 132).

This student comment indicated that relevant multicultural literature sustained personal as well as literary interest. In addition, this short story provided the students with an opportunity to share prior knowledge about Maori culture—largely repositioning them into places of power and expertise. This is keenly important in evaluating the implications of "voice" related to students who may be marginalized. Such literary experiences may empower marginalized students within other mainstream components of society (Locke & Cleary, 2011).

At the same time, empathy has the potential to guide students toward deconstructing class status while encouraging overall engagement with multicultural texts. Lewison, Flint and Van Sluys (2002) studied thirteen educators over the course of eight months to study the effectiveness of Critical Literacy. Effectiveness was assessed by disruption of societal norms and stereotypes, interrogation of multiple viewpoints, focus on socio-political issues and action to promote social justice. For teachers in the early stages of implementing Critical Literacy strategies, researchers found that teachers and students disrupted societal norms and interrogated multiple viewpoints. In fact, during a story discussion session pertaining to poverty, a fifth-grade student commented that, in some instances, children meet people "that their mothers do not like" (p. 386). This comment, demonstrated personal connection along with insight concerning the early questioning of class status in a wider community.

Even though this particular student may not have a personal connection with poverty, he identified one of the story's implicit themes. This demonstrates the significance of teachers

attending to student voice and intertextual links. Findings indicate that unexpected intertextual links, such as the ones described, may serve as the foundation for scaffolding literary comprehension. When student experience varies greatly from characters in stories read in the classroom, this strategy may be applied.

Teachers may have the misconception that by stocking bookshelves with multicultural literature, readers will develop an empathetic connection with characters that have different social or cultural experiences. Unfortunately, this is not always the case—especially when multicultural literature is not relevant to the classroom community. In addition, readers may have trouble comprehending a text without explicit literary support.

In a study of eight Caucasian sixth grade students, Rice (2005) found that readers were unable to comprehend four short Hispanic-American stories. Readers also responded apathetically to new cultural themes presented in text. A biased response, in relation to unfamiliar text components, is sometimes referred to as "aesthetic shutdown". Rice commented that readers were unable to relate to character conflict and perceived many of the story characters to be lacking intelligence or education. In addition, readers frequently tended to refuse to engage with unfamiliar Spanish terms and commented that characters were "weird". Readers relied on personal and individualistic understanding, which often resulted in misinterpretation. Due to aesthetic shut down, students had trouble with comprehending text and were unable to empathetically identify with the depicted culture.

Rice's study offered a limited illustration concerning aesthetic shutdown. In reviewing this study, teachers should consider the timeframe and setting in which this study was conducted. The study took place over the course of four days within a university-based laboratory. In

addition, multicultural experiences were exclusively portrayed by one author—Gary Soto. This may have limited the range of potential responses.

Socio-Cultural Frames



Figure 2. *Where does your compass point?* The hand, positioned over a text, holds a compass with directional symbols titled: "Race", "Religion", "Place", "Culture" and "Socio-Economics". The compass symbolically represents how a reader's background influences interpretation (Syrett, 2012).

As Rice's study illustrated, it is quite common that readers routinely encounter unfamiliar items in culturally relevant text. Readers may respond to unfamiliar items as being "weird" and in turn rely on their inner-texts to decode. Despite this frustration, readers should be reassured that the unknown is an essential part of learning and "cultural meaning is humanly made and [constantly] remade" (Mills, 1997, p.1080). Personal backgrounds do shape and form different interpretations and discourse stances (Hartman, 1995 & Rice, 2005). Research demonstrates the importance for teachers and students to investigate ways in which society assigns value to varying forms of text and storytellers (Enciso, 2011).
Exploring reader response. Henly (1993), decided to employ Reader Response in her eleventh and twelfth grade English language arts classroom as a way of justifying the value of using a controversial, multicultural novel—Toni Morrison's *The Bluest Eye*. After qualitatively assessing transcribed discussion and Reader Response logs, Henly concluded that Reader Response turned a potentially stressful literary encounter into an empowering experience for the students and for her. Field notes and teacher narrative demonstrated how students employed prior-knowledge, made links with other texts and engaged with Reader Response discussion. These strategies helped readers to reconstruct meaning about difficult and controversial topics, such as incest and isolation.

During the story unit of *The Bluest Eye*, Henly frequently read aloud and stopped to ask and answer questions. It was during one of these reading aloud events that Henly realized students did not have prior knowledge related to traditional American families. This provided an opportunity for Henly to scaffold student understanding about the historical flux and symbolic breakdown of the traditional family structure. In this example, Henly taught readers to be cognizant of how they position themselves within a text. Although Henley's work could be viewed as anecdotal, teachers can still gain a sense of how to implement Reader Response. This study may inspire further investigation pertaining to the cultural construction of text along with the effects of discourse stances.

Discourse stances. During the formative stage of piecing together the facets of effective reading, teachers may conjure a sterile image of a reader and a text as well as a separate backdrop of social cultural experience. However, it is crucial for teachers and student readers to recognize such components as being authentically inseparable. Social cultural experiences largely shape the context and production of a text as well as reader interpretation. Considering

this paradigm, teachers may be inspired to view the socio-cultural frame as an implicit compass, guiding both the author and the reader.

Hartman (1995) studied verbal responses of eight proficient high school readers to understand the socio-cultural process in relation to reading. Hartman commented that although reader attitudes were sometimes determined by how unfamiliar or interesting a text was, most often such stances had largely been shaped by a reader's prior experience. In his seminal study concerning a process called "text-based linking," Hartman identified three discourse stances routinely made: *logocentric, resistant* and *intertextual.* To summarize, logocentric stances relate to how the reader exclusively surrenders to authority while a resistant discourse stance describes how the reader assumes complete authority over a text. Of special importance—and identified as the most effective stance concerning effective reading—is the intertextual discourse stance which allows the reader to assume various authorities while reading.

In Hartman's study, intertextual readers were able to revisit prior textual experience in order to deconstruct and reconstruct meaning. The plurality of Hartman's three discourse stances greatly problematized traditional identification of expert and *ideal* readers. Even though Hartman's study offers teachers important insight concerning reader predispositions and attitudes— such evidence narrowly pertains to proficient English language readers. This leads to further inquiry regarding teacher assessment of a linguistically diverse reader.

Storytelling with linguistically and culturally diverse students. Interpreting Reader Response along with identifying a reader's main discourse stance can present some level of difficulty—especially when a reader's language and cultural experiences differs from the teacher. At times, teachers may infer that a linguistically and/or culturally diverse student is inept at literary analysis as he/she may offer a non-standard interpretation. Enciso (2011)

investigated how and why individuals may equate unfamiliarity with inferiority, concerning language and other forms of text. She argued that all stories are positioned within context of power. Cultural capital and societal norms determine who is recognizable as a storyteller and what is recognizable as a story (Enciso, 2011). This implicitly positions teachers as they explore how culturally and linguistically diverse groups are constantly negotiating social misunderstanding. Cultural and linguistic groups often struggle to be understood in what is perceived to be *somebody else's* linguistic domain or cultural space.

Enciso worked with six to eight students from a linguistically and culturally diverse sixth grade language arts classroom in the United States. While immigrant and non-immigrant readers regularly attended an informal weekly story club, they discussed topics and stories. The goal, across the first year of storytelling, was to invite readers to move beyond finalized meanings in their interpretations. Instead, readers were urged to speculate and play with text. Meanwhile, Enciso transcribed their discussion by using an ethnopoetic narrative form, based on oral story structures. She later commented that mediated storytelling served as an important tool for linguistically diverse students to utilize their cultural and literary prior-knowledge. However, many immigrant readers were not always perceived as experts or as individuals who had something important to offer. Enciso discussed how reader stories often remained unheard due to peer distraction, lack of empathy, and misinterpretation.

In addition, she found that it was quite difficult for her—as a participant facilitator—to steer away from finalized meaning. During one story club meeting, she found herself unintentionally emphasizing a literary term, allegory, instead of permitting a discussion about race and exclusion concerning a Sudanese tale. The candidness of Enciso's research discussion,

allows other teachers to realize that many student stories remained unheard due to the persistent marginalization of linguistically diverse students.

Innovation Concerning Text: Employing Visual Art, Drama, and Facebook

In tackling difficult questions pertaining to the implementation of Critical Literacy and Reader Response approaches, innovative and contemporary practices such as visual art, drama and even Facebook may be effective in classroom application (Hayik, 2011; Reid, 2011; Sanders, 2009). As was mentioned in the introduction, teachers may reassess what characterizes a text and what characterizes an effective reader. This new conceptualization should exceed the boundaries of leather binding and type-faced print, in turn allowing a rich experience of code, spoken word, artistic interpretation and gesture to take value within the classroom. Once an expanded text-based understanding is established within the classroom, a growing variety of text—across varying genres and media—can give access and power to students (Reid, 2011).

Hayik (2011) used multicultural literature—within the critical literacy theoretical lens as a springboard for a group of Israeli-Arab middle school readers, in Israel, to explore multiple perspectives concerning visual text. Hayik asked readers to create visual representations after previewing a multicultural picture book about a fatal conflict. After readers completed their sketches, Hayik critically analyzed two sketches based upon the following research frameworks: Alber's (2009) visual discourse analysis, Kress and van Leeuwen's (2006) grammar of visual design, and Reissman's (2007) narrative visual analysis. Hayik, then gave readers the opportunity to explain how they understood specific works of art. To clarify any misconceptions, individual artists verbally revealed their intentions. During this time, Hayak claimed that the two students were able to connect to all four dimensions of critical literacy based upon Lewison's (2002 and 2008) research: disruption of societal norms and stereotypes,

interrogation of multiple viewpoints, focus on socio-political, and action to promote social justice.

Despite the relatively short time span of this study, it offers teachers insight about the text-based richness of art. Hayak's work models how teachers can facilitate space for readers to explore their own socio-cultural positioning within text along with local and global community influences. Moreover, once readers understand their own stances and interpretations, as evidenced by Hayak's study, teachers can scaffold this awareness by helping students to make important empathetic and cognitive links when encountering unfamiliar cultural experiences.

Sanders (2009) evaluated both individual and collective performance-based responses of unfamiliar multicultural texts. During a one-day topical course, an intergenerational group of teachers read: Librarian of Basra: A True Story from Iraq, and First Crossing: Stories about Teen Immigrants. Prior to reenacting specific texts, Sanders asked teachers to provide written responses in the form of prompts, reflections and poems. Dramatic reenactments included auto images and improvisations. Teacher participants also provided contemplative reflective responses to dramatic reenactments. After evaluating responses, Sanders claimed that process drama and prompt-based writing not only deepened understanding and meaning of multicultural text but also appealed to kinesthetic and experiential learning styles. Sanders found that teachers were able to empathetically experience multicultural text in addition to recognizing literary features like poetic rhythms and cadence. Transcripts supported Sanders's claim that dramatic performance transformed cultural assumption and aided in aesthetic and cognitive literary development. However, one limitation of the study may be that participants were all adult teachers. Further study and discussion concerning the application of performance art within the primary and secondary classroom need to be explored.

Technological media is frequently overlooked when considering the approaches of Critical Literacy and Reader Response. Teachers may be hesitant in using computer-mediated communication in the classroom because such practices are perceived to encourage non-standard forms of literacy (Reid, 2011). This discourse, concerning computer-mediated communication, greatly depends upon whether a teacher *prescribes* language practices—judging certain forms to be more correct—or whether he/she encourages readers to *describe* how language is used, without judgment (Harrison, n.d.).

Reid (2011) evaluated a compulsory literacy course at the University of the Witwatersrand (South Africa) where all first year Bachelor of Education students and tutors were given the opportunity to join a closed Facebook page. To assess voluntary social page posts, Reid used a socio-cultural approach along with interdependent model of Critical Literacy developed by Janks (2004, 2010). Students used Facebook to informally discuss learning experiences, obtain advice, and even examine important sociopolitical events like teacher strikes and campus-based programs. According to Reid, evidence in the form of electronic transcripts and literary discussion demonstrated how Facebook allowed students to disrupt power, use their own codes, find physical and social access, construct identity, cross-culturally communicate and redesign understanding. This was evidenced by how readers: invented new language forms; used humor; reflected about shyness and cultural identity; and expressed personal insecurity. Reid's theoretical research frame can be conceived as being broad—generalizing democratic progress. However, student discourse offers teachers important insight pertaining to how varying literary domains govern how we communicate with each other. In support of computer mediated communication, Locke, Cleary, (2011) and Reid (2011) discussed how social pages in the classroom can provide students a safe space to learn while also assisting educators in

understanding students' socio-cultural positioning, as well as, discourse stances and literary misconceptions.

Conclusion

During my review of research concerning scholastic and cognitive implications of Critical Literacy and Reader Response two main themes surfaced: empathetic identification and socio-cultural frames. In consideration of national reading assessments and global literacy inventories—which indicate that most readers in the United States are not meeting proficient standards (United States Department of Education, 2011, Rong Zhang, Hui-Yin Hsu & Shiang-Kwei Wang, 2010)—it is proving imperative for teachers to employ evidence-based strategies that incorporate independent inquiry along with cultural discovery. Critical Literacy and Reader Response challenges contemporary literacy paradigms, which often seek prescribed and scholastic remedies for "struggling" readers. Research indicates that the collective engagement between text, reader discourse stances and prior experience exceed definitive processes and finalized meaning. Instead, a messy literary exploration, within the framework of critical thinking and empathetic identification, can help readers find their place within the global and text-based landscape of the 21st century.

Within this literature review, there was a strong emphasis of qualitative and poststructural methodology—case studies, teacher narrative and reconstruction of societal paradigms. In addition, scholastic evaluation of student and class progress was limited. In fact, the main study, which assessed and discussed academic progress in correlation to Critical Literacy, was conducted outside of the United States (Locke & Cleary, 2011). This causes some level of concern for many teachers who wish to further investigate academic success in connection to these approaches. I believe that the implementation of quantitative methodology, related to

Critical Literacy and Reader Response, is necessary in developing important educational discourse.

In a western society, which prizes the perceived objectivity and conclusiveness of quantitative research, Critical Literacy teachers may feel it necessary to provide performancebased statistics in order to gain support from administrators, board members and families. In addition, quantitative research may offer teachers the opportunity to replicate studies—further benefiting the scientific stream of critical realization and discourse. This is not to say that qualitative methodology does not have special merit in assessing literacy performance. Teachers can be reminded of the subtle complexity inspired by qualitative research—a complexity that would be extremely difficult to convey through numerical correlation. Despite methodology and setting limitations, I believe that it is crucial to engage with available research in order to further explore and implement Critical Literacy and Reader Response strategies within the classroom. For the remainder of this literature review, I will offer a brief synthesis of evidenced-based recommendations.

Recommendations

In discussing theoretical underpinnings concerning Critical Literacy and Reader Response, it has proven beneficial for both teachers and student readers to redefine text beyond books. Regardless of literacy proficiency or type, readers engage with countless forms of text. Meaning is conveyed through a politician's speech, a grocery list, a YouTube video or even a hand shake. Moreover, if teachers consider technological advancements along with cognitiveevolutional research concerning the relative newness of literacy (Armstrong, 2003), it appears that language and communication is a quickly adaptive and inventive process—taking many forms. This leads teachers to ponder the significance of innovative literacy methods and

strategies. In pursuit of effective and relevant strategies, teachers can begin by helping students re-conceptualize the variation and purpose of text. This gives readers access to a wide variety of text-based and individual resources. These resources can help to foster critical thinking skills along with empathetic identification.

Empathetic identification assists readers in constructing meaning along with promoting literary interest (Locke, Cleary, 2011, Maine & Wailer, 2011). By treating empathetic identification as an intellectual and constructive process, reading becomes a multi-faceted relationship conditioned by new understanding and application. This allows the reader to move beyond decoding and formulaic recitation; instead, he or she is able to synthesize prior experience in order to *create* meaning. However, meaning is contextual—largely dependent upon an individual's socio-cultural frame. Unfortunately, due to a climate of high-stake testing and structural mindsets relating to literary analysis, finalized meaning is often rewarded instead of reader exploration (Enciso, 2011). This proves to be especially problematic for readers who are linguistically and/or culturally diverse. Teachers can begin by reevaluating their own literary expectations and socio-cultural frames. After investigating bias, teachers are better prepared to help mainstream readers to embrace the unfamiliar. Linguistically and culturally diverse readers bring a wide range of experience that can serve as resources. This important exchange gifts mainstream readers—and teachers—empathetic understanding while positioning linguistically diverse readers into places of power.

The fear of the unfamiliar--or even the unexpected—has served as a recurring motif, surfacing in several studies used for this literature review. Rice (2005), discussed how Caucasian readers experienced aesthetic shutdown while reading and discussing Hispanic-American literature. In addition, Enciso (2011) commented that many linguistically and culturally diverse

storytellers were often misunderstood or ignored by other readers. In consideration of these findings, it appears necessary for teachers to explore strategies that scaffold understanding of multicultural encounters. Rice emphasizes the importance of peer-led discussions so that teachers can make observations and consult with readers pertaining to any misunderstanding. This can also be achieved through reader response logs and even social pages. Teachers may need to employ a variety of innovative strategies in nurturing literary and multicultural understanding.

Lastly, I would like to discuss the importance of employing innovative strategies in fostering student understanding. Hayik, (2011) and Sanders (2009) used visual art and dramatic reenactment in helping readers to reconstruct the meaning of text. In addition, Reid (2011), Locke, and Cleary (2011) investigated and discussed how computer-mediated communication helped to support student learning while cultivating safe places for marginalized and invisible students. These latter examples are keenly relevant concerning national aims mediated by technological engagement.

Due to ongoing advancements, a multidimensional form of engagement and thinking has proven essential for both post-secondary schooling and the workforce (Gregory & Kuzmich, 2005). If readers are equipped to use technological resources in order to evaluate authenticity, they may synthesize new information and gain multicultural views to develop innovative literacy. Innovative literacy is a life-long development in which readers develop adaptability, independent thinking, empathy and construct new knowledge (Gregory & Kuzmich, 2005). When readers achieve proficiency concerning such practices, they are not only able to navigate everyday dilemmas with confidence but they are better equipped to imagine new possibilities.

In consideration of our changing world, it seems especially vital for teachers to move beyond secondary paradigms regarding literacy. To better serve readers and students,

classrooms can no longer be viewed as meeting places to establish cultural and intellectual reproduction. Instead, innovative, evidence-based approaches are needed to help readers synthesize prior experience and in-text encounters with modern resources. Instead of finalized meaning, readers should be encouraged to produce new meaning and understanding. It is my hope that *all* readers be presented with Critical Literacy and Reader Response strategies as a means to nurture important critical thinking skills and global interconnections.

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Into the Ether: The Benefits of Creating and Utilizing a Classroom Website

Robin Tuckett

Abstract

Offering students access to content and communication provided outside of the classroom walls is a critical part to increasing student progress. This literature review addresses the question: what effects on student progress does a classroom website have and does everyone have access to it? The three categories used to organize these studies are student performance, satisfaction and communication, as well as home connection and access. The results of the studies explored suggested many benefits of classroom websites. Websites are linked to the increase of student scores and implementing additional features linked to the website, such as the use of wiki sites, could improve the authentic and deliberate nature of their education. A class website can improve the satisfaction and communication of education and some teachers feel that their website is an essential aspect to the success of their classes. Communication and supplemental information provided on class websites can improve parental involvement. Computer ownership is a possible link to higher test scores and grades although merely giving students access to a computer and the Internet could not be sufficient to get them to utilize it for schoolwork and enhance their academic success. Community technology centers are explored as a possible solution to foster the development of a positive relationship with technology that is needed.

Into the Ether:

The Benefits of Creating and Utilizing a Classroom Website

In an age of booming technology, the educational system is challenged with maintaining high standards our society has traditionally valued as important to teach students, as well as acknowledging the change of preferred mode to acquire this knowledge. Not only has there been studies conducted to establish the importance of technology in the classroom, there is additional information to illustrate the advantage of having access to curriculum outside of the classroom. The need to communicate with students about content is evident and crucial to their success in the classroom. In the past, teachers have relied on worksheets, textbooks, and letters home as their main source of communication with students and their families after the classroom is closed. The direction of our society is rapidly moving most of its communication onto the Internet. Students, parents, and teachers alike are merging their traditional modes of communication.

In my student teaching, I found that communication was the most challenging aspect of supporting student success. After students left my classroom, they lacked additional support. This is true of students who were unable to attend class that day. The only access students or their families had to their educational progress was a database of assignments that had been graded and what assignments were missing. The titles of these assignments were abbreviated, leaving the student unclear of the expectations, and no additional or supplementary information was given to assist them in the completion of such tasks. As their teacher, I was then fully responsible for continuing to check on their progress and providing extra copies and notes on things we covered in class since they had no access to it on their own. Students were then able to

find an excuse for their incomplete work because of that lack of access. I was left with a desire to give them access and hold them accountable for acquiring the information on their own. This led me to find research studies that would illustrate one tool some teachers are using to prevail over this obstacle: classroom websites.

I will be discussing certain aspects of technology. For the purpose of this paper, "technology" will be used as term describing a traditional computer and its ability to be connected to the Internet. Access to this technology will be defined as the ability to physically access it. Although access can also be defined through other means, in the context of this paper it will represent a socioeconomic viewpoint of acquiring a computer and Internet service. The effects of implementing a class website are addressed in three categories. First exploring the connection to student performance will be addressed. Websites are possibly linked to the increase of student scores (Persin, 2002), and implementing additional features linked to the website, such as the use of wiki sites, could improve the authentic and deliberate nature of their education (Tarasiuk, 2010). Next the literature explores how a class website could improve the satisfaction and communication of education. Some teachers feel that their class website is an essential aspect to the success of their classes (Witt, 2003), and some students report a higher level of satisfaction especially when features of communication are incorporated (Elicker, O'Malley, and Williams, 2008). This communication and supplemental information provided on class websites could improve parental involvement (Epstein & Dauber 1991). Finally, the literature continues to explore the home connection and addresses the issue of ensuring quality access to all students. Computer ownership is a possible link to higher test scores and grades (Fairlie, Beltran, & Das, 2010), while merely giving students access to a computer and the Internet could not be sufficient to get them to utilize it for schoolwork and enhance their

academic success (Snyder, I., Angus, L., & Sutherland-Smith, W., 2002). Community technology centers are a possible solution to foster the development of a positive relationship with technology that is needed (London, Pastor, Servon, Rosner, Wallace, 2010).

These connections lead me to the possibility that a classroom website could be an effective tool to enhance my classroom. The question behind this literature review was: what effects on student progress does a classroom website have and does everyone has access to it? For the purpose of this paper I have limited my scope to the benefits of utilizing technology outside of the classroom. There are many research-supported reasons to include technology within the classroom that I plan not to address. The purpose of selecting the studies I did was to narrow the span of what happens beyond the classroom walls with specific attention given to websites. This literature review attempts to use a variety of classrooms, spanning elementary to post secondary education. This was done intentionally to illustrate commonalities websites have between grade levels.

Literature Review

There are many suggested benefits to the creation and utilization of a class website. The literature discussed describes examples, though not exhaustive, of instances where websites have been incorporated successfully. Through the research, three themes emerged depicting the advantages. They were 1) student performance, 2) satisfaction of the class and communication between student, teacher, and parents, and 3) the home connection and access to the website. The studies are organized according to the themes they have the strongest connection to.

Student Performance

Ron Persin (2002), a physics teacher at Boca Raton high school in Florida, conducted a 12-year study of his students' final exam scores over the course of three consecutive four-year

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periods. He was inspired to conduct the study when students were changed to a block schedule, and he noticed a subsequent drop in test scores. The school schedule changed from the traditional scheduling of 7 periods of 50 minutes each, to a block format of a 4 period day with each class lasting 92 minutes each. This change was explained as an attempt to prepare students for a college-like atmosphere while also allow teachers to be more efficient in each class period.

After the block scheduling was introduced, Persin compared student data and realized that student scores were being negatively affected by the change. Persin attributed this drop in scores to the new schedule. In an attempt to raise student test scores, he implemented Internet assisted instruction through the creation of a class website. On his website, he maintained weekly plans, assignments, and lecture notes to give students access to this material if they had missed class. His site also included links to other sites, and on-line quizzes and tests to give his students supplemental material as well as instant feedback. Persin also included an email link to provide communication with his students outside of normal class time. Over the course of four years, approximately 400 students took physics and the site had been accessed over 40,000 times.

Findings in the data showed a growth in test scores after the class website was created. Before the schedule change and any Internet assisted technology, the mean score on the final exam was 78.2. After implementation of the block schedule but before the class website, student scores dropped to a mean score of 65.7. Then after the website, mean scores rose to 72.4, an increase of 6.7 points. Although the increase was not as high as before the schedule change, he attributed the increase to his use of a class website.

The range of this study tends to be the most significant limitation of this study. It only took into account one teacher at one high school and one subject matter. The researcher also did

not take into account that the teaching style in the class could not have been effective for the longer 92-minute classes. Another possibility for the drop in test scores could have been the attitude of the students toward the new block schedule and their possible distain towards it. It is possible that the rise of test scores was attributed to the length of the study. The researcher reported results during four-year increments. The last group of students was never exposed to the traditional scheduling previously used and therefore the block schedule could have become an accepted school norm, not a source of animosity.

Although there is more research that needs to be done around this particular study, it does illustrate the possible connection between higher test scores and class websites. This website offered a way for students to remain connected to their teacher even when absent from school. The importance of providing differing modes of communication and participation seem to be linked to the increase of scores.

A teacher, T. J. Tarasiuk (2010), conducted a study attempting to find differing modes of communication and participation with her students. Through observations and surveys, realized that her middle school students were using the Internet outside of class to produce alternate forms of literacy. One student, in particular, refused to complete school assignments and readings, but created complex stories published on YouTube. Her realization that students possessed a type of literacy that was not entirely traditional encouraged her to discover a way to incorporate her students' desired practices into her traditional approaches in the classroom. To better understand student use of the Internet, Tarasiuk developed a survey and distributed it to 252 middle school students. The results indicated that the majority of her students enjoyed and used both traditional books as well as the use of the Internet. In an effort to combine the two modes of literacy to engage all of her students, Tarasiuk asked students create online wikis to

keep track of information while they read novels. These wikis consisted of online space where many contributors could write about a specific topic while also modifying content throughout the process.

Immediately, Tarasiuk found that students were participating at a higher level of engagement and working harder than she had observed in the past when she used traditional packets and worksheets. She speculated that the increased engagement was, in part, because their wiki sites were a public space for people to see their work and, therefore, motivated students to be more thoughtful. Students also seemed to be going beyond the assignment requirements by adding extra items to the wiki page, like a countdown clock to record when they would be finished with the book and chat boxes to encourage discussion. The culminating project of reading their novel became a digital book talk. This digital book talk was in a format similar to a movie trailer. Again Tarasiuk found that students were contributing far more than the required particulars of the assignment and relating to the text in a way she had never seen her student achieve.

This study, however, did have limitations. The results could have been misrepresented because of the novelty of the assignment as well as their teacher's excitement toward it. More research should be done to prove this is not an anomaly within this one teacher's classroom. Tarasiuk continued to use this process of teaching literacy through modes of technology and has achieved additional positive results. This study provided an example of how teaching students with the added benefit of technology can improve the authentic and deliberate nature of their education. Comparing Tarasiuk's class before and after newly implemented technology suggests the likely positive impact.

Maria Bartini (2008) also explored how a traditionally taught class would compare with a class that included a website. She conducted her study at a public liberal arts college, including 39 students. These 39 students represented two child development classes taught by the same teacher, 20 students in the traditional class and 19 with the class website. Both classes were tested using the same five unit exams and one final during the semester and their scores were compared to the same two classes taught the previous semester. There was an added requirement for students in the website supplemented class. They were required to complete a reading quiz for each required reading before they discussed it in class. The scores to their reading quizzes were made immediately available to the students and they were able to track their comprehension. Along with the reading quizzes, the website also provided students with links to a variety of study aids.

In this experiment Bartini found that the students exam scores improved significantly in the class taught with the supplementary website. Although the scores improved for the five exams, when it came to the final, students in the website enhanced class only scored slightly higher than the traditionally taught class. Bartini speculates that this could due to the fact that the periodical exams given throughout the quarter were in the same format as the reading quizzes provided online and the final was created with a different format.

Students were also given a survey at the end of the class to evaluate their attitude and enjoyment of the website. Students seemed to generally favor the website. The survey showed that they enjoyed the online 24-hour access they had to the study guides and information. They did, however, rate the online reading quizzes lower than the other website components. Bartini speculates that this might due to the ridged nature of the quizzes and the forced added homework

required. It is possible they might have rated the quizzes higher if they were an optional enhancement to check their reading comprehension rather than a requirement.

Possibly the most noticeable fact of this study is that when students were asked to evaluate the class, students enrolled in the traditionally taught class said that the in class activities were the most enjoyable part of the class while the students enrolled in the website enhanced class commented on their learning as being the most enjoyable part of the class. This is interesting because the in class activities were the same for both classes so this implies that the outside of class learning enriched the entire class.

This was a very small sample size and so it is hard to determine the accuracy of these results. Although the results did show an increase of exam scores it was difficult to determine if it was because the quizzes held them more accountable for the reading or if it was the added components on the site. More research needs to be done to determine the difference between the two variables. It would also be beneficial to examine weather having more quizzes online in the same format would have improved their scores on the final exam. This would show if having them take the online quiz was actually helping them with their reading comprehension therefore giving them higher exam scores or if they are just rehearsing the format of the exam and the format is what they have learned not content.

Satisfaction and Communication

Although research suggests a class website does improve student performance, exploration of the amount of satisfaction it has for its users is necessary. A survey was distributed to 24 teachers who taught on an urban community college in the south. They represented diverse academic disciplines such as computer science, music, foreign language, and science (Witt, 2003). Witt wanted to know if the faculty felt it was worth the time and effort put

in to creating a class website for their students. A voluntary survey was distributed. 36 questionnaires were sent out to teachers who had a class website and only 24 were returned. The survey had nine open-ended questions asking things such as who authored the original site, how much time and money was spent building it, who performs the maintenance, how much time does that take, motivation for the creation, goals associated, and the extent the goals have been met.

Witt discovered that teachers said that their websites provided access to class information, promoted communication, helped students learn online, and they aided in delivering classroom instruction. There was significant time devoted to the creation and maintenance of their site. Teachers reported that they spent an average of 13.6 hours to create the site and spent another 10.6 hours throughout the semester to maintain it. Although there was a lengthy time commitment, 77% of teachers reported they built it themselves with no money. As far as the teacher opinion about the importance and usefulness, 60% felt that their objectives were entirely or largely met. As well as meeting their class objectives, teachers felt that their website was an essential aspect to the class.

This was, however, a very small sample and Witt did not consider the results of the surveys not returned. Having 1/3 of the sample not respond alters the accuracy of the results. The teachers who did not respond could possibly have a negative opinion about creating a website therefore did not find the study valuable. This study does possibly illustrate the point that although websites may be a daunting task, teachers found they added to their effectiveness to deliver content and manage their class.

Although delivering content to students outside of the classroom is the main goal of teachers, students need to access this content in order for it to be of value. At a Midwestern

university, a study was conducted to determine weather adding communications features to a website would increase student opinion and use of class websites (Elicker, O'Malley, and Williams, 2008). Eight classes of Introduction to Psychology were taught to 258 students, 153 women and 105 men. Four classes were taught using the existing class website and four classes were taught using a WebCT site, an enhanced website outfitted with communication tools. Students used both websites on a volunteer basis. They were told about the site at the very beginning of the class and the teacher only referred to it on occasion thereafter. Both websites were organized similarly. Each site came equipped with components such as test topics, syllabus, assignments, practice quizzes, and links to other websites. The added components added to the WebCT site were discussion boards, chat rooms, and the ability to directly email their teacher and classmates from the site. Students were given one pre and one post questionnaire to determine the use and attitude towards both class websites. The researchers also used the total class points earned to measure the efficacy of the enhanced WebCT.

Elicker et. all, discovered the students who were given access to the WebCT site accessed it on a near weekly basis. This is differs from the other students using the original website. They reported using the class site only a few times during the quarter and mainly accessed it to complete homework assignments and review test material. The survey also concluded that the WebCT students accessed it mainly for communication and accessing the syllabus. Elicker, et. all, speculated that the students using the WebCT site allowed them to clarify questions about the class, continue in-class discussions, and problem solve outside of class. This made their learning less about completing and memorizing, instead focusing on processing the information they acquired.

Students using the WebCT site also earned more class points. It was reported that the WebCT students earned 73% of the total class points, whereas the other students earned only 66% of the total class points. These points were earned through quizzes, tests, and papers throughout the quarter. Students also reported higher satisfaction in all measured categories. These categories included their satisfaction with the class in general, their teacher, the class website, and the communication they had with their teacher.

The study's results are limited. The study relied on student survey responses only and did not track actual usage. They based their results on student perception of use, which could have been biased. Accounting for actual usage would help to analyze the effects of class work and supplemental learning activities done outside of class, enhancing student success.

Student success is influenced by many factors. One factor is the amount of parental involvement. A study was done to examine teacher practices of involving parents in "difficult" or "disadvantaged" inner-city schools (Epstein & Dauber 1991). The focus was based on earlier studies that suggested that there are five major types of involvement schools and families have to share in the responsibility of a child's education. The first type of involvement is the basic obligations of the family. This was defined as creating and maintaining a positive home environment as to assist in healthy child development that supports the school. The second is the basic obligations of schools. This type of involvement was defined as any communication with families about the student's progress or school programs. It included phone calls, emails, report cards, and any other form of communication the school creates. The third type of involvement was parental involvement at school. This included any in school volunteering or attendance such as in class assistance or watching student sports, performances, or any other event. The fourth type was the parent's involvement in learning activities at home. This required parents to assist

their own children with learning activities while providing guidance on how they can be more successful at school. The fifth major category of involvement was the involvement in decision making at the school. This includes organizations such at the PTA or community advocacy groups that create participatory roles for school improvement. The researchers used these five types of involvement to conduct their research.

The purpose of this study was to examine the types of parental involvement programs that were in place currently, what were the important aspects of the program, and how they correlated. This examination was to be the foundation in further studies attempting to find ways to improve the parental involvement in school. Data was collected from eight different schools, five elementary and three middle schools. All were found in inner city Baltimore, MD and were defined as Chapter 1 schools. 171 teachers participated and were paid for their time. The teachers were given a questionnaire that consisted of 10 questions with many sub questions.

The study concluded two major findings from their research. The first finding was that programs of parental involvement are reported to be much stronger in the elementary schools and decrease when students enter middle school. The second finding was the correlation between the types of involvement and how the type of involvement affected the other categories. This study concluded that if the school had a strong program in supporting learning activities at home you could predict with up to 32% accuracy that one or more of the other types of involvement also were in place. This is evidence to the importance of creating a program that assists students to have learning activities occur at home as to support parental involvement in their child's education.

This study, however, did not focus the attention on the parents themselves and possibilities for why they were able to contribute some types of involvements and not others. It

would have been beneficial to examine the possible reasons parents were not participating. Information about the difficulties of participating, the lack of interest to participate, or the perceived desire the parent felt that the school wanted them to be involved would make this study more conclusive. If the goal was to create a program that increased parental involvement, more attention toward the intended party might provide better insight.

To explore parental opinion, an online survey of both teachers and parents of elementary schools was conducted to determine the opinions and beliefs about the usefulness of classroom websites. Volunteers were solicited by email and responses were collected from 244 elementary school teachers and 483 parents of at least one elementary school age child from various schools around the country. The survey included three sections. The first section contained demographic information about the participants ensuring equal representation in the study. The second section was aimed at finding out if parents and teachers felt a website was important for them and why, and the third section attempted to identify the necessary elements needed in a teacher website to make it effective.

The survey discovered that an astonishing 94% of the parents and 97% of the teachers believed that a teacher website was valuable. Some of the reasons discovered to support that belief were the things that a website could facilitate. A large percent of participants, 78% of teachers and 81% of parents, believed that a website can serve as another form of communication between school and home. This communication helped build parental involvement according to 73% of the teachers, but only 45% of the parents. Results also showed that 76% of parents and 51% of teachers believed that a teacher website was an effective way to deliver and receive information and other resources about the class.

When the survey attended to the question of what elements should be found on the websites, the teachers and parents mostly agreed. Both parents and teachers felt that contact information including the teacher's email address and telephone were essential elements as well as forms needed for the class. Both groups also highly desired to see class homework, in class assignments and pages, such as a homework help page, that would assist in doing homework. There were, however, elements of a website that both teachers and parents felt were unnecessary. These were things such as the teacher's teaching philosophy, outside of the institution links, personal links, and lesson plans.

While the two groups mainly agreed about the components of an effective website, there were areas of disagreement. Although parents felt that a teacher's resume and administration and school board news were important, teachers did not. On the contrary, teachers felt that elements such as a guestbook, visitor statistics, and teaching standards were significant elements and parents did not highly value them.

This study was able to capture many aspects of the beliefs and opinions of teachers and parents but it did have many limitations. The only source the researcher used to acquire survey volunteers was to solicit through email. This only included parents and teachers who already use that form of communication and only parents who were signed up on listservs. The also asked the question of its volunteers about the issue of home access to the website. Approximately 27% of both teachers and parents felt that there are students without computer access at home. This highlights that the study needed to broaden their sample of volunteers to get a more accurate result as well as the need for more research in the future directed at giving access to students who do not have computer access.

Home Connection and Access

Home access to a computer is essential for families to have this type of parental involvement in their child's educational journey. A study was conducted and researchers found that 26% of students have no access to a computer in their home (Fairlie, Beltran, & Das, 2010). They explored the relationship between computer ownership and positive educational outcomes of academic success. The researchers used the National Longitudinal Survey of Youth 1997 and the Current Population Survey to conclude their findings. Fairlie et al. noted that the federal government spends an average of two billion dollars a year providing classrooms with technology. Schools have an average of 3.5 computers per classroom and nearly all principals report that technology will be important for increasing student performance in the next few years. In this study, Fairlie et al. attempted to decipher the data from the two surveys and analyzed the effect of computer ownership. The data analyzed illustrated a direct connection to household income and computer ownership to high school graduation rates. Students with this access had over 8% higher probability of graduating from high school. The surveys analyzed suggested that students who had access to a home computer had many benefits in addition to high school graduation. The researchers concluded that home computers were also associated with higher test scores and grades. Students were less likely to be suspended from school and reduced criminal activity. In an attempt to distinguish between a higher household income and computer ownership, they compared results next to another indicator of wealth, cable television.

Although the researchers attempted to find evidence linking computer ownership to positive educational outcomes, more research is needed to determine the specific reasons for student success. The myriad of factors that contribute to student success, such as academic ability and parental motivation, would likely alter the conclusions of this study. Although

findings cannot be completely accurate because of the lack of ability to filter the contributing factors, the research suggests the importance of providing technology into disadvantaged homes.

A study was done to try to understand the effects of providing access to technology in homes that previously did not have it (Snyder, I., Angus, L., & Sutherland-Smith, W., 2002). In Australia, a software company and an Internet provider developed a program that offered computers and Internet access to workers at a reasonable cost. This qualitative study followed the use of this access in four different households who had taken advantage of this program and received Internet access at home for the first time. Researchers visited each home six times and visited the school at least three times. At the school, researchers interviewed the teachers, principal, and curriculum coordinator of the selected families.

One of the families, the Brown family, consists of a single mother and her son and daughter, ages 12 and 14. The researchers considered this family as having a low socioeconomic status. The mother did not have a job and the three of them lived on government assistance as their only source of income. Although not for schoolwork, the Brown family reported using the computer for extended periods of time. The mother and her daughter used the computer and Internet access mainly for chatting and social networking. They both stated that they could stay in some chat rooms for up to four hours. Her son stated that he used the Internet mainly to pursue his hobby of racing cars. The Brown family would usually sit together in their living room and participate together in using the computer. The children did have computers at school but they did not enjoy the time allotted for them there. They felt they already possessed the computer knowledge that was being taught and despised the restricted access they were allowed.

Of the other three families studied, similarities were noted. One family were recent immigrants from Chili and were of the same socioeconomic status of the Brown family. The

other two families were considered to be middle class. All three families' computer usage at home seemed to be similar. All three families revered book culture over technology and would limit the amount of use and website content for their children. Each one of these families placed a high value on education and felt that access to a computer and the Internet should be utilized for that purpose. Although the families reported using the Internet for occasional recreation, the priority was set to find educational benefits.

This study, however, was limited in its scope. The sample size was relatively small and the variety of families was too diverse to conclude the reasons behind the relationship with technology in the home. The student participants also consisted of six females and only one male. This could skew the findings, as a gender relationship with technology was not discussed. More research is needed to determine the factors contributing to the technological use of computers and Internet in homes. Researchers concluded that merely giving students access to a computer and the Internet was not sufficient to get them to utilize it for schoolwork and enhance their academic success. The culture of the home as well as the children's' school had more of an effect on how it was used rather than just giving access to this technology. They stated the importance of building a relationship with technology is an important step to ensure equal access to technology.

When providing technology access inside each student's home is not achievable, alternate access points need to be explored to provide a quality relationship with technology for students. A qualitative study was done examining the impact of an alternate access point of technology through community technology centers (CTC) and the affects they have on providing access to the Internet and general youth development of low income youth of color (London, Pastor, Servon, Rosner, Wallace, 2010). CTCs are different from libraries or other traditional access

points to technology and the Internet. They are found in housing projects, community centers, storefronts, and other domains that are accessible to lower income community members. In this study, London et al. focused their attention to five different CTCs across the country. They limited their sample to CTCs that fit certain requirements. Each center studied had an established youth program and served a minority population. Researchers read all available information about each center and then spent several days visiting the site. They conducted several in person interviews with people associated with the center and observed activities and programs offered. They also looked at the products created by youth using the technology they learned at the CTC.

The researchers found that CTC programs had many positive outcomes and put them into four different categories. First, it was concluded that CTCs provided technology education to youth and they gained skills that improved their qualifications required to secure employment. Second, they supported youth in creating stronger and different social networks. Third, it was noted that youth used their newly developed technology skills to portray their individual stories through different modes such as written word, film, and music. Finally, CTCs provided encouragement to youth. This fostered the development of engagement in community development.

Although the study concluded many positive outcomes, data was not collected to conclude the positive outcomes of academic success. All findings were derived from interviews and observations but were not substantiated by any numbers reporting the increase of things such as employment or college enrollment. A quantitative study would be useful to acquire this information and would more accurately define their conclusion of the benefits to establishing future CTCs and integrating them into more communities.

Conclusions

The motive behind finding research supporting classroom websites was an attempt to alleviate some of the demands required from a teacher and to fulfill some of the needs of the student. These connections lead me to the possibility that a classroom website could be an effective tool to enhance my classroom. The literature presented illustrated the benefits of a classroom website has and called attention to the fact that not every student has access to it. Providing access and communication to students outside the walls of the classroom is an essential component to student success. Not every student is able to gain the essential knowledge for success in the allotted timeframe of school and developing a class website is one solution to that dilemma. The research clearly indicates the benefits of implementing and utilizing classroom websites confirming the connection to the increase of student scores (Persin, 2002). Implementing additional features linked to the website, such as the use of wiki sites, can improve the authentic and deliberate nature of students education (Tarasiuk, 2010). The literature also illustrated how a class website can improve the satisfaction and communication of education. Some teachers even felt that their class website was an essential aspect to the success of their classes (Witt, 2003), and some students report a higher level of satisfaction especially when features of communication are incorporated (Elicker et al., 2008). This communication and supplemental information provided on class websites improve parental involvement by providing learning opportunities for students at home (Epstein & Dauber 1991). While the benefits of developing a classroom website are many, the information in this review is not exhaustive. Other benefits including, student autonomy and challenging gifted students are possible additional benefits. Further research is needed to identify other positive conclusions.

Teaching Toward a Better World

Connecting home and school is one of the objectives when attempting to create a classroom website. To ensure equal access to the benefits we must take into account the reported 26% of the students without a computer or Internet (Fairlie et al., 2010). Computer ownership is connected to higher test scores and grades. Although merely giving students access to a computer and the Internet might not be sufficient to get them to utilize it for schoolwork and enhance their academic success (Snyder, I., Angus, L., & Sutherland-Smith, W., 2002), there is a need to find solutions to combat this issue. One solution explored was the creation of Community technology centers. They provide underprivileged students the opportunity to gain access otherwise not achievable. They also foster the necessary development of a positive relationship with technology required to use this technology to gain greater academic success (London, Pastor, Servon, Rosner, Wallace, 2010). Further research is needed to find additional solutions that give access to technology for each student. The evidence illustrating the benefits of having access to technology outside of the classroom is abundant, but the solution to give that benefit to everyone is not. It is my conclusion that this is an important area of necessary research

for the future.

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Supporting Student Development of Metacognitive Skills

Sandra M. Warren

Abstract

This literature review looks at research on the topic of supporting student development of metacognitive skills. The studies reviewed were conducted in a variety of counties and used participants from a range of ages, generally including elementary to high school grades. The literature review examines studies that answer the following questions: 1) Can metacognition be taught? 2) What are the benefits of metacognition? 3) How can metacognition be taught? Evidence was found to support the conclusion that metacognitive skills and knowledge can be taught and supported by teachers, with some limitations due to student age. Findings also indicated direct links between metacognitive abilities and positive academic results. Additionally, the research articles reviewed suggested ways of teaching and applying metacognitive skills in the classroom, such as by providing student choice, volitional control, complex tasks, metacognitive prompting, use of metacognitive strategies, and student participation in assessments.

Supporting Student Development of Metacognitive Skills

All too often, students are not equipped with the necessary skills to take control of their learning. As Marsha and Camahalan (2006) state, "unfortunately, teachers are not often systematic about teaching the strategies of cognition. Instead, children are left to discover them on their own" (p. 79). Teachers do not always explicitly teach students how to understand their own learning process, which may include the ways in which they learn best, knowledge of various strategies at hand, and the ability to know when and how to use different strategies in various contexts. Some students develop such metacognitive abilities on their own through years of home and school experiences. Other students do not gain strength in such skills, which could greatly assist them in academic success. Instead, they are left less capable of determining their needs as students and learners.

As a student teacher in an elementary school classroom, I interacted with students at varying levels of metacognitive abilities. I had the opportunity to observe student thinking and analyze their understandings of themselves as learners through various activities such as students answering questions, completing reflective worksheets, and participating in class discussions and one-on-one teacher interviews. I casually observed the differences in metacognitive abilities and self-regulated learning skills, noting that the more academically successful students generally showed more ease in communicating their strengths and weaknesses, were more willing to ask for help, and were more confident in their completion of assignments and participating in whole class work. The students I noted as having higher metacognitive abilities and self-regulated learning skills generally had the tendency to show more enthusiasm for learning and enjoyed school, and showed strengths in reading and math. Furthermore, these students exhibited a

confidence and academic strength that others did not necessarily display. It was these ongoing observations that initially attracted me to the concept of metacognition.

There is extensive discussion on what makes a successful student. Many researchers attempt to determine the skills attained by academically successful students and the skills lacking in academically unsuccessful students (Annevirta & Vauras, 2006; Dermitzaki, Andreou, & Paraskeva, 2008; Yang, 2005). With such information, teachers can learn what skills and knowledge will best serve students in developing abilities that can positively affect their entire educational career. Research has indicated that metacognitive and self-regulated learning skills show strong relations to academically successful student practices (Isaacson & Fujita, 2006). As Issacson and Fujita (2006) stated, as students are obligated to take on academic assignments of increasing challenge, it is crucial that they embody the metacognitive skills to evaluate their mastery of the content on numerous levels. According to Issacson & Fujita it is essential that we find ways to promote such abilities in the classroom.

Through my exploration of peer reviewed studies, I aim to explore the various aspects of metacognition and self-regulated learning in order to determine what it means to obtain such skills. The focus of my study is to explore ways in which teachers can support student development of metacognitive and self-regulated learning skills. These studies enforced classrooms that promoted metacognitive skills and self-regulated learning. My focus is to examine the data and conclusions of these studies. I will examine the classroom, learning, and teaching practices used in these studies that showed positive academic improvements and development of such metacognitive and self-regulated learning skills. Specifically, my literature review will focus on studies that provide answers to the following questions: 1) Can metacognition be taught? 2) What are the benefits of metacognition? 3) How can metacognition

be taught? I chose to use studies to examine the feasibility and benefits of teaching and learning metacognitive skills and knowledge first by providing the readers with a purpose for investing in this literature review. I end this literature review with applicable concepts and methods in teaching metacognitive skills in the classroom to show teachers how metacognition can be taught.

The most prevalent terms referenced in my literature review are *self-regulated learning* and *metacognition*. Self-regulated learning is the process in which the learner actively contributes in their own learning process and portrays goal directed behavior (Yang, 2005). This relies on the metacognitive abilities such as planning, organizing self-instruction, and self-evaluation in their learning process (Yang, 2005). Annevirta and Vauras (2006) defined metacognition as the awareness that learners have about 1) their academic strengths and weaknesses, 2) the cognitive resources they can utilize to meet the requirements of specific tasks, and 3) their knowledge and skill regarding how to regulate commitment and participation in tasks to enhance learning processes and outcomes. A learner does not have metacognitive knowledge until he or she is capable of effectively explaining why a specific strategy is beneficial to a particular cognitive activity. A student obtains metacognitive skills as they gain control of their ongoing cognitive processes.

Self-regulated learning is a new and broad concept which includes many subdivided categories. For the purpose of this literature review, I will limit my research to metacognition and to self-regulated learning, as it relates to cognitive and metacognitive skills and knowledge. This literature review will examine research studies with a range of elementary to university aged participants with a main focus on elementary education, as metacognitive and self-regulated learning skills develop with age and experience (Vukman & Licardo, 2010). I limited my search

of resources to peer-reviewed studies from the Educational Resources Information Center (ERIC), an online journal database search. Within this search, the studies that related to my interest and focus were generally limited to studies conducted outside of the United States. Readers should be aware of the possible cultural factors that may have influenced the schools and students within these studies. Some of these studies used experimental designs and casestudy designs, while others relied on questionnaires from the teachers and/or students, academic tests, and observation, among other forms of assessment.

Literature Review

Can Metacognition Be Taught?

The research studies discussed in this section investigated the question: can metacognition and related self-regulated learning skills be taught? The studies discussed in the first part of this review explored students' abilities to learn metacognitive and self-regulated learning skills and knowledge. This research considered issues relating to the teaching and supporting of learning self-regulation of cognition and behavior, and the capability to engage in metacognition in relation to student age.

Yang (2005) conducted a questionnaire study to investigate the structures and patterns of self-regulated learning. A sample group was utilized from four different high schools in Seoul, Korea. The participants totaled 757 students, consisting of 339 boys and 418 girls. These students were in their second year of high school. The study categorized self-regulated learning variables into three components: cognitive regulation, motivational regulation, and behavioral regulation. Students were asked questions about how much they regulated their own cognition voluntarily, how much they regulated their own learning motivation, and how often they took control of their own behavior in various learning situations.

The researcher found that use of cognitive regulation, motivational regulation, and behavioral regulation all supported academic achievement (Yang, 2005). The research uncovered that students were able to have control over their own cognition, motivation, and behavior. Yang affirmed that teachers can provide assistance in student development of selfregulated learning skills. Yang stated that the findings of this study implied the following for students and teachers: 1) Self-regulated learning is a significant factor in academic achievement. 2) Students are capable of controlling their cognition, motivation, and behavior as they improve their academic achievement. 3) Students can be taught self-regulated learning skills.

In critically considering these results, it is important to recognize the potential problems stemming from data acquired from self-reported questionnaires. This limitation may be compounded by the fact that the questionnaire was developed by the researcher for the purpose of this study. Finally, there may be limitations in the applicability of the results, as this study was conducted outside of the United States.

Annevirta and Vauras (2006) examined the differences in children's verbal and nonverbal self-regulatory behavior, and the developmental relationship among metacognitive knowledge and metacognitive skill. This study used a sample of 252 Finnish-speaking students from 14 kindergarten classes and four public schools from urban environments. A final part of the study was done with 43 children who were selected from the original 252 students. This study used multiple forms of assessments to measure students' metacognitive abilities. The metacognitive knowledge test consisted of a sequence of verbally and pictorially represented tasks used to determine the children's level of comprehension of important cognitive processes. Participating children were to indicate the best way to remember, learn, or understand a particular cognitive task. The study also used a metacognitive skill task, which determined students' metacognitive

skills based on verbal and nonverbal expressions in a play-like situation. The final form of assessment used was a task evaluation in which children were asked a self-evaluation question.

This study found that children with high levels of metacognitive knowledge are better able to regulate their cognitive activity and performance (Annevirta & Vauras, 2006). Annevirta and Vauras suggested their findings implied that teachers of young children can successfully support their students' self-awareness of thinking and problem solving processes. However, students need support, guidance, and scaffolding before they can use metacognitive skills independently and appropriately. A limitation of this study was the small sample size (43 students) for the final portion of the study. Also, there may be limitations in the applicability of the results as this study was conducted outside of the United States.

Dermitzaki, Andreou, and Paraskeva (2008) researched the behaviors and performance of students with high and low reading comprehension. The researchers examined 1) various cognitive, metacognitive, and motivational traits of students' problem-solving behaviors, 2) profiles of strategic behaviors among high and low reading comprehension students, and 3) associations among the various strategic behaviors and succeeding performance in reading comprehension activities in high and low achievers.

Dermitzaki, Andreou, and Paraskeva (2008) used a sample population of high and low reading comprehension achievers in their research. Participants in the first phase of this study (Phase A) included 127 third graders with a mean age of 9 years and 7 months. The third graders consisted of 71 boys and 56 girls from five primary city schools, and the second phase of this study (Phase B) included 45 students selected from the original sample. Twenty of these students were high reading comprehension achievers and 25 were low reading comprehension achievers.

The researchers used reading comprehension tests and observation (Dermitzaki, Andreou, & Paraskeva, 2008). During phase A, the researchers used a reading comprehension test. This test used a folk story that was selected and adapted for this study, and measured the students' skills in predicting the end of a story, answering content questions, and summarizing. Results of this test were used to assist them in selecting the 45 students to participate in phase B of this study. During phase B, the researchers used another reading comprehension test. Students were video-recorded while taking this test for further observational evaluation. This test examined students' abilities to predict the context of the text by its title, answer content questions, put sentences in the correct order, recognize a hero in a given photo according to his description in the text, put the words of a sentence in their correct order, pinpoint the key words in the text, find out the main idea of the text, and more. The researchers also used observation to measure the students' strategic behaviors during reading comprehension. Two or three observers measured 11 strategic behaviors regarding cognitive aspects of strategic behavior and regulation for motivation, on a four point scale.

Dermitzaki, Andreou, and Paraskeva (2008) found that high academic achievers showed a significantly higher use of strategic behaviors during reading comprehension than the low achievers. They found that the high achievers were more effective in regulating their cognition and motivation in solving tasks, while the low achievers were deficient in utilizing the metacognitive and cognitive strategic behaviors. The findings of this study also show that third grade students were able to use a wide range of skills and strategic behaviors in reading comprehension. At the same time, the researchers found that many young children had significant difficulties in cognitively and metacognitively performing and regulating comprehension tasks. One limitation of this study was the low number of participants in the

second phase of this study. There may also be limitations due to the study setting, as these findings may or may not be directly applicable in United States classrooms.

Several researchers have found that young students are able to develop metacognitive and self-regulated learning skills (Annevirta & Vauras, 2006; Dermitzaki, Andreou, & Paraskeva, 2008; Yang, 2005). Students have the capacity to take control over their learning through metacognitive awareness of their cognition, motivation and behavior in the learning process (Yang, 2005). In addition to children's abilities to develop metacognitive skills and knowledge, these studies have shown that such skills and knowledge can be taught. Younger children are capable of learning and using metacognitive and self-regulated skills; however, they require more direct instruction and modeling (Dermitzaki, Andreou, & Paraskeva, 2008).

What Are The Benefits of Metacognition?

The next group of research studies explored benefits of metacognitive and related selfregulated learning use for students. This section specifically focuses on research-based links between metacognitive and self-regulated learning and academic performance.

Metallidou (2010) examined children's use of self-regulated learning in the subjects of language and math. This research was focused on examining the possible contextual differences in the relationships among motivational, cognitive, and metacognitive components of self-regulated learning. A sample group of 263 students were utilized, 114 of these students were from the fifth grade and 149 from the sixth grade. The sample included 133 girls and 130 boys from the classrooms of 13 public schools in Central Greece.

Metallidou (2010) relied on a self-reported questionnaire containing five subscales. Three subscales focused on motivation by measuring task value beliefs, self-efficacy, and test anxiety. The two remaining subscales measured cognitive and regulatory strategies. The study

also used a teacher rating scale, in which teachers ranked student achievement in language and math, metacognitive knowledge, and frequency at which each child revealed certain behaviors indicative of the presence of self-regulated learning.

Metallidou (2010) found that there were significantly higher performance levels among the high task value group of students, versus the low task value group of students regarding math related metacognitive knowledge, use of strategies, and other self-regulated learning behaviors. The researchers found significant differences in behavior between the two groups in seeking information, self-evaluation activities, goal setting and planning, and intrinsic motivation to learn.

In considering these results, it is important to recognize the potential problems stemming from data acquired from self-reported questionnaires. There may also be limitations to the applicability of the results due to the cultural factors that may be present in other countries. The researchers also failed to include a clear definition of some of their key terms, such as task value beliefs.

Isaacson and Fujita (2006) examined metacognitive knowledge and self-regulated learning in relation to academic success. The researchers focused their study on 1) the long-term changes between the students' estimation of test grades, 2) how their satisfaction and goals are different from the students' actual performance, 3) how students' self-efficacy changes and how it compares to their actual test results, and 4) the students ability to make academic choices based on their metacognitive knowledge.

The sample population was 84 undergraduate university students consisting of 59 females and 25 males (Isaacson & Fujita, 2006). These students were enrolled in a Midwestern university in an introductory education psychology course on a commuter campus. Isaacson and

Fujita used a pre and post questionnaire for each test given to the students. The study compared the students' self-reported measure of abilities with their actual test scores. Students' metacognitive abilities were measured by providing the test option of choosing what questions to answer given the requirements and stipulation provided. This provided choice as it required strategizing and metacognitive abilities of the students for success.

Isaacson and Fujita (2006) indicated that the high performing students were more metacognitively aware. High achieving students were more accurate in their satisfaction goals, expected points, and pride goals in comparison to their test scores. The students that used metacognitive skills versus number of hours studied to determine their scores were more likely to do well on the test.

One limitation of this study was the age of the participants. This study examined university aged students, as older students are found to have higher metacognitive abilities than the general age range of this literature review. Another limitation of this study was the small number of participants and scarce amount of information provided about the participants and setting. The study was also limited in its definitions of important terms such as satisfaction goals, expected points, and pride goals.

Vukman and Licardo (2010) examined the influence of self-regulation on academic performance. The study explored the different aspects of self-regulation (cognitive, metacognitive, motivational, and emotional) in relation to academic performance. This study used three different age groups. The first group consisted of 110 students aged 14 to 15, with 50% females and 50% males. The second age group had 116 students aged 17 to 18, consisting of 60% female and 40% male. Age group three consisted of 107 university students aged 22 to 23, with 70% females and 30% males. This study used self-report questionnaires to measure

cognitive and metacognitive self-regulation, motivational self-regulation, and emotional regulation.

Vukman and Licardo (2010) found that use of metacognitive self-regulation was linked to school performance among all age groups studied. The study found that metacognitive self-regulation showed stronger benefits to academic achievement than it did to motivational self-regulation, and emotional regulation. A limitation of this study was its use of self-reported questionnaires, which relied on participant answers. There may also be limitations in the applicability of the results as this study was conducted outside of the United States.

The research reviewed (Isaacson & Fujita, 2006; Metallidou, 2010; Vukman & Licardo, 2010) expressed a strong relationship between student academic results and their abilities with metacognitive and self-regulated learning skills and knowledge. All preceding studies showed that student use of metacognitive and self-regulated learning skills was linked to high academic performance in math and/or language studies. As stated above, metacognitive awareness promotes student abilities in self-regulation as they can monitor, make adjustments, and evaluate throughout the learning process.

How Can Metacognition Be Taught?

The next group of research studies explored the question: How can teachers support and teach metacognitive and related self-regulated learning skills? These research studies explored issues concerning supporting metacognitive development. This section of the literature review examines research studies that examined specific tasks, activities, and methods related to metacognitive and self-regulated learning skills.

Sungure and Senler (2009) examined student use of metacognition. The researchers explored 1) the differences in the level of student knowledge: declarative knowledge, procedural

knowledge, and conditional knowledge of cognition, 2) the difference in the level of student regulation of cognition regarding planning, information management, monitoring, debugging, and evaluating strategy use, 3) the differences in student levels of mastery approach goals, performance approach goals, mastery avoidance goals, and performance avoidance goals, 4) the relationship between the knowledge of cognition and the regulation of cognition in relation to metacognition, and 5) the relationship between students' metacognition (knowledge of cognition and relation of cognition) and achievement goals, competence expectations, and perceived classroom environment in terms of challenge and threat.

Sungure and Senler (2009) used a sample group of 141 high school students, ages 14 to 17, consisting of 67 boys and 74 girls. The study was located in Turkish high schools in urban environments. The study consisted of four questionnaires assessing student knowledge and relation of cognition: students' adoption of a mastery approach, performance approach, mastery avoidance, and performance avoidance goals; competence expectancy; and students' perceptions of academic challenges provided and students' perceptions of the academic threats introduced.

Sungure and Senler (2009) found connections between students' metacognition and the concepts of motivational variables, goal orientations, competence expectation, and perceived classroom environment. Sungure and Senler (2009) suggested that these overall findings imply that knowledge of cognition and the ability to regulate cognition are improved through factors such as challenging learning environments that foster metacognitive activities while also utilizing metacognitive knowledge and reflection on their cognition. These findings also suggest that teachers can encourage student metacognition by supporting the use of various strategies within challenging tasks and peer cooperative work. In addition, the researchers found a correlation between the knowledge of cognition and regulation of cognition. As Sungure and

Senler suggested, this implies that levels of declarative, procedural, and conditional knowledge were linked with higher levels of metacognitive skills such as: planning, information management, monitoring, debugging, and evaluating strategy use.

A limitation of this study was its reliance on self-reported questionnaires. There may also be cultural implications regarding the study setting, as these findings may or may not be directly applicable in the United States.

A study by Housand and Reis (2008) examined the self-regulated learning strategies used among students in gifted pedagogy programs. The study researched 1) the environmental conditions present when students use self-regulated learning strategies, 2) the instructional methods utilized to support the use of self-regulated learning strategies, and 3) the self-regulated strategies used by gifted students participating in a higher self-regulation classroom in comparison to gifted students participating in a lower self-regulation classroom.

The study was located within two gifted and talented classrooms in a school consisting of 1043 gifted students (Housand & Reis, 2008). The teachers were selected and placed in the treatment and control conditioned classrooms at random. This study was a qualitative comparative case study that used classroom observations as its main tool. Observations were done weekly and recorded in field note summaries. The researchers used a SEM-R Observation Scale for the observers to rank the teachers' application of self-regulated learning characteristics. They also used the Self-Regulated Observation Scale, which was an environmental attributes and behaviors checklist, to measure the students' behaviors in self-assessment, choice, movement within the classroom, and seeking of assistance. It also measured the teachers' offering of choice in activities and work location, opportunities for complex tasks and students' self-assessment, and encouragement toward help-seeking.

Housand and Reis (2008) found that the use of self-regulated learning was much lower in classes receiving lower levels of self-regulation support. These findings imply that personal processes, the environment, and the individual behaviors of the teachers and the students affected the students' use of self-regulated learning strategies. Both environmental and instructional factors supported the development of student metacognitive and self-regulated learning skills through explicit instruction, teacher modeling, and student involvement. The main self-regulated learning concepts discussed in this study were student choice, volitional control, complex tasks, metacognitive prompting, use of metacognitive strategies, and student participation in assessments.

A possible limitation of this research study was that the participating observers consisted of the researchers, as this leaves room for bias. There may be limitations in the applicability of the results as this study was conducted outside of the United States.

Houtveen and van de Grift (2007) conducted a study to investigate the effects of metacognitive strategy instruction on reading comprehension. The researchers attempted to determine 1) ways in which teachers can improve student performance in reading comprehension, and 2) if metacognitive strategy instruction will result in increased metacognitive skills among students.

The study participants consisted of 10-year-old children in Dutch elementary schools (Houtveen & van de Grift, 2007). Eleven schools participated with 344 children in the experimental group, and nine schools with 225 children in the control group. About 19% of the children in this study were of low socio-economic status native families and about 2.5% of the children in this study were of low socio-economic status ethnic minority families. The teachers

participating in the experimental group were trained to conduct cognitive strategy instruction for reading comprehension.

This study was quasi-experimental in nature, using multiple questionnaires and tests to determine various aspects of student academic characteristics and abilities (Houtveen & van de Grift, 2007). These questionnaires and tests included a reading comprehension questionnaire, a reading attitude and reading material questionnaire, the Test for Measuring Reading Comprehension, and an intelligence test. The reading comprehension questionnaire was used to measure metacognitive knowledge regarding reading comprehension. It was used to determine a student's ability to monitor their reading behaviors and strategies when struggling with a text or paragraph. All questions were related to strategies used before, during, and after reading; strategies for evaluating the reading process; and strategies used to resolve uncertainties. The reading attitude and reading material questionnaire was used to determine students' attitudes regarding reading reading and reading materials, measuring the students' tendencies to value reading situations and reading material in a positive or negative manner. The Test for Measuring Reading Comprehension was used to measure the students' reading comprehension performance, and the intelligence test was used to measure the students' reasoning abilities.

Houtveen & van de Grift (2007) found that student involvement in metacognition of the reading processes can be supported by activating prior knowledge, as well as utilizing the title, subheadings, the summary, punctuation, and the layout to predict the substance of the text. It was also found to be supported by making numerous predictions about events to come, reading selectively and making conclusions about the reading process (what should be read attentively, what to read briefly, what not to read, and what to read again); extracting from, comparing, and

incorporating prior knowledge with content in the text; monitoring their comprehension of the text; and checking their comprehension of the content.

The researchers stated that metacognition can be supported by teachers explicitly explaining the previously mentioned strategies and skills, demonstrating and modeling use of these strategies and skills, and offering support and scaffolding in the use of these strategies and skills (Houtveen & van de Grift, 2007). This research also support encouraging students to utilize strategies and skills, guiding students in learning to master strategies and skills, giving students responsibility of their learning, and checking what the students comprehend. Houtveen and van de Grift (2007) also support providing students with feedback on their application of the strategies and skills, letting students make conclusions on the text and their application of strategies, pointing out strategies that led to the accurate answer, employing reading comprehension in authentic contexts, discussing ideas and insights related to the learning objective, and involving students in in-depth conversations about texts; and giving students opportunities to converse about the text and applications of the strategies. A limitation of this study was the applicability of the results, as this study was conducted outside of the United States.

Camahalan (2006) examined the reading achievement and metacognitive strategies of dyslexic students in a metacognitive reading program. The researcher investigated the reading achievement differences among students before and after participating in the Metacognitive Reading Program, and the differences among metacognitive strategy use before and after participation in this program.

This study took place in The Reading Works Reading Laboratory at Loyola Heights, Quezon City, Philippines (Camahalan, 2006). The Reading Works Reading Laboratory was a

learning center with educational programs for emergent readers, beginning readers, fast learners, underachievers in school, students with specific learning differences, and students with autism. The study consisted of a sample group of four elementary aged students diagnosed with dyslexia. Two of those students were incoming second graders while the other two were incoming third graders. These students were studying spelling, writing, and reading skills as students with average academic performance and significantly low reading and language skills in comparison with his first grade peers. Student B was an eight year and nine month-old boy with below average academic performance who took the first grade twice. Student C was an eight year and 11 month-old girl with below average academic performance, who also took the first grade twice. Student D was an eight year and eight month-old boy with below average academic performance.

This study was designed as a single-case quasi-experiment (Camahalan, 2006). It used three forms of measurement: a reading achievement test, metacognitive strategies questionnaire, and informal observation of student behavior. The reading achievement test was adapted from the Slingerland Reading Test. The Metacognitive strategies questionnaire involved three essential factors based on the conceptual framework of metacognition: planning, monitoring, and evaluating. Informal observation of student behavior was conducted through student interviews as well as through the portfolios of student work.

The research indicated that explicit teaching of metacognitive strategies resulted in positive academic achievement in students (Camahalan, 2006). The main metacognitive strategies supported fell in the categories of planning, monitoring and evaluating. Students were supported in identifying and expressing use of these strategies in their reading. The researcher

found that teachers can promote metacognitive development by supporting students in 1) identifying and setting personalized meaningful goals regarding their own learning, 2) working independently and cooperatively to accomplish their learning goals, 3) developing and using learning strategies properly in their learning, 4) understanding, planning, monitoring, and evaluating their own learning, and 5) enduring and overcoming obstacles in attaining their learning goals.

As Camahalan (2006) found, specific methods and techniques used in teaching metacognitive knowledge and skills regarding reading include: identifying book selection strategies, comparing the book with others, interest in the book, and the purpose of reading the book. Book selection strategies may also consist of skimming through the book and looking at the pictures, and considering the title. It was found that other metacognitive skills can be supported through activities such as, students monitoring their own progress through record keeping logs, and student made stories and drawings. The study also identified specific metacognitive strategies that can be utilized before, during, and after reading. Strategies that can be applied before reading include prediction questions and plans, such as predicting plot details and character actions. During reading strategies include think-aloud strategies and decoding strategies such as, sounding out words, asking for help, and using a dictionary. Finally, post reading strategies include reflection. Reflecting activities may consist of: thinking about what was read, looking back and reflecting on pictures, and thinking about favorite parts of the story. A limitation of this study was the small sample size, as well as the fact that there may be cultural factors that had an influence of the participant in this study as the research was conducted outside of the United States.

The research reviewed in this final section (Housand & Reis, 2008; Houtveen & van de Grift, 2007; Sungure & Senler, 2009) explored various concepts, methods and techniques related to teaching metacognitive and self-regulated learning instruction. Research findings show the importance of creating an environment that fosters development of metacognitive activities. This may include a classroom that provide challenge and complex tasks, yet maintain a supportive environment in which the students feel to be safe and non-threatening, as the teacher provides opportunities for students to practice metacognitive skills (Sungure & Senler, 2009; Housand & Reis, 2008). In addition to creating the appropriate learning environment, the studies also expressed concepts and methods in metacognitive instruction. Environment and instruction can support development of metacognition and self-regulated learning by providing opportunities for choice, volitional control as students are metacognitively aware of their behaviors, complex tasks as students are provided challenge, metacognitive prompting as students ponder questions and prompts, use of metacognitive strategies, and student participation in assessment as students become aware of their personal progress (Housand & Reis, 2008). Much, if not all, of the metacognitive concepts are most successfully taught when teachers use the methods of explicit instruction, teacher modeling, and student involvement. Explicit instruction was found to be essential as students are provided with various strategies in which they may not be currently aware of. Teacher modeling supports students in having a strong concept of what it means to use such strategies in various contexts. Finally, student involvement was fount to be essential as metacognitive and self-regulated learners are required to actively participate in their own learning (Camahalan, 2006; Houtveen & van de Grift, 2007).

Conclusion

In this section I look at how the research just reviewed answers the following questions: 1) Can metacognition be taught? 2) What are the benefits of metacognition? 3) How can metacognition be taught? In answering question number three, I will also include suggestions and recommendation for teachers wishing to apply such research findings in their classroom.

Can metacognition be taught? Metacognitive skills can be taught to students of a wide variety of ages (Annevirta & Vauras, 2006; Dermitzaki, Andreou, & Paraskeva, 2008; Yang, 2005). Although it was found that the younger students require more support, students are capable of taking control of their learning process, and teachers can support the development of this skill by providing instruction that promotes students as active participants in their own learning (Yang, 2005). As teachers provide students with the appropriate support, guidance, and scaffolding, they can support students' in becoming aware of their thinking and problem solving practices (Annevirta & Vauras, 2006).

What are the benefits of metacognition? Students with high academic performance showed stronger metacognitive abilities than students with low academic performance (Isaacson & Fujita, 2006). This positive connection between school performance and metacognitive awareness was found among all age groups studied (Vukman & Licardo, 2010). This implies the importance of teaching metacognitive skills as to best support student academic success.

How can metacognition be taught? In order for teachers to best support student development of metacognitive awareness, teachers must include metacognitive support in the environment and instruction (Housand & Reis, 2008). Camahalan (2006) found that the main metacognitive strategies are related to planning, monitoring, and evaluating. Housand and Reis (2008) found that instruction and environment can best support development of these metacognitive skills by applying the concepts of student choice, volitional control, complex tasks, metacognitive prompting, use of metacognitive strategies, and student participation in assessments.

As Housand and Reis (2008) support, it is recommended that teachers provide students with choices in the classroom as an integral aspect of supporting student development of metacognitive skills. This includes providing students with choices within the classroom environment, such as providing students with options in book content. This also includes providing choice within the classroom instruction, such as providing choice in the content of the lessons and options for students within the learning activities and tasks.

Volitional control can be supported in the environment by maintaining an organized, quiet, and controlled classroom. Teachers should maintain a classroom with easy to access materials for students, as to support students' abilities to take responsibility in accessing materials they find best support successful completion in tasks (Housand & Reis, 2008). Teachers can also support students' abilities to develop and maintain volitional control by providing students with independence in access to movement in the classroom. Teachers should allow students the provision of being able to move around the classroom without permission, as this supports students' abilities to take independence in accessing materials and other resources they find to support their learning (Housand & Reis, 2008).

Teachers should also develop an environment consisting of complex tasks. This involves students determining the purpose of a task as well as providing students with access to resources that can support their use of metacognitive skills, such as access to reading logs (Housand & Reis, 2008). Complex tasks can also be utilized in instruction as teachers are clear

of the purpose of a task. Teachers should support students in utilizing materials and resources that will support students in learning and strategy use (Housand & Reis, 2008). As Camahalan (2005) found, this can be supported by providing students with opportunities to work independently and cooperative as students endure and overcome obstacles in attaining their learning goals.

Metacognitive prompting can be supported by providing students with access to activities that promote metacognitive thinking. Such activities include writing activities that encourage use of new vocabulary, personal and academic reflection, and open-ended writing prompts (Housand & Reis, 2008). Metacognitive prompting can be accessed by teachers' use of asking open-ended questions. Teachers should allow provision of materials and resources and activities that promote reflection and self-monitoring, such as reading logs, open-ended writing prompts and reflections, and differentiated questions (Housand & Reis, 2008).

Metacognitive strategies can be supported by establishing an environment that encourages students to participate in activities that support reflection and planning. Reflection can be supporting through materials such as reading logs and progress tracking, and planning can be supported through student developed lists for activities such as books to read in the future (Housand & Reis, 2008). The teacher can support student use of metacognitive strategies by providing explicit instruction of strategy use, opportunities for students to answer higher order thinking questions, modeling book selection processes, connecting to students' prior knowledge, as well as summarizing and identifying task and activity purposes (Housand & Reis, 2008). As Houtveen and van de Grift (2007) suggested, teachers should support student use of metacognitive strategies by explicitly explaining, demonstrating and modeling use of strategies

and skills as well as offering support, guidance, and scaffolding in the use of strategies and skills. This can be done through techniques such as pointing out when strategies lead to the accurate answer. Teachers should encourage students to utilize metacognitive strategies and skills, giving students responsibilities in their learning. Teachers should also check and monitor what students comprehend, and provide students with feedback on their application of the strategies and skills. Students should also be provided many opportunities to be involved in in-depth conversations, discussions on ideas and insights related to the learning objective, letting students draw conclusions and converse about strategy applications.

Finally, student participation in assessment is a key aspect in supporting student development of metacognitive awareness. This includes developing an environment where students can access materials to track their own progress, such as reading logs. Teachers can maintain scheduled conferences with students regarding the development of specific goals for strategy use (Housand & Reis, 2008). Teachers can support student participation in assessment by providing clearly defined, measurable, and attainable goals set with students' input, as well as modeling and accountability for goals through conferences and reflection, and varied and differentiated questions to match students' current levels (Housand & Reis, 2008). As Houtveen and van de Grift (2007) suggested, student involvement can also be supported by activating students' prior knowledge, and promoting student participation in making predictions and conclusions. Teachers can also promote student participation by encouraging students to extract from, compare, and incorporate prior knowledge in learning activities, as well as encourage students to check for their comprehension. Camahalan (2006) suggested that teachers support students in identifying and setting personalized meaningful goals regarding their own learning as they understand, plan, monitor, and evaluate their learning. Teachers should support students in

managing their own learning, forming questions for class discussions, choosing learning patterns, and deciding how to complete their work.

While reviewing the literature, I found that there are areas where future research is needed. Such areas include research on metacognition conducted in the United States. As I looked at studies that would most tightly link to my literature review topic, I found that all of my research studies used a setting outside of the United States. This should be done to ensure applicability of these results for students of United States cultures. Given the positive findings regarding metacognition and student learning, additional research is also encouraged that looks at a wide variety of self-regulated learning approaches and their relation to student academic success.

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Bullying: Impacts and Interventions

Rebecca Watts

Abstract

Bullying has become an internationally recognized problem in recent years. Knowing what bullying is, how it affects student learning, and how it can be prevented is becoming more important in schools. This literature review examines research related to how bullying affects students and what strategies might be employed to prevent it in the classroom. The reviewed studies were primarily done through surveys and self-reporting by students, along with some observational information and data analysis by the researchers. Studies have shown that bullying can have damaging effects on both the bullies and their victims; there are physical, emotional, and mental traumas that can occur. Students involved in bullying as either the bully or the victim may exhibit signs of low self-esteem, increased violent tendencies, depression, and social issues. The researchers in this review have suggested a variety of programs and methods to prevent and intervene in bullying situations, but there is a lack of evidence that shows which methods may be most effective in the classroom setting. A common theme in the suggestions is that being a supportive and caring educator and taking time to get to know your students may be one of the most effective strategies a teacher can develop, along with persistence.

Bullying: Impacts and Interventions

Every day when Martin sits down in his class, Jordan comes by, pushes his books onto the floor and makes fun of him for being "a nerd" and "teacher's pet." Leslie spends part of each day crying in the bathroom because the other girls make fun of her for her weight, tell her she's ugly, and exclude her from their group. Jonathon sits behind Dean in class and every day pokes him, slaps him, blows in his ear and calls him a fag.

These are just some of the things that happen in schools every day, and are examples of situations where bullying is occurring. Anyone who has spent time in a school setting has seen situations like these, or other repetitive negative actions taken by students that put down or minimalize other students. In recent years, bullying has become a recognized concern worldwide, with one third of Australian students who responded to surveys reporting feelings of victimization (Bansel, Davies, Laws, & Linnell, 2009), as have 5.2% of Irish students, 25.6% of Italian students, 2.0% of Chinese students, and 16.9% of the students in Spain (Vervoort, Scholte, & Overbeek, 2010). Students in the United States are believed to feel victimized at even higher rates.

I chose bullying as my topic after doing my student teaching at an alternative-type high school. Many of the students were there because they had difficulty fitting into mainstream schooling. There were several instances where I witnessed students picking on one another or physical altercations in the classrooms and hallways. It also became obvious that the classroom dynamic on any given day varied according to which students were in attendance or absent. I noticed that some students were more regularly picked on than others, and some students were more regularly the aggressors. At times I would see students in one situation being the victim, later they would become the bully. After talking with several of the students I realized that they

did not understand how their actions might actually be affecting others or what kinds of consequences they could face for what they were doing. Several of the incidents I observed crossed gender lines and could be considered sexual harassment, but the underlying concept was the same; the bully/aggressor wanted to gain a form of power, recognition, or status over the victim/recipient of the action.

After several weeks noticing specific patterns in some of the classes, I began to be more direct in how I dealt with the behaviors. Instead of bringing attention to the student who was misbehaving, I strived to focus on the behavior and attempt to explain why certain behaviors were not appropriate. After finishing my student teaching I decided to spend some time on defining bullying for myself based on my observations and what I found in literature, and determining how being a bully or a victim might affect a student's performance in the classroom. I also became focused on reviewing what strategies have been suggested in the literature for how to correct/disrupt bullying behavior in the school setting. The primary query of this literature review is how bullying impacts a student's education and intervention strategies that have been researched to prevent it in the classroom.

In this literature review I began my research by seeking what the definition of a bully was and how a victim was also defined. From there I moved into what some of the factors behind bullying might be and how it impacts student learning. I finished with seeking suggestions for intervening in bullying situations in schools, both in the classroom and school wide.

In order to address my interest in classroom bullying and its effects on learning, I had to first define both bullying and victimization. According to Maines & Robinson (1994), "Bullying is a relationship between individuals or groups over a period of time during which one party behaves in a way which might meet needs for excitement, status, material gain or group process

without recognizing or meeting the needs and rights of the other people/person who are harmed by the behavior." Bullying has also been defined as "using one's authority, position, or size to undermine, frighten or intimidate another person; this action often leaves the victim feeling afraid, powerless incompetent, and ashamed" (Lawrence & Adams, 2006). Finally, research suggests that some bullies act out aggressively in the ways they do simply to demean someone else (Jacobson, 2010).

For the purposes of this paper, the term "bullying" will be defined as negative behavior(s) by a specific individual or groups of individuals that occur repeatedly and serve to make the targeted victim feel frightened, intimidated, powerless, or inferior to the aggressor. The term "bully" will be defined as the individual or group that conducts the aggressive or degrading behavior, and "victim" will be the target of the negative behavior or the one who is being degraded by the aggressor.

After my own experiences in the classroom observing and working with students, I feel that I have come to recognize some of the more common behaviors that constitute being a bully and some of the behaviors that may help recognize a victim of bullying. In this paper I will briefly discuss some of the factors research has found that may affect whether a student is more likely to be a bully or victim, the relationship between the bully and the victim, and how this may affect student learning. I will conclude with some of the research that has been done on methods of dealing with, educating about, and disrupting bullying behaviors.

Literature Review

The Factors of Bullying

Research suggests that going to school is not just about getting an education; it is also about having the opportunity to develop socially and develop skills to fit into society (Jacobson,

2010). There are both implicit and explicit efforts in schools to equip students with skills that help them develop proper relationships with others through instruction, training, construction of rules, and analysis of efforts on the part of the students to develop into members of society. By the time students reach adolescence, it is believed that they may be more actively seeking to find their place within the society where they live; this is when they are building a strong personal identity and determining what their specific individual role in society might be (Van Rossem & Vermande, 2004). At times this means that students who want to gain peer acceptance, fit into a specific group, or gain acceptance into higher social levels will imitate behaviors that they see as more acceptable to the popular students (Dijkstra, Lindenberg, & Veenstra, 2008). The peer relationships that students have poorly developed peer relationships it may be a predictor that the students will drop out of school, perform poorly in their classes, become more delinquent, or develop psychopathologies (Van Rossem & Vermande, 2004).

Adolescents work not only to fit in with more popular students or a specific social group, but also to gain status within their peer group (Dijkstra, Lindenberg, & Veenstra, 2008). For adolescents, imitating successful peers and working toward being accepted by them may help them feel better about themselves; being rejected from a desired group based on being different, and being labeled as "unpopular" could increase the possibility that an individual will be bullied. If these students are of the majority group in the school, yet are repeatedly being bullied by peers they feel socially equal to, they may begin to believe that they are of lower status or have shortcomings that separate them from the rest of the peer group (Graham, Bellmore, Nishina, & Juvonen, 2009). These students may become more submissive and passive as time goes by (Lawrence & Adams, 2006); they can become more anxious, insecure, sensitive and quiet.

Teaching Toward a Better World

If, as the research suggests, the primary approach taken by bullies of different genders is so recognizably different in type, then gender could be one of the factors that relates significantly to bullying and victimization (Vervoort, Scholte, & Overbeek, 2010). In studies done on peer relationships, boys have been shown to be bullies and victims more often than girls and in mixed groups of adolescents composed primarily of males. Boys with a perceived higher social status may physically and verbally threaten those who appear to be of lower status (Lawrence & Adams, 2006). The more popular males exhibited some of the characteristics commonly found in research to be representative of male bullies: popularity, athleticism, strong social skills and the ability to manipulate others (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008). Alaude et al. also found that teenage boys target both boys and girls, while teenage girls primarily target other girls.

Teenage girls were found in the research to do the majority of their bullying in groups. Groups of adolescent females were more likely to use verbal and emotional taunts or to shun those students they felt do not fit in or were of lower status (Lawrence & Adams, 2006). Girls were also more likely to recognize social exclusion as a form of bullying (Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006) as well as gossiping and spreading rumors. Teenage girls were less likely to physically bully others; they instead spread gossip, taunted, called names, teased and harassed their victims (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008).

Dijkstra et. al., (2008) researched the relationship between student status and the classroom norm. Through a series of peer nominations where students were asked to submit the name of a fellow student in response to such questions as "who do you like" and "which classmates bully you" the researchers gathered names of students within 172 classes in 34 schools from 3,312 student participants. The goal of this study was to determine whether there

was a negative or positive relationship with bullying behavior when popular students were involved. From what was reported about the study, it appears that the students themselves determined what they felt bullying refered to; in response to "which classmates bully you" the student would more likely recognize the physical and verbal bullying forms, but might have missed the more overt rumors and exclusions that can also constitute bullying.

Researchers also looked at whether ethnicity may play a role in a bullying relationship. Vervoort, Scholte, & Overbeek (2010) conducted a study with 2,798 eighth grade students from 43 schools in the Netherlands on whether ethnicity played a role in bullying relationships; the data was collected through questionaires given to the students which included questions about ethnicity of both parents and themselves, bullying, and victimization. There was additional data gathered through peer nominations; students were given lists of their classmates along with a list of descriptions and asked to create connections between their peers and the descriptions.

The results obtained after analysis of the collected data prompted the researchers toward several observations; the results seemed to suggest that ethnic minority students in a large mixed group were seen to be less victimized than ethnic majority students, but were reported to have a higher rate of being the bully than those in the ethnic majority targeting victims within their own ethnic minority group. This appeared directly related to the population dynamics of the class; if the classroom had an ethnic minority population of less than 25%, they scored proportionally lower as being the bully. When the class had a population of 25-50% ethnic minority students, the proportion of ethnic minority students that became bullies increased. In schools that contained a population of 25-50% ethnic minority students, the ethnic majority students were found to be more likely to bully members of their own ethnic group; the students within the ethnic majority who were most commonly victimized often represent those individuals who were

social misfits or deviants from normative behavior within their group (Graham, Bellmore, Nishina, & Juvonen, 2009).

One important consideration when looking at the implications of the research may be the way the data was collected. It is important to know that the method of data collection, the specific questions asked on surveys, and the definition the researchers choose to give to the term "bullying" may show a bias in the results based on how the issue is addressed. Many of the studies in this literature review were based on student perceptions and responses to specific questions (Dijkstra, Lindenberg, & Veenstra, 2008; Gastic, 2008; Graham, Bellmore, Nishina, & Juvonen, 2009; Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006; Roland & Galloway, 2002; Van Rossem & Vermande, 2004; Vervoort, Scholte, & Overbeek, 2010), so the results of the studies may refer to more specific bullying types than the broader definition used for this literature review. Some of the studies focused on more overt forms of bullying, others on the less obvious. At least one of the studies was also based on student perceptions of how other individuals within their class were treated (Graham, Bellmore, Nishina, & Juvonen, 2009).

The results of the studies should be looked at critically; much of the information collected for the studies was done through surveys of students. The results may also depend on how the students themselves viewed bullying if it was not specifically defined for them. Children may have focused more on the overt and obvious forms of bullying such as direct verbal and physical abuse (Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006). They also may not have taken into account or recognized the repetitive aspect of bullying. The methods used to collect the data may be the major factor in determining a gender split related to bullying. Dijkstra, Lindenberg, & Veenstra (2008) mention that a study they did on the relationship between popularity and peer acceptance found that adolescents did not show a large gender difference in their bullying
behaviors, but that it could be due to the fact that the questions were specifically referring to both overt and covert forms of bullying, the overt forms being more physical (which is typically the male bullying approach) and the covert more verbal (which is a more typical female approach).

Gastic (2008) was interested in researching how being a victim of bullying might affect truancy of the victim students. Some of the research Gastic based her study on had shown that youth that are bullied in schools are more likely to miss classes, entire days of school, or to avoid attending extracurricular activities. Gastic acknowledged that there were different definitions of truancy and absence and that the definition of each of those words could have significant effect on the results of the different studies that had been done, and also recognized that there was a lack of research focused on adolescents and students from the United States; most of the research at the time was based on elementary and middle school aged students in other countries.

Gastic used research from the Educational Longitudinal Study of 2002 that was collected from students through use of survey. Students were asked how many times in the previous semester they had been picked on and those who responded with "more than twice" were classified as victims of bullies. This survey did not allow for indicators that would signify for students to be classified as bully-victims or bullies, it was focused on identifying victims. These results were crossed with responses to questions about disciplinary problems based on problem behaviors, the definition of problem behaviors being that the behavior or truancy were displayed by no more than 25% of students. The disciplinary problems were classified as: lateness (late to school seven or more times), excessive absence (absent seven or more times), missing class (missed or skipped class without an excuse at least three times), getting in trouble (got in trouble at least three times), in-school suspension (suspended at least once), probation (put on out-ofschool suspension or probation at least once), and disciplinary transfer (transferred for

discpilinary reasons at least once) (Gastic, 2008). Gastic used matched samples to help eliminate biases based on gender and ethnicity as these were not the focus of the research. The results of Gastic's study suggested that being a victim was associated with higher levels of excessive absence, in-school and out of school suspensions, and disciplinary transfers.

Effects of Bullying

Many of the studies reviewed looked into how being bullied affects the victim. Graham, Bellmore, Nishina, & Juvonen, (2009) presented mental and physical consequences to the victims of bullies. Children recognized as chronic targets of bullies were found to suffer from depression, social anxiety, loneliness, and low self esteem. On occasion they were believed to act out against the bully, becoming aggressive in return (Graham, Bellmore, Nishina, & Juvonen, 2009). Victims of bullying reported feeling hurt or threatened (Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006) and sometimes the victims were rejected from their peer groups (Maines & Robinson, 1994).

During adolescence, peers and close friends are recognized as the primary source of social support, replacing parents as most influential on adolescent social and personal identity development (Siegel, La Greca, & Harrison, 2009). So for students who are feeling rejected by their peers, they may feel they have no support left. These students may feel insecure or develop negative self image (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008). It is also believed that the victims of bullies develop lower self esteem, depression, increased anxiety, and physical and mental health issues (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). Flaspholer et al., (2009) conducted a study on how being the victim of bullying affected quality of life for those victims. Their research was conducted using a bully/victim questionnaire and the responses of students to questions on the questionnaire helped them to classify students into four

categories: bully, victim, bully-victim, and bystander. The results of their research supported the idea that students who do not participate in bullying behavior have a higher quality of life or life satisfaction than those who bully or are victimized. Students who are victimized were found to feel less satisfaction with their lives than those who bullied, but those who were identified as both bully and victim seemed to have the least satisfaction with their life and the lowest determination of quality of life. These students more often exhibited suicidal thoughts and actions. It was also implied from the responses to the surveys that up to 30% of bullying victims have at some point brought weapons to school with the intention of harming the bullies that have tormented them (Lawrence & Adams, 2006). This was exhibited on Tuesday, April 20, 1999 when two students, Eric Harris and Dylan Klebold, brought an assortment of guns and explosives with them to Columbine High School in Colorado (Gastic, 2008). On that day they killed 12 students and a teacher, and wounded dozens of other students before they killed themselves.

Harris and Klebold are believed to have been victims of bullying (Stancato, 2001). They were continually degraded, humiliated, harassed and socially rejected for being different than everyone else in the school according to classmates and writings they left behind. Together they planned to end their vicitmization through violence and death, seeking to become famous and respected (Stancato, 2001). While most victims do not take their response to this extreme, there seems to have been an increase in the rate of school shootings in recent years.

As mentioned above, the victims of bullying are not always just victims. Some victims are considered bully-victims (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). These bully-victims have shown to be more aggressive than the more passive victims and may act out against their tormentors (Graham, Bellmore, Nishina, & Juvonen, 2009). As for psychosocial and behavioral outcomes of bullying, research suggests that the bully-victim is

considered to be at the highest risk for depression, low self-control, poor social competence, poor peer relationships, loneliness, low academic achievement, and functioning poorly in school (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). Bully victims may also be hyperactive, have been found to have a high rate of ADD and ADHD, and have attention issues (Smokowski & Kopasz, 2005). They may annoy other students in the classroom, and cause disruptions and aggravations for the teachers.

Bullying victims and bully-victims have been found to not only experience emotional and mental trauma, but also have their classroom participation and academic achievement affected. In addition to functioning poorly in school; victims of bullying may also be absent more often, get in trouble more often at school, and receive more formal punishments than other students (Gastic, 2008). Because most peer bullying occurs in a school setting, victims of bullies may suffer deterioration in academic progress and success as schooling continues due to the negative impact of being a victim and causing a lack of engagement within the school environment (Smokowski & Kopasz, 2005). The victims may also have lower academic achievement due to their attendance issues and may not realize their academic potential.

As so much of the bullying occurs at school, some victims are afraid to go to school and may suffer from psychosomatic symptoms such as headaches and stomach pains (Smokowski & Kopasz, 2005). It has been estimated that approximately 160,000 students stay home from school each day out of fear of being bullied (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008; Lawrence & Adams, 2006). One study found that 7% of eighth grade students in the United States missed school at least one day a month in order to avoid bullies, and even if students went to school each day they were more likely to avoid public areas of the school such as bathrooms,

gyms, and lunchrooms (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008; Gastic, 2008; Smokowski & Kopasz, 2005).

Research shows that it is important for students to feel connected to and safe at school in order for those who are victimized by bullies to want to attend and engage (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008; Flaspohler, Elfstrom, Vanderzee, & Sink, 2009; Gastic, 2008; Graham, Bellmore, Nishina, & Juvonen, 2009; Smokowski & Kopasz, 2005; Stengle, 2010). Students who had a perception that they were socially supported by both peers and teachers were less likely to feel victimized and were more connected to school (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). These students who felt more supported were more likely to have regular attendance and to participate within the classroom setting.

Addressing Bullying

There are a variety of suggestions found in the research for effective approaches that could help students feel supported and safe from bullying and to discourage bullying actions in the classroom. Within the scope of research for this paper there was a decided lack of evidence of the effectiveness of the suggested interventions. The strategies and approaches toward antibullying agendas are considered arbitrary and effective only in specific situations at specific times (Jacobson, 2010). Some strategies focus on the victim, others on the bully. At times the victims were encouraged to change themselves in some way; they were told to "stand up for themselves," "hit back," or "walk away" (Maines & Robinson, 1994). This reportedly caused them to feel inadequate and responsible for being a victim when they failed to stop the negative behaviors directed toward them. Instead of putting the burden on the victims, it might be more useful to research the other options. Some of the strategies are designed to be utilized in a

specific method, others are suggestions on how to intervene in bullying situations without fully diagramed strategies. Both have found their place in the literature and will be discussed.

Many of the intervention strategies in the literature were based on classroom management. Some were focused on democracy in the classroom (Pryor, 2010), others on ensuring that the action was separate from the student (Maines & Robinson, 1994). Safe space, no-blame approaches and collective biographies may be utilized in different situations and different ways. At this time, no one method of dealing with bullying has proven to be more effective or better than another; there hasn't been enough research yet into the long-term effects of any of the strategies (Smokowski & Kopasz, 2005).

One of the most commonly held ideas when it comes to students feeling protected in the classroom is the idea of "safe space" (Stengle, 2010). Safe space has become a kind of catch-all phrase for protecting students in the classroom. Safe space is meant to give students the freedom to be individuals within a social setting without fear, discrimination, threats, or social reprisal. Safe space is sometimes seen to mean that all students who are or might be discriminated against or harassed should be removed from their attacker(s) to protect them (Stengle, 2010). Sometimes this removal meant pulling all of the threatened students into a single space or school instead of keeping them in the mainstream school system (Stengle, 2010). Other times it meant that the classroom norm was set up to stop the harassment before it got started through clear guidelines, social contracts, and self-regulating (Smokowski & Kopasz, 2005; Roland & Galloway, 2002; Lawrence & Adams, 2006; Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006). Some of the basic tenets of the "safe space" idea according to Boostrom (1998) were: we are all isolated; our isolation is both physical and psychic; we can become less isolated by expressing our diverse individuality; and students thrive in a classroom in which individuality is freely expressed.

According to Boostrom (1998) in a classroom considered a "safe space," stress and psychological pain were removed from the setting; students were no longer isolated, threatened, intimidated, or harassed. Stengel (2010) looked at safe space from a different perspective. Stengel wanted to determine where the call for safe space originated, and who it was most likely to affect. It was alleged that one reason for needing safe space was due to harassment on specific groups of individuals (Stengle, 2010), a bully might be picking on their target because they are afraid of them and want to assert their dominance. By separating the targeted students from the bullies, the research implies that both the bullies and the targets are given their own safe space.

Parents and educators were found to be more likely to advocate for safe space in response to their own perception, real or imagined, that a student may be suffering in some way than the student who was being harassed than a student is to advocate for safe space for themself (Stengle, 2010). It was alleged that the adult calling for "safe space" might be doing so in response to their own discomfort over a perceived situation that may be occurring, a situation where students of a certain designation may be getting harassed or bullied due to their differences from the majority of their peers and lack of conformation to the norms of their peers (Stengle, 2010). The students themselves may not be aware that the adults are trying to mediate the situation; they may feel it is a punishment in some way to be separated from their peers (Stengle, 2010) and lower their self-esteem further than it already had been (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009).

Instead of approaching bullying from the safe space argument, Maines & Robinson (1994) focused on a "no blame approach." They believed that a plan to reduce bullying should focus on the feelings and status of the bully, not on the victim. The instructor in a classroom will most likely approach a bullying situation with sympathy for the victim and anger or frustration

toward the bully (Maines & Robinson, 1994), so it is important for the instructor to make sure that they avoid labeling the students and separate the behavior from the child (Bansel, Davies, Laws, & Linnell, 2009) (Maines & Robinson, 1994). Students who have been repeatedly called out for negative behavior might have been labeled as deviant or delinquent and could become resentful because they feel they have been treated unfairly (Bansel, Davies, Laws, & Linnell, 2009); they may react negatively especially toward teachers who perpetuate the label or they feel are treating them unfairly. By punishing the bully, teachers reinforce that having power over others and using intimidation to manipulate them is important and not correct the behavior (Maines & Robinson, 1994).

Instead of allowing bullying to rule the classroom, it may work better to instill higher values into students; empathy, consideration, and unselfishness are some traits that are regularly missing or diminished in bullies (Maines & Robinson, 1994). Though many teachers view their job as teaching the content area, students gain significant experience in social behaviors while in school (Jacobson, 2010). Instead of making a moral judgment, Maines & Robinson (1994) suggest seven steps that might be taken in order to follow a no-blame approach (p. 5):

Step 1 - interview with the victim. When a teacher determines that an instance of bullying has occurred, they should speak with the victim about how they feel without questioning them about the situation except to determine who else was involved.

Step 2 - convene a meeting with the people involved. The teacher should then arrange to meet with all of the students who were involved in the situation, including bystanders.

- Step 3 explain the problem. Explain to the group how the victim is feeling and use poems, a piece of writing, or a drawing to better illustrate the feeling to help others understand. There should not be discussion of the details of the incident nor should blame be given to any member of the group.
- Step 4 share responsibility. The teacher should not assign blame but should let the group know that she is aware they were responsible for how the victim is feeling and that they can do something about it.
- Step 5 ask the group for their ideas. Each member of the group should be solicited for an idea of how the victim could be helped to feel better. The teacher should respond positively, but should not extract a promise of improved behavior.
- Step 6 leave it up to them. The teacher should end the meeting reinforcing the idea that the students involved are responsible for solving the issue. She should also arrange to meet with them again.
- Step 7 meet them again. The teacher should speak with each student, including the victim, about a week after the first meeting in order to monitor the relationship between the students and keep the students involved in the process.

Within the research there are some responses by the authors to questions about the noblame approach (Maines & Robinson, 1994). Some may see it as a weak approach, some would prefer to help the victim instead of intervening with the bully, some wonder about how to deal with a bully who may be violent or disturbed. As with the safe space approach, the no-blame approach has not been strongly researched and there is little unbiased review of how the approach has been implemented.

A third approach found in the literature that seems to relate to Step 3 of the no-blame approach is to use a collective biography (Bansel, Davies, Laws, & Linnell, 2009). In a collective biography the participants read about the topic (bullying) in both fictional and academic texts. They then meet for several days in a row and share their own stories and experiences on the topic, sharing details until everyone has gained the same information and can picture the situation themselves. The students then write down the stories in a basic structure and read them out loud. After group discussion of the stories they are rewritten without clichés and explanations. The story has now become less autobiographical and more collective; students can take ownership of the stories as everyone has had some say in developing how the story reads (Bansel, Davies, Laws, & Linnell, 2009). The stories no longer tell the "truth" of what happened, instead they share more of the feelings of the situation and the way the feeling was developed. Students are then supposed to read these stories and be able to recognize some of the cause-effect factors of the situations. Unfortunately, within the scope of this review there was a lack of research citing implementation of this approach, so it could be taken as a suggestion and a possible way to address behaviors, but as with anything may be very specific to contexts in which it would be effective.

Another researcher had suggestions for programs and projects that might be useful in intervening in bullying (Smokowski & Kopasz, 2005). The first program they discussed was the Olweus Bullying Prevention Program, which was designed by Olweus and Limber in 2000. They stated that it is a comprehensive intervention program and is widely recognized. School

personnel are the key to this program, teachers are there to create an environment that is warm and involves all students. The program also has firm limits on what behaviors are unacceptable, applies non-hostile consequences when necessary, and sets adults up as authority figures and role models (Smokowski & Kopasz, 2005).

The Bullying Project is another program discussed by Smokowski and Kopasz (2005). It has been built on the research done by Olweus and can be used as additional material to the bullying prevention program mentioned above. Instead of having a focus on the school environment, the project was meant to teach students how to stand up to bullies, how to approach adults for help, and how they can recognize and reach out to possible victims of bullying (Smokowski & Kopasz, 2005). More support was offered for the victim; physical protection, support groups, or individual therapy are offered. Expressive arts therapies are suggested, with the options of writing, acting out, drawing, or talking about what has happened with them. Interventions for the bully were also recommended; counseling sessions that could help the bully focus on acknowledging what they have done, developing empathy, and determining how they may correct the situations (Smokowski & Kopasz, 2005).

The final program suggested by Smokowski and Kopasz is Bullybusters, which is an antibullying campaign that focused on the performance of the play <u>Bullybusters</u> (Smokowski & Kopasz, 2005). Students get involved by acting out short skits about typical bullying situations and then discussed what they knew and how the skits made them feel. The whole school then gets together and explains about the zero tolerance policy in place, and asks students to help prevent bullying in schools (Smokowski & Kopasz, 2005).

In addition to the approaches above, there were some recommendations for intervening in bullying situations. According to Pryor (2010), a democratic practitioner is the key to opening

dialogue with students about behavioral conflicts. A teacher who knows their students can address and prevent bullying by using their knowledge of their students to help them engage in discussions related to behaviors and actions of the students (Pryor, 2010). Students are believed to adopt behaviors based on fairness and democracy while in the classroom, so teacher-based curricula should be available to teach social responsibility in schools.

While Pryor believes the curricula for teaching social responsibility should be available as teacher-based instruction, other suggestions have been made. Lawrence & Adams (2006) encouraged taking every report of student bullying seriously and working to create a reputation as a caring, reliable adult. A teacher working against bullying should never give up, they should try a new approach when the one they are currently attempting does not work. Some of the suggestions are for the victim to report the incidents or discuss them with an authority figure, others involve bringing the information to groups of peers.

One of the suggestions they shared for how the authority figure could deal with bullying situations was to encourage the victim to write what happened, when it happened, and who was around (Lawrence & Adams, 2006). Creating a record of the behaviors may help to create a case against the bully and will document repetitive behaviors. Another suggestion was to persuade the victim to talk to an adult, or to offer to speak to an adult on the victim's behalf. Encouraging the victim to be assertive and try not to show fear so the bully sees that they are not afraid is another suggestion. Each of these is a more personal way to deal with the issue, and may be difficult for a victim to follow through with on their own. Taking the suggestions to the next step are ideas about encouraging the victim to bring up the topic of bullying to a student council or other group that represents the student body, or to bring it up in class or at club meetings. The last suggestion on the list was to be proactive and talk to all the teachers and other students so people are aware

of the situations that are occurring (Lawrence & Adams, 2006). Lawrence and Adams add a caveat to their suggestions, "if any of these (suggestions) do not work, do not give up. Try something else." They do not support or provide research into which might be most effective, they recognize that things are situational and what works with some students may not work with others.

There were more suggestions for intervening in bullying situations in some of the other research. Smokowski and Kopasz (2005) suggested that some of the methods for intervening with bullies could include the use of behavioral contracts and teaching of social skills. Bullies also need to be made aware of the rules and guidelines regarding bullying; so administration and teachers need to ensure that the rules are clearly defined, that all students are aware of the rules, and that students are held accountable to the rules. Intervening with bullies and providing them counseling and assistance with behavior modification training are other suggestions (Smokowski & Kopasz, 2005).

For intervening with the victims, Smokowski and Kopasz (2005) suggested watching out for students exhibiting behaviors consistent with being victimized. They asserted that victims may be afraid of coming forward and may be embarrassed to admit they have been bullied. When counseling suspected victims of bullying, Smokowski and Kopasz stress that it is important to be gentle and sensitive. Gastic (2008) also suggested supporting victims of bullying by teaching them to modify their behavior and to understand social cues and how to respond when others make overtures toward them. Victims may also need academic support and access to resources that can help them remain engaged with school (Gastic, 2008). Unfortunately neither Smokowski and Kopasz (2005) or Gastic (2008) researched the suggested intervention strategies to determine whether they were effective, Smokowski and Kopasz were focused on introducing

characteristics of bullies and suggestions for intervention strategies and Gastic focused her research on how bullying related to truancy and disciplinary problems.

Jacobson (2010) suggested that listening, waiting and paying attention to the individuals involved may be a necessary step to intervening in bullying situations. Listening was considered important as it gives an opportunity to find the desires that motivates the behavior of the bully. It was also suggested by Jacobson that bullies were using a form of "bullshit" to manipulate the perception of those observing the bullying activity. The bully was not thought to care about what people thought of the victim even if it looked as though the bully hated them; instead the bully wanted others to focus on them, the bully, as though they were higher in status than their victim (Jacobson, 2010). Jacobson was focused on the relationship between bullying and lying and the research suggested that the notion of bullying is more complex than most people generally think; because there are a wide variety of reasons for bullying ind characteristics of bullies there are likely a variety of ways to effectively address bullying issues. Finding the cause seemed to be the recommendation from the research as a method of determining the most effective strategies for addressing the problem.

In order for a bully to gain status, there have to be observers to the actions. One possible option is for schools to provide bullying prevention strategies that help the observers learn to stop bullying when they see it happening (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). The bystanders may be better situated to report bullying when it happens, intervene in situations when they occur, and to support the victims. The suggested ways to do this include teaching inclusive strategies to help involve all students, forming student committees that work with staff to plan, implement, and evaluate school bullying prevention activities and to be representatives for their peers (Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009).

Lawrence and Adams (2006) also supported the suggestions for what could be done to support victims of bullying situations. If a teacher chooses to follow a strategy that supports the victims, it is recommended that the teacher not suggest that the victim use violence against the bully, nor should the teacher tell the victim to deal with it on their own (Lawrence & Adams, 2006). The research also recommended that you involve other people and make sure that bullying is talked about so others know about the situation and it can be addressed at a classroom or full school level. Lawrence and Adams did not mention research that supports any of the suggestions given for interrupting bullying, but recommended that if one approach does not work, then try something else, just do not give up.

Conclusion

The primary focus of this literature review is bullying's effect on student's education and what strategies have been suggested for dealing with bullying in the classroom. Bullying is negative behavior(s) by a specific individual, or groups of individuals that occurs repeatedly over time and serves to make the targeted victim feel frightened, intimidated, powerless, or inferior to the aggressor. The bullies may choose their victims based on their own feeling of superiority, or because the victim exhibits behaviors that are outside of the group norms. Male bullies more often treat their victims with more overt forms of bullying including physical and verbal attacks, female bullies are more commonly covert with their bullying and use rumors, exclusion, and verbal and emotional taunts to attach their victims (Lawrence & Adams, 2006; Vervoort, Scholte, & Overbeek, 2010). Female bullies are more likely to work in groups to attack their victims, males work more commonly as individuals to increase their superiority over others (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008).

The effects of bullying on victims has recently come to national attention with the internet allowing victims to more quickly share their stories, and sometimes send out a cry for help that does not always receive the response needed to prevent the students from ending their life or acting out in a deadly manner against their attackers or the schools that let them down. It is believed that up to 30% of bullying victims have at some point brought weapons to school, contemplating using it against those who have either bullied them or the bystanders who have done nothing to stop or prevent the bullying (Lawrence & Adams, 2006).

Educators should be worried, not only because of the possibility that students who have been victims of bullying may act out violently in response, but also because it affects whether these students may succeed in their educational endeavor. Students who are victims of bullying can suffer depression, low self-control, low self esteem, social anxiety, poor peer relationships, loneliness, low academic achievement, rejection from peer groups, increased anxiety, suicidal thoughts and actions, or negative self image (Aluede, Adeleke, Omoike, & Afen-Akpaida, 2008; Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009; Maines & Robinson, 1994). Bullying victims may also be more disruptive, annoying, and distracting in class; victims of bullying have been found to have a high rate of ADD and ADHD (Smokowski & Kopasz, 2005). They also have a high rate of discipline problems and truancy, receiving more formal punishments than other students (Gastic, 2008). Because the victims of bullying may feel that the institution of school has let them down and failed to protect them, victims may exhibit a lack of engagement within the school environment, have lower academic achievement due to their attendance issues, and may not realize their academic potential (Smokowski & Kopasz, 2005). The truancies and increased absences may also be attributed to psychosomatic symptoms such as headaches and stomach pains due to victims' fears of being bullied at school.

There are a variety of suggestions for addressing the issues of bullying, but research into the effectiveness of the strategies seems to be lacking. Knowing your students and being supportive and caring may be one of the best defenses against bullying. Creating a warm and inclusive classroom environment, inviting conversation about behavioral conflicts, listening to students when they have concerns, recognizing motivation for bullying behaviors, making expectations clear, having social contracts, and training students to recognize unacceptable treatment of others are all suggestions for intervening in bullying (Boostrom, 1998; Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009; Gastic, 2008; Jacobson, 2010; Maines & Robinson, 1994; Pryor, 2010; Smokowski & Kopasz, 2005). Maybe the most important conclusion drawn from this literature review is that the behavior should be separated from the student; the student is not bad, the behavior is (Bansel, Davies, Laws, & Linnell, 2009; Lawrence & Adams, 2006; Maines & Robinson, 1994). Addressing the negative behaviors without blaming or labeling the student may be a more effective approach than some of the other suggestions. Once the behavior and motivations are discovered, it may be possible to counsel and work with the bully to modify their behavior into something more positive (Jacobson, 2010).

For ideas in helping the victims to get out of their situation, literature suggests that providing support and a safe, inviting space for all students may help victims gain confidence and get out of their role of victim (Boostrom, 1998; Smokowski & Kopasz, 2005). Victims could also be encouraged to write down everything about a situation including who else was involved, who else may have seen it, what exactly happened, and when it happened in order to help identify repetetive behaviors in individuals who may be classified as bullies (Lawrence & Adams, 2006). It is important to remember that victims of bullying may need gentle and sensitive individuals helping them through counseling (Smokowski & Kopasz, 2005). Victims

may be encouraged to modify their behavior that makes them a target, get help with developing social skills, and to seek academic support to help them remain engaged and attending school (Gastic, 2008). And, as Lawrence and Adams (2006) mentioned, if any suggestion (or strategy) you try does not work, try something else. You should not give up on helping prevent bullying in your classroom.

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Constructivist Inspired Teaching Practices in Emotionally or Behaviorally Disabled Special Education Classrooms

Kobi D. Wilson

Abstract

Research has shown that children who receive special education services for significant Emotional or Behavioral Disabilities (EBD) continue to have poor social and academic outcomes in adolescence and into adulthood. This paper argues from a critical-constructivist perspective that traditional behavior modification and direct instruction programs for children with EBD are not adequately meeting the underlying emotional and cognitive needs of these students. The author posits an alternative model of instruction, which incorporates some aspects of traditional behavior modification into an expanded socio-constructivist inspired teaching model. The author argues that this type of instruction may be better able to support the development of internal control and higher-order critical thinking skills that could positively impact the long-term outcomes for students with EBD. This paper highlights the lack of empirical research in the effect of using critical-constructivist inspired instruction for students with EBD but also discusses the available research in other related areas that suggests the possibility of using these types of instructional and classroom management techniques in EBD classrooms. Constructivist Inspired Teaching Practices in

Emotionally or Behaviorally Disabled Special Education Classrooms

One Morning in the City of Delft

It was toward the middle of my first student teaching assignment in a self-contained special education class for primary grade children with emotional or behavioral problems. It had been a difficult morning. Two out of the five children in our class had arrived at school defiant, angry, and looking for a fight. There had been some yelling and swearing, desks and chairs had been thrown, and the remaining three children had been evacuated from the room to spend most of the morning on our self-contained outdoor playground.

Now things were finally starting to settle down. The two children were each being held in separate rooms located off our main classroom space, and the three remaining children were back in the classroom. I was started to explain that we were going to work on a writing assignment that related to Johannes Vermeer, an artist we had been studying in connection with our literature block. I had only gone a minute or two into the introduction when I was called away again. After a struggle to place one of the angry children into a small adjacent deescalation room, I looked back across the classroom at the first three children. Typically, without specific instructions, these children, like any group of children, will become distracted by talk or play as soon as the adults' attention is focused elsewhere. But today, when I looked across the classroom I saw they were not playing, but instead had pushed their desks together at the front of the classroom and were bending over an open book. Isaac^{*} was in the middle, pointing at something inside.

^{*} All students' names are pseudonyms.

Isaac: The Absent Child

As a third grader, Isaac already had a long history of academic failure. He was two to three years behind his general education peers in almost all academic subjects, primarily because he was still reading at a first grade level. He had a history of family and housing instability, combined with a very recent history of suspected sexual abuse. He had been identified for special education services in the category of Emotionally or Behaviorally Disabled (EBD) two years before, but since his recent suspected abuse he had completely shut down. He would occasionally have extreme outbursts of destruction and rage, but most of the time his mode of defiance was a passive but absolute refusal to participate in any academic activity.

At the beginning of the year he rarely spoke or even made eye contact during class time and he kept his distance from everyone. Yet, there he sat not just participating in a discussion but right in the middle of it. "They must be looking at a comic book," I thought but nonetheless I approached cautiously. When I got closer, I saw that instead of comic books, every book I had about Johannes Vermeer was scattered across their desks. "What are you guys looking at?" I asked casually as I knelt down near them. Isaac glanced up, looked me right in the eye, and said, "I was just explaining to Kaleb that this is the town where Vermeer lived with his family. He (Kaleb) wasn't here that day." Sure enough, I looked down at the book to see that the boys had found a painting I had shown them a few days before of the city of Delft, where Vermeer lived and worked. Isaac continued, "We just wanted to know more about it…"

"We just wanted to know more about it..."

I had started my work with EBD children while working as a treatment aide and advocate within the foster system. As a result, when I began my student teaching assignment I was already well schooled in behavior modification techniques and had seen their success with some

of our state's most difficult children first hand. However, through the Master in Teaching program I was enrolled in I had been introduced to the idea of constructivist education, and had become slowly convinced that this was a significantly better way to teach all students. When I started my student teaching I persuaded my supportive cooperating teacher to let me give it a try with our EBD class.

Then came that morning with Isaac and the other students. As a constructivist-inspired educator struggling to apply these principles within the unique context of a self-contained EBD classroom, that moment with Isaac felt like a miracle. I knew that I had seen all the students slowly become more engaged in their work throughout the unit I had been teaching. It was an integrated unit that took up two-thirds of our instructional time each day. The unit integrated art, reading, writing and science through a modified reading/writing workshop (Fountas & Pinnell, 2001). Of course, I also hoped that it would teach critical thinking, inquiry and self-direction.

All of the students seemed to enjoy the work in the unit. Even Isaac was slowly beginning to participate and I occasionally caught moments when his withdrawn face would quietly open up. In addition, I was starting to see signs of academic progress in all of the students, especially in the areas of reading and writing. Still, this moment of self-motivated investigation was the pinnacle of everything I had been trying to do. It told me that they were beginning to be motivated to learn because they were engaged in the *content*, rather than because they would lose points for misbehavior or receive rewards for completing their work. Self-directed learning, critical thinking, and problem solving were skills that would last these kids a lifetime and give them a chance to break free from the destructive patterns that had encircled their young lives thus far. Those were the skills that I had been trying so hard to instill through our work as a class, and that morning the seeds I had planted finally sprouted.

Conflicting or Complementary: Theoretical Foundations

However, despite the type of success I saw during my student teaching children with emotional and behavioral difficulties are rarely, if ever, exposed to this type of instruction in their classrooms. Students with EBD are referred for special education services because their behaviors or emotional difficulties are so extreme that they significantly interfere with their ability to learn, despite the student's otherwise normal development and/or intelligence (Wehby, Lane & Falk, 2003; Lewis, Hudson, Richter & Johnson, 2004). These children can be unpredictable, disruptive and out of control. The goal of self-contained EBD classrooms is to stabilize students' behavior and return them to general education. The question is how best can this be accomplished?

Behaviorism

Most EBD classrooms use an educational process called behavior modification to accomplish this goal (Danforth & Smith 2005; Freinberg, 1999; Wehby, Lane & Falk, 2003; Lewis et al., 2004). Behavior modification systems are designed to teach social and cognitive skills based on the needs of the child or the class. The system includes direct instruction on needed skills as well as an integrated system of rewards and consequences that are focused on extinguishing negative behaviors and replacing them with more positive alternatives (Landrum et al., 2003). Within this context academics often come second, out of necessity. According to Wehby et al (2003), because of the extreme behavior of students with EBD programs, many classes only spend 30% of the school day on academic instruction, which is unfortunate because students with EBD need both academic and social growth to be able to succeed. Within special education literature the type of instruction most commonly used is referred to by many different names including direct instruction, instructionism or reductionism (Danforth & Smith, 2005;

Johnson, 2004; Macinnis, 1995). However they all refer to the same basic types of instructional practices, so I will use the term direct instruction for the sake of clarity in this paper. Like behavior modification, practitioners who advocate direct instruction believe that learning is best accomplished when complex concepts can be broken down into discrete skills or pieces of information. These pieces can then be taught through a carefully organized sequence and practiced through repetition until mastery is reached. Students are expected to retain large amounts of information and provide it back to the instructor when requested. Direct instruction and behavior modification both come from the same theoretical foundation that learning occurs through exposure to external stimuli, therefore, within the context of this paper I will refer to these as behaviorist-inspired instructional practices (see Figure 1).

Behaviorist Learning Theory	
Instructional Strategy	Classroom Management Strategy
Typically <i>direct instruction</i> , sequential, skill based	Typically <i>behavior modification</i> , external control, system of positive and negative consequences for behaviors

Figure 1: Behaviorist Relationships

These types of programs and practices have been the primary focus of educational research in the field of EBD for the last 30-40 years, which I will discuss further later in this paper. These trends remains strong even at the Federal level. Positive Behavior Intervention Plans are mandated for students with EBD through the Individuals with Disabilities Act (IDEA) and No Child Left Behind (NCLB) (Lewis et al., 2004; Smith & Katsiyannis, 2004). These plans require a functional behavior assessment to determine the preceding events as well as the student's motivation (the function). Most often, this data will be used to create a behavior modification plan. Specific strategies are then developed to change the undesirable behaviors

through positive and negative reinforces, a behaviorist-inspired strategy. Within the field of EBD it is strongly believed that behaviorist-inspired practices are the only way to minimize disruption and provide a safe, productive learning environment for all of the students.

Challenges to Behaviorist Theory

However, this type of instruction emphasizes lower-level thinking and memorization skills because the focus of instruction is usually on specific information and not whole concepts. When these students are removed from mainstream classes and tracked into low-level special education classes they are not exposed to the same range or depth of content as their general education peers. This type of learning does not provide students with adequate opportunities to make connections across subjects or apply new understandings to their lives and experiences, which is often referred to as transfer (Bransford, et.al., 2000; Zull, 2002). Transfer is an important element in deeper levels of understanding, higher-order thinking skills, long-term recall, problem solving, the application of knowledge or understandings to future events. Learning opportunities that foster transfer are closely aligned with the latest advances in brain research and research into how people learn. Within these classrooms teachers maintain control and motivate participation through meticulous consistency, severe consequences for misbehavior and some type of external reward to encourage compliance with classroom procedures and instructions (Landrum et al., 2003). This compliance makes it easier for other students to receive instruction, but what, if anything, are students with EBD really learning in this process?

Behaviorist instructional pedagogy situates the locus of control and motivation firmly outside of the student, as a result they are not learning self-control or independent motivation. For a student like Isaac who is already resistant because of past school failure, this further disenfranchises him from his own motivation to learn (Carter, Lane, Crnobori, Bruhn, & Oakes,

2011; Danforth & Smith, 2005). In addition, through the use of inflexible structures and schoolwide procedures for physical containment and restraint, these students are also learning that adults have the right to control their bodies, movement and interests. For a student like Isaac, who has already experienced violence and lack of control over his body and person, this is a dangerous place indeed.

In addition, many students with EBD come from marginalized communities when they enter school (Bradley, Henderson & Monfore, 2004, Greenbaum et. al. 1996; Wagner, 1995). According to National Center for Educational Statistics (www.nces.ed.gov) as of 2009 there are approximately 420,000 students ages 3-21 who qualified for special education services because of SED that are being served through public school special education services in the United States. This number represents approximately 6.5% of the total number of children served under IDEA, making it the 4th most common disability category. EBD students are significantly more likely than other students to experience additional risk factors such as low socioeconomic status, single-parent households, limited parental education, or other family based stressors such as abuse, family history of metal illness, parental drug or alcohol abuse, or family police involvement (Greenbaum et al. 1996; Wagner, 1995). Sometimes students' aggression is an expression of resistance against this disenfranchisement, inequality or fear of continued failure within a system that is not working for them. Their behavior is the only means they have to communicate their discontent (Danforth 2001; Kohl, 1994; Nolan, 2011; Redl, 1975). Behaviorist instruction is not well suited to helping students develop a critical annalysis of the world or thier own lives. However, this type of analysis is vital because it might enable them to identify more effective strategies of engagement or resistance as well as the internal motivation needed to make changes in thier personal outcomes.

Constructivism

The other prominent school of thought in the field of education is the related theories of Constructivism, Social-constructivism, and Critical Constructivism. Although each theory focuses on a slightly different part of the learning process, they all assume that learning is an active process, situated within the individual and their social context, where all knowledge and understanding is built (constructed) upon previous knowledge and understanding (Baviskar, Hartle & Whitney, 2009; Cornelius-White, 2007; Danforth & Smith, 2005; Macinnis, 1995; Powell & Kalina, 2009). This means that classroom instructional practices will be studentcentered, interactive or experiential, and lessons will often be inquiry or project based with students working in collaborative groups. When students take more control over their own learning they develop higher levels of mental, emotional and social engagement, which encourages positive social skills and minimizes negative behaviors (Carter, Lane, Crnobori, Bruhn & Oakes, 2011; Pederson, 2003). Constructivist-inspired educators typically believe that the same level of student-centered control and socially constructed understanding that is utilized in academic work should be applied to classroom management as well, this style is usually referred to as educative or democratic classroom management (Landau, 2004). For the purpose of this paper I will refer to all of these theories under the umbrella term "Constructivist" because they share an underlying theoretical foundation that all knowledge is actively *constructed* by the learner and not passively acquired through external stimuli (see Figure 2).

Constructivist Learning Theory	
Instructional Strategy	Classroom Management Strategy
Inquiry or problem based, typically student centered	Typically student centered, structured to be educative and/or democratic.

Figure 2: Constructivist Relationships

Teaching Toward a Better World

I will be approaching this paper from a critical-constructivist perspective because I believe that more than simple accademic outcomes or critical thinking skills are at stake in this debate, I beleive that this is an issue of social justice. Critical-constructivists situate constructivist educational theories within a critical examination of the history, social context and the construction of knowledge and power within society (Danforth, 2000; Danforth & Smith, 2005; Nolan, 2011). Critical constructivists understand that both access to "knowledge" and the content of that "knowledge" is controlled by socially constructed institutions that are steeped in racism, sexism, classism, ableism, homophobia and other forms of bias. This social context marginalizes the histories and truths of all but a small segment of society, undermining the lived realities of those outside the dominant group. Critical constructivist-inspired teaching provides an opportunity for multiple perspectives and "truths" within both the classroom and the content.

However, even when EBD teachers employ more complex or engaging curriculum students can still tip the balance of a good day into violence and destruction in the blink of an eye. For many teachers of EBD students, these behaviors make it feel unrealistic to attempt more unstructured, inquiry-based activities that require individual motivation or extended group cooperation. There are simply too many opportunities for unexpected discord. I well remember the frustration of having stayed up late the night before to prepare an inquiry based lesson for science, involving seeds and fruit, only to have everything end up splattered on the floor when a student unexpectedly blew up. Over time, these lessons might begin to feel like a waste of already limited time and resources, when instruction is so frequently disrupted by misbehavior, it is simpler, and provides fewer unexpected opportunities for conflict, to use curriculum straight out of the book. However, I also know that even though we never did get the opportunity to finish the exploration of fruit seeds, that day at lunch two of my students, Kaleb and Oliver,

came running up to me holding pieces of kiwi, "Look Miss Wilson," they said "We found some seeds!"

The Seeds of Investigation

These events, and others, planted the seeds of interest in me and motivated me to investigate effective constructivist inspired practices with EBD students. This paper is the result of that investigation. I was surprised to discover that almost all of the research available is focused on behaviorist-inspired practices and that there was almost nothing available that discussed using the types of constructivist-inspired practices I have described. However, I was encouraged to find research and theoretical discussion within other related fields that seems to indicate that these practices could be effective within EBD classrooms as well. For this paper, I will describe a few significant events in the history of EBD education as well as current trends and outcomes for students with EBD in the United States. Next, I will discuss research in other areas that could support bringing constructivist inspired educational practices into EBD classrooms and how these strategies could be used to facilitate positive behavioral changes and academic growth in students with EBD. After that, I will discuss typical characteristics of students with EBD, as well as the types of support these students need to be successful. Finally, I will address how traditional constructivist-inspired teaching practices could be effectively adapted for use with students who have EBD, providing examples and specific classroom practices from my own experience.

How We Got Here: History of EBD Education in the United States

Despite the fact that education for students with EBD is almost entirely focused on behaviorist-inspired instruction, this has not always been the case. Early efforts to help students with EBD were based on much more naturalistic principals and relied on metacognitive and

therapeutic interactions to help students with mental or emotional challenges which is much more closely aligned with the constructivist-inspired practices of today. In the early days of public education children who were considered mentally ill or mentally disabled were not allowed in school, instead they were housed in mental institutions or lived on the streets. (Bradley, Henderson, Monfore, 2004; Danforth &Smith, 2005). Although society developed more compassionate attitudes over time an estimated 1.75 million (Danforth &Smith, 2005) children and youth, including children with serious emotional disorders (SED), were kept out of public schools until the passage of the landmark "Education for All Handicapped Children Act" (P.L. 94-142) in 1975. This legislation significantly affected programs for students with SED as enrollment increased by 478% in the next five years. This increase was due in part the increase of those who had been previously excluded from public education as well as more students being identified for services. During this time students with SED were usually educated in specialized classrooms or schools, so this increase created a huge demand for new teachers trained to work with students with EBD.

According to Danforth and Smith (2005) prior to 1975 teachers in EBD programs were usually "teacher-counselors" who were educated in both teaching and psychiatry, including a residency at a psychiatric ward. Most of these "teacher-counselors" followed the neo-Freudian techniques of child psychiatrist Fritz Redl, who created the "Life Space Crisis Intervention." These therapeutic educators believed that children didn't benefit from traditional therapy techniques, instead it was the role of the "teacher-counselor" to take advantage of small moments of emotional crisis throughout the day to help children observe their thoughts, emotions and choices within the context of their lived experiences. These educators followed more naturalistic methods of instruction and incorporated the children's ideas and experiences into therapeutic

interventions (Whelan & Kauffman, 1999). However, the extreme need for new teachers combined with the public schools' continued emphasis on order and discipline abruptly made "teacher-counselors" seem like an outdated luxury (Danforth &Smith, 2005). Instead, the social climate suddenly made behavior modification seem like an ideal strategy. Given the quickly growing number of students with increasingly challenging behaviors, administrators needed large numbers of new teachers who could maintain control over growing classrooms and force compliance with instruction. Behavior modifications has a simple structure with an explicit system of consequences that are easily modified and implemented in any classroom. Soon behavior modification programs became the norm in all schools across the country, and today even mainstream classroom management systems are often based on behavior modification techniques. However, it is important to note that "the victory of behaviorism [teachercontrollers] over neo-Freudianism [teacher-counselors] within the field of [EBD] was not due to the intellectual or practical superiority of behavioral theory and methods" (p.28) instead it was due to the social dynamics and personnel needs of the time.

Current Trends in EBD Special Education

Despite almost 40 years of school based behavior modification programs, children and youth with EBD still struggle socially and academically in school and continue to struggle long after leaving. In order to provide a national picture of the status of youth and children with EBD who are being served through special education Bradley, Henderson and Monfore (2004) compiled data from three federally funded national longitudinal studies.¹ These studies found that children and youth with Emotional Disabilities (ED) are generally placed in more restrictive settings than their peers with other disabilities, which means that they are more likely to spend

¹ The Study of State ad Local Implementation and Impact of IDEA (SLIIDEA), the Special Education Elementary Longitudinal Study (SEELS) and the National Longitudinal Transition Study-2 (NLTS2).

either all or part of their day in separate classrooms or schools. As discussed above, this removal from mainstream education significantly limits students' opportunities for social interaction as well as their access to the depth and breadth of academic content that non-disabled peers receive. These studies also found that students with ED ranked lower in social skills than almost all other special education students, except for students with autism. Finally, they found that 73% of secondary students with ED had been suspended or expelled, and more than 34% had been arrested at some point.

Unfortunately, these negative trends continue into adolescence and young adulthood. In 1985 The National Adolescent and Child Treatment Study was commissioned by the National Institute of Mental Health and the National Institute on Disability and Rehabilitation Research in the United States Department of Education (Greenbaum et al. 1996). The researchers followed 812 students with EBD ages of nine to seventeen who were receiving either school based or outside mental heal services for a period of seven years. At the beginning of the study over 93% of the students exhibited math achievement levels that were one or more years behind their peers and almost 59% had reading achievement levels that were one or more years behind their same age peers. However, despite receiving multiple support services through school and community based organizations these scores did not improve. Instead for students who were over the age of eighteen at the end of the study, the number of students who exhibited a discrepancy between their grade level and their scores had *risen* to 97% of students testing below grade level in math and 75% testing below grade level in reading². In addition, only a quarter of these students had achieved graduation with a high school diploma while an additional 17% had received a GED, meaning that the majority of students in this study did not graduate.

² As measured by the Wide Range Achievement Test- Arithmetic and Reading.

The National Longitudinal Transition Study (NLTS) of Special Education Students described a similarly grim picture. This study surveyed parents, students, principals and teachers as well as collected school records over a period of seven years on approximately 8,000 young adults from over 300 school districts (Wagner, 1995). This study focused on all federally recognized disability categories and compared student outcomes between various groups of students with specific disabilities as well as to their general education peers. In her article Wagner used a subset of this data to describe the outcomes for students with Serious Emotional Disturbance (SED). She found that high school students with SED exhibited very limited engagement with school as demonstrated by a high rate of absenteeism and one of the lowest rates of involvement in clubs or social groups compared to other disability groups. In addition, students with SED had lower grade point averages than other students with disabilities as well as their general education peers, and over 75% had failed one of more courses, which is the highest rate in all groups. In the end almost 55% of these students dropped out of high school before graduation.

However, the NLTS took it one step farther. The researchers wanted to discover how students with EBD integrate into adult society after leaving school so study participants were contacted at several points over the course of the next three to five years. When looking at this type of data it is important to note that social customs, such as what is a positive or negative indictor of adult success are subjective, and any one specific indicator, such as marriage or children, carries different meanings depending on the cultural context and the social group of the person involved (Rogoff, 2003). For example, even within our own country the appropriate age for a person to marry, if at all, or the social/emotional significance of choosing to have a child outside of wedlock varies greatly depending on any number of possible factors including age,
race, ethnicity, class, gender, education level, and geographic location. However, one of the major goals of EBD education is to prepare students to be successful in their lives, which typically also means being able to navigate mainstream white, middle-class society. These statistics are included as indicators of how well this goal is being met.

In addition, many of the same indicators, although subjective in meaning, are still statistically significant risk factors either for the person, or for their children. For example youth with EBD were less likely than any other group to have married or be living with a partner at the time of the final survey (Wagner, 1995). This statistic might indicate that these young adults lack attachment or emotional stability, in addition despite low levels of marriage young women with SED were significantly *more* likely to become mothers at a very young age (48%) than young women in the general population (28%). Although the moral implications of this choice vary based on personal belief being a single parent still places these women and their children at greater risk of poverty and other challenges. Coming from a single parent home or growing up in poverty are two significant risk factors that place a children into a higher-risk category for being diagnosed with EBD later on (Greenbaum et.al. 1996; Wagner, 1995) which starts the entire cycle over again. In addition, at the time of the final survey only 47% of these students were employed, verses 57% of other youth with disabilities, and 69% of youth in the general population (Wagner, 1995). The results of the survey also indicate that these children continue to have low levels of educational attainment, with only 25% having ever enrolled in some form of postsecondary education, verses 67% of the general population, which is also a family stressor that might place their children at greater risk. Finally, and perhaps most grim, 58% of these students had been arrested at some point in the first three to five years after leaving school which can have far reaching impacts on themselves, their families and their future.

Theoretical Foundation Outside of EBD

Although other historical alternatives existed, today the focus of research within the field of EBD is primarily on the use of behaviorist-inspired instructional and behavioral management best practices. Despite the lack of information available to directly address the usage of constructivist-inspired instructional practices in EBD classrooms there are some strong indicators of the possibility of success within the neighboring fields of education and therapy. I drew on this research during my previous student teaching as well as within this paper. I also examined research that addressed the effectiveness of constructivist-inspired practices for all students (Baviskar et al., 2009; Cornelius-White, 2007; Powell & Kalina, 2009). Within the field of education there have been positive results using appropriately modified constructivist-inspired instructional practices with other groups of special education students, especially students with Specific Learning Disabilities (SLD) (Graham & Harris, 1994; Harris & Graham, 1994; Johnson, 2004; Macinnis, 1995; Smith, 1982; Steele, 2005; Scruggs & Mastropieri, 1994; Trent, Artiles & Englert, 1998). There is also support for activity or adventure-based therapy/education for at-risk youth, which is relevant because many of the group process techniques used in adventure therapy are similar to the democratic classroom management strategies advocated in this paper (Brendtro & Strother, 2007; Greene, 1942; Hattie, Marsh, Neill & Richards, 1997; Long, 2001; Loughmiller, 2007; Passarelli, Hall, & Anderson, 2010; Walsh & Aubry, 2007). Finally, other experiential activities also seem to support positive academic and social outcomes for at-risk youth, such as equestrian training or school-based art-therapy programs (Sutherland, Waldman & Collins, 2010; Trotter, Chandler, Goodwin-Bond & Casey, 2008; Wallace-DiGarbo & Hill, 2006). In this section I will discuss each of these areas individually and then describe the overall

implication of this research for the possibility of using constructivist-inspired instruction and behavioral management practices in EBD classrooms.

The largest body of academic work that seems to support the use of constructivistinspired practices in EBD classrooms is found in literature that deals with the use of constructivist-inspired academic instruction in other branches of special education (Graham & Harris, 1994; Harris & Graham, 1994; Johnson, 2004; Macinnis, 1995; Smith, 1982; Steele, 2005; Scruggs & Mastropieri, 1994; Trent et al., 1998). The debate over the use of constructivist verses behaviorist techniques in special education spans almost 30 years and is contentious and extensive. Over that time many educators on the extremes have taken a strong stance for one theory or the other. However in recent years more judicious voices have been able to ascertain the value of a moderate approach. These educators advocate modifying one set of instructional practices with the other to support the highest possible outcomes for students with special needs. For this paper, I chose to examine authors who advocated strategies that held central elements of constructivist-inspired practices but modified them using behaviorist techniques (Johnson, 2004; Steele, 2005; Harris & Graham, 1994). The modifications suggested by these authors for students with mild developmental or learning disabilities are similar to the modifications suggested in this paper for students with EBD. Based on my own limited review of the literature its seems as though the majority of the literature on using constructivist-inspired instructional practices in the field of special education is focused on students with Significant Learning Disabilities (SLD) or mild developmental disabilities, and the bulk of that is focused on the field of reading/writing instruction (Johnson, 2004; Graham & Harris, 1994; Smith, 1982) although there is also some support for the use of these practices in math, science and social studies as well (Mercer, Jordan & Miller, 1994; Scruggs & Mastropieri, 1994; Steele, 2005).

In all of these cases the highest and least contentious outcomes occurred when traditional constructivist-inspired practices were adapted to address the unique needs of special education students. The above articles advocate a variety of instructional adaptations for with students with SLD or other mild cognitive or developmental disabilities these techniques include teacher modeling either visually or through "thinking aloud," specific questioning strategies to guide student discovery, and explicit instruction in basic skills that might be hard for students with SLD to access naturally like academic language, mathematical relationships or written phonics. Students with these types of disabilities may not be able to internalize these skills organically because of difficulties with metacognition, memory, attention and generalization all of which are also true for students with EBD. The literature also advocates providing explicit instruction in important skills, lots of practice with teacher modeling and scaffolding support before and during students' participation. This is important because students with SLD and other mild disabilities often have a long history of school failure and can become easily overwhelmed or frustrated when confronted with a new task, similar to students with EBD. Students with SLD are also much more likely than their general education peers to be lacking in foundational skills, which is also true for students with EBD. Finally, constructivist-inspired instructional practices increase students academic engagement or motivation, which is important because students with these types of disabilities are much more likely to be academically disengaged because of their difficulty in accessing typical content and their history of school failure (Carter et al. 2011; Pederson, 2003).

The next area that provides strong evidence to the possibility of these practices in the EBD classroom is adventure or activity based group therapy/education for at-risk youth (Brendtro & Strother, 2007; Greene, 1942; Hattie, Marsh, Neill & Richards, 1997; Long, 2001;

Loughmiller, 2007; Passarelli, Hall, & Anderson, 2010; Walsh & Aubry, 2007). These terms are used somewhat interchangeably in the available literature but the basic premise is the same, for this paper I will use adventure therapy because although these programs sometimes include academic instruction the premise of adventure therapy is primarily focused on the individual and group therapeutic benefit. These programs rely on the use of adventure or outdoor activities to provide significant opportunities for group collaboration and authentic reliance on and responsibility to the group. In addition, this approach is holistic, allowing counselors to focus on multiple underlying mental or emotional needs, and focus therapeutic interaction on the whole person not simply one specific metal health diagnosis. Constructivist-inspired behavior management programs could support student with EBD in similar ways, educative or democratic classroom management provides authentic opportunities for students to practice social skills and to engage in group collaboration in a meaningful context. In this context the student becomes an integral part of the group and vice versa, making each students' successful participation significant and the success of the group relies on each individual students' responsibility to make positive behavioral choices. A behavior management plan that was modeled after adventure therapy techniques might also be able to focus on the needs of the child holistically and support students in the development of more complex meta-cognitive analysis of their own behavior rather than simply focusing on discrete behaviors or behavioral skills.

Finally, there is also some evidence of positive behavioral or academic outcomes for atrisk youth that are supported through other forms of alternative school-based experiential activity such as Art Therapy or Equestrian programs (Sutherland, Waldman & Collins, 2010; Trotter, Chandler, Goodwin-Bond & Casey, 2008; Wallace-DiGarbo & Hill, 2006). These programs support at-risk students in similar ways to the adventure based therapies discussed above, by

providing authentic and engaging opportunities for students to practice pro-social skills and develop higher levels of self-efficacy through their successful participation in activities that draw on skills not typically valued in academics. Successful participation in these activities increases the students' general engagement in school activities, by providing an alternative connection to school and increasing students' confidence in their own capabilities. Experiential therapies also give students alternative avenue to process their internal landscape and build trust with other participants, teachers and counselors. I will describe how behaviorist classrooms currently attempt to meet these needs, and then consider how a constructivist-inspired classroom could have the potential to support students with EBD in very similar ways, while also providing better support for long-term success.

Looking forward in EBD Education

Students with EBD have many unique needs, some of which are well served through behavior modification and direct instruction classrooms. However, I argue that there are additional higher order needs that are not being served which lead to continued poor social, emotional and academic long-term outcomes for EBD students. I believe the best model for working with this population is *modified constructivism*. EBD students' internal mental and emotional states, as well as their external behaviors, indicate that they require more structure than typical general education classrooms, especially ones that use a constructivist-inspired pedagogy. However, I believe that in an EBD classroom constructivism can be modified using traditional behaviorist structures to create a new model that supports immediate academic success and long-term positive outcomes.

According to Landrum, Tankersley, and Kauffman (2003) EBD students exhibit "high rates of inappropriate behavior and, conversely, low rates of positive behavior" (p.149). This

behavior might include aggression, classroom disruption, withdrawal, refusal to comply with directions or classroom norms, low academic achievement, frequent off-task behavior, impulsivity, poor social skills, unsatisfactory peer relationships, anxiety, depression (Landrum, Tankersley, & Kauffman, 2003; Vaughn, Bos, & Schumm, 2007). The reasons for these behaviors are complex and can result from many different causes or a combination, including family, environmental, psychological and physiological factors. These factors might include abuse, neglect, familial drug or alcohol abuse, exposure to violence, familial instability, physical or emotional trauma, and mental illness. However, there are four main factors that underlie the way that these behaviors manifest in the classroom 1) Anxiety, 2) Anger and Frustration, 3) Lack of internal control, and 4) Lack of academic engagement. As demonstrated in Figure 3 below these underlying factors are the primary drivers of classroom behavior. In addition, how well as student does, or does not, address these underlying factors during their schooling may partially determine a student's long term outcomes.



In this section I will briefly describe my understanding of each of these underlying factors based on my research and experience with children. Then I will discuss how constructivist inspired teaching practices might be modified to meet these same needs while also attending to vital higher order thinking and social/motivational skills that typical behavior classrooms are not able to reach.

EBD students experience large amounts of stress and anxiety on a daily basis (Factor 1). This anxiety may stem from previous trauma or abuse, lack of control over their own lives, or a fragile mental state. High levels of stress and anxiety can cause these students to be easily overwhelmed by simple tasks, high levels of stimulus, heightened emotions or surprise events. Students with EBD also demonstrate low tolerance for uncertainly and frustration, they exhibit extremely low levels of perseverance in the face of challenge. These attributes contribute to EBD students' success in well-organized, highly structured environments with predictable routines, which are designed to minimize surprises or overwhelming situations. However, this fear and anxiety may also drive students to attempt to take greater control in situations where a lack of control increases their fear or anxiety.

This is especially a challenge for students who have been victims of abuse. They have experienced a lack of control over their bodies or their safety, so they react to this by refusing to relinquish control in any situation or by attempting to claim additional control over situations outside of themselves. These students experience high levels of grief and rage (Factor 2), which are reasonable reactions to previous experiences of injustice, abuse, or trauma, however they do not possess the necessary skills to react appropriately when triggered in the classroom. This lack of emotional control and the intensity of these feelings, means that these children may do well in an environment that is structured to provide emotional security through highly predictable

routines and few surprises. However, like fear and anxiety this grief and rage can also stem from feeling out of control, causing the child to attempt to take even greater control over themselves, their time and their environment in any way possible including aggressive or defiant refusals to comply with any expectations.

Within EBD classrooms these types of strong emotions are a challenge primarily because students lack internal controls (Factor 3) to self-regulate their emotional and behavioral reactions. This lack of internal control can stem from a lack of opportunity to develop internal control through growing up with a history of highly chaotic, abusive or externally ridged environments where the child experienced a chronic lack of control over their own life, which can inhibit the development of internalized controls. This lack of internal control can also be caused by a variety of physical, mental or cognitive conditions, such as Autism, Attention Deficit/Hyperactivity Disorder (ADHD), or Fetal Alcohol Syndrome (FAS) which could inhibit the development of internal controls.

Finally, EBD students often have very minimal motivation to develop internal controls or modify their behaviors appropriately (Factor 4). Even when they know what to do, because of lack of academic engagement at school, they often choose not engage. Here, I am not merely talking about time on task, as it is often referred to in the literature, but instead the student's state of being mentally or emotionally engaged in their own learning. As the students' negative behavior and time off-task increase in the general education classroom (a normal precursor to enrollment in special education services) they are generally removed from the more mentally and emotionally engaging tasks first (hands-on experiences, group projects etc.). The rational for this is generally that their aggressive or disruptive behavior inhibits other students' ability to participate or adult concern for their safety. However, when this happens, these students are then

generally remanded to direct instruction techniques: a simple, more rigid form of instruction that is much less emotionally or mentally engaging. This lack of emotional or mental stimulation within the curriculum or classrooms of most EBD programs provides students with very little intrinsic motivation to participate appropriately and to pursue strong academic progress. This lack of engagement may also cause the student to lash out or misbehave because of boredom or frustration.

Based on the above list of student characteristics it should quickly become apparent that the primary conflict within an EBD classroom is around control: who is in control, students feeling out of control, needing to keep a predicable routine so that students (and teachers) feel more in control, and teachers and students wrestling for who is in control of the choices, time and movements of the classroom at all times. For both adults and students this is a very serious, almost life or death matter, with both groups feeling justified in demanding that they maintain primary control over all situations. Behavior modification classrooms, especially ones that are focused on direct instruction, are a myriad of opportunities to re-engage in this struggle for control during almost every moment of the day. Ultimately, students need to be made to feels safe if they are going to be able to learn and predictability in routine and curriculum do provide one form of safety. However, the rigid external control of the adults in these classrooms undermines that safety because students are not able to feel that they are in-control of their own choices, movements or bodies, which re-ignites their fear or defiance.

In addition, anyone who has spent time with EBD students knows that there is almost no real predictability in a class full of such an explosive and unpredictable students. This means that the students do not truly receive the stability and predictability that would alleviate their anxiety or frustration, and in fact the atmosphere and movements of other students and adults is

frequently unpredictable, and sometimes aggressive or violent, which can cause one student to be re-traumatized by other students outbursts. When considered in this light it seems that the ends of creating predictability to make students feel secure, do not justify the means or rigid inflexible structure and rote memorization of skills and content at the cost of students internal motivation and creative engagement. It is my belief that modified constructivist approaches will provide enough structure to make students feel safe while allowing students and adults to disengage from this constant power-struggle and re-engage student imaginations and enthusiasm for the learning process.

A New Model for EBD Instruction

I believe that students with EBD would be better served by a modification of current behaviorist instructional and classroom management models. As shown in Figure 4 below behaviorist learning theory is focused on discrete incremental skills and observable outcomes, because of this focus these classrooms are not able to address the underlying factors, like those discussed in the above section that drive students inappropriate behaviors.



Figure 4: This model is unable to address students' underlying mental or emotional drivers. Does not provide the necessary internal skills to sustain positive long-term outcomes into adulthood.

Constructivist learning theories deal directly with the student's internal understanding and motivation. Instead of focusing only on measurable discrete outcomes this theory is also concerned with how the student is making sense of their world and what their thinking and problem solving processes are. This process allows students to make sense of their own story and use their individual understandings and strengths to chart a new way of being in the world. The difference between constructivist inspired behavior management and behavior modification is that this path is unique to the student's own process and not a set of external standards they have been directly taught (Figure 5, below).



Regardless of the instructional technique, students with EBD struggle with many inappropriate and dangerous behaviors, so this internal exploration must take place within an environment that provides enough external support to keep students safe and to provide them with opportunities to learn behavioral models and skills that are more productive than their current strategies. A more appropriate model for students with EBD would incorporate the most supportive aspects of both theories into a unified model of EBD instruction that provides enough structure and support for students with EBD to be successful but also offers independence and inquiry based investigation to encourage the intrinsic motivation, internal control, and higher order critical thinking skills.

As explained above, I believe that students with EBD have four primary underlying drivers to the majority of the inappropriate surface behaviors that are seen in school: 1) Anxiety, 2) Anger and frustration, 3) Lack of internal control, and 4) Lack of academic engagement. I will use two different types of student centered lessons that are compiled from experiences I had during student teaching to demonstrate how a successful pedagogy could be developed by modifying current constructivist inspired techniques with behaviorist mechanisms to provide a successful environment for students with EBD. I will demonstrate how the use of student centered teaching can address all four of these underlying drivers while supporting positive academic and social outcomes. Both examples are drawn from actual units or lessons that were successfully implemented during my student teaching experience within a self-contained EBD classroom.

Science Inquiry: Enhancing engagement

As a general rule science instruction is ripe with opportunities for hands on exploration or experimentation and has typically included these elements more than any other subject matter (Anderson, 2002). As such it lends itself easily to constructivist-inspired inquiry based lessons. However, this is exactly the type of instruction students with EBD are generally prevented from participating in. Inquiry based work in science generally includes some sort of manipulables (a

model), physical investigation (a fossil) or a chemical investigation (changing chemical properties). Students will EBD are very tactile and present in the moment because of their lack of impulse control. This can be challenging when trying to teach appropriate behavior, but it can also be used as an asset in this type of inquiry based instruction. Providing physical elements and asking students to use these physical items to solve an inquiry based scientific investigation immediately catches students' attention and increases their level of social and academic engagement (Factor 4).

It is easy for a student with EBD to choose to misbehave so that they will be removed from an academic lesson if they are not invested in their ability to participate and may even prefer to avoid being asked to use skills that they struggle with. However, if a student is mentally and emotionally invested in being able to participate in an inquiry based investigation because they are highly engaged in the activity, then they are more likely to utilize their internal control skills to be able to continue that participation. Each time a student independently chooses to use their internal control skills, these skills are developed further increasing the student's ability to use those skills successfully in the future (Factor 3).

Next, when a student is highly engaged and committed to using their internal controls to continue their participation in an activity, they are more tolerant to frustration and exhibit higher levels of perseverance even when asked to perform skills that are challenging to them. I believe that this is in part because their internal control has been activated and partially because they have become invested in the outcome of the inquiry based investigation and are willing to use whatever skills they have to discover the solution even if it means pushing their own comfort levels with difficult skills (Factor 2). Finally, when students make the independent choice to engage all of the above internal skills and positive drivers they are much less likely to experience

overwhelming levels of anxiety because the student feels like they are in control of their participation and the deployment of their internal skills which allows them to circumvent much of their overwhelming anxiety or stress (Factor 1).

During my student teaching experience I was fortunate to see students engaging in every step of this process. One day in particular we undertook an extensive investigation of the chemical properties of some kitchen powders. There were multiple steps in the process, and the students struggled to identify the mysterious powders. Each student was given their own set of chemicals and guided through various experiences to determine what each powder was, these experiments required students to measure carefully, observe closely and maintain their focus for an extended period of time. After an hour the students still had not solved the mystery. I assumed everyone needed a break so they were sent out to recess. A few minutes later I went out to the playground to see how they were doing. The whole group immediately ran up to me begging to return to the classroom and continue our science experiment, despite its difficulty and the intensity of focus it required. Needless to say, I don't turn kids down when they are *asking* to do schoolwork and they worked hard and figured out all of the chemicals we were investigating. The look of pride on their faces when they were able to correctly identify each chemical without being told was truly priceless.

Literature Exploration: Student-centered control

Another example of how constructivist-inspired instructional techniques can be used to support the academic and social success of students with EBD is in student driven literature exploration such as Readers/Writers Workshop³ (Boushey & Moser, 2006; Fountas & Pinnell, 2001; Diller, 2007). Readers/Writers Workshops consolidate all of the literacy activities in an

³ For more information on one type of Readers/Writers' Workshop in this style check out Boushey and Moser's *The Daily 5* at www.thedailycafe.com

elementary classroom into one extended literacy block. Within this time students are allowed to choose from a variety of literacy development activities including reading, responding to what they have read, writing (fiction and non-fiction), peer-editing, revising and publishing their work. Writing is often informed by reading or vice versa and students are invited to work independently or with peers as needed. During this block the teacher will generally provide a mini-lesson on a subject that the majority of the class needs further instruction around as well as meet individually or with small groups of students to work on specific skills or assess individual progress.

I feel it is important to point out, based on my personal experience, that I do not believe that students with EBD would function successfully with the complete self-direction and open choice of some general education programs, especially when a student centered literacy program is first being implemented in a classroom. However, this is a good example of an opportunity to modify current constructivist-inspired instructional strategies to make them appropriate for an EBD classroom. Students with EBD do need increased structure and boundaries in the classroom, which support their learning around appropriate behavioral choices. So in order to continue this support, but also allow for student-centered participation in this type of instruction I would advocate a more limited menu of choices within an integrated reading and writing block.

However, regardless of the needed modifications a reading/writing workshop is a strategy that supports the success of students with EBD in several important ways. Students with EBD almost always struggle with basic academic skills, reading, writing and math. This means that they experience high levels of anxiety and frustration when they are asked to perform reading or writing tasks. In addition, one of the primary motivating factors within and EBD classroom is the issue of control, as discussed above. Offering students multiple choices for how they will

engage with reading and writing skills on any given day puts the control over their involvement in these difficult activities back into the hands of the students, which in turn lessens their performance and/or production anxiety, as well as their frustration at not being able to perform or produce at the same level as their peers (Factor 1). This system places the control back into the hands of the students which also lessens their frustration at being "forced" to participate in activities where they will feel anxious, insecure or inadequate, instead when students make choices about how they will participate they are more likely to push the boundaries of their skills and exhibit perseverance in the face of frustration or difficulty (Factor 2). Practicing perseverance and receiving positive re-enforcement from their successful participation in these activities will further develop student's internal control over their anxiety and frustration (Factor 3). Additionally, when students make the choice to participate they are much more likely to be engaged in both their content and their choice of activity (Factor 4) and much less likely to instigate negative behaviors.

Remember Isaac from the story at the beginning of this paper? I will never forget the first day that Isaac, a third grader who reads and writes at barely a first grade level, went running to his desk when I announced that it was time for our literacy block, as opposed to pretending he didn't hear me as he had on every other day. On this day, he threw his hand in the air before he was even seated in his chair, and boldly declared his *choice* for what he wanted to work on that day before I had even had a chance to begin the lesson. From that day on, literacy block was one of Isaac's favorite parts of the day. I rarely had any behavioral problems with him during this block and saw vast improvements in both his reading and writing skills.



Making it Work for Students with EBD

Figure 6: Integrated Model

Based on my own observations and my understanding of constructivist and behaviorist techniques I would recommend adapting general education constructivist-inspired teaching and classroom management strategies in the following ways.

 Limit Choices: Students with EBD have low tolerance for frustration and high levels of anxiety, this means that they may become overwhelmed by too many choices. In addition, students with EBD might default toward defiance and refusal to participate regardless of the activity. By limiting choices the teacher provide some direction and control over that activities of the classroom and is able to provide adequate support and structure for students who need it.

- 2. *Provide scaffolding and support*: Again, because of these students' high levels of anxiety in unfamiliar or uncertain situations and students' low levels of tolerance for frustration the teacher should provide significant scaffolding and support as needed. This support should be drawn from a balance of constructivist and behaviorist techniques. Some techniques might include simply being present near the student or asking probing questions to support the students' development of their own thinking and/or behaviorist techniques like the direct instruction of specific incremental skills or strategies that are necessary for successful participation in the broader activity.
- 3. Provide structure in other ways: Students with EBD need to have structure, however this sort of structure can be provided by being very explicit about the process of group participation, the necessary steps, specific expectations or time frame of an inquiry based activity. It could also be provided through the use of a consistent and predictable routine throughout the day, with each content or activity occurring on a predictable schedule. In this case is also important to provide students with clear explanations when daily activities must deviate from this schedule.
- 4. Provide students with lots of practice: Provide students with lots of opportunities to practice the necessary skills for independent and appropriate participation in group work in low-pressure situations such as games or role playing before they are asked to perform these skills in more high pressure academic settings.
- 5. Provide an acceptable escape valve: Students with EBD struggle with unpredictable situations and the more freedom students have the more opportunities there are for unpredictable or frustrating situations to occur either with their own work or during work with peers. This means that it is vital to provide EBD students with an acceptable escape

valve if they decided that the activity is too much or the situation with their peers becomes overwhelming. Students need to have a safe place to cool down and to then be provided with an alternative assignment to complete.

- 6. Step in when necessary: It is an important part of the constructivist learning process to allow students the opportunity to struggle with problems and to encounter some frustration along the way. However, it is also important to be aware of your student's limits and to support them before they become too overwhelmed or frustrated. If a student is exhibiting these behaviors it might be a time to step in and provide specific directions, direct the group process or assign the student a specific task for the day.
- 7. *Remember that students with EBD are just students:* The final key to making these practices successful in an EBD classrooms is to remember that the above modifications are not that different than what any young student would need. All children struggle to control their emotions and to express themselves appropriately and because of that need the above accommodations at various time and to various levels. The needs of students with EBD are not really that different than their general education peers they are just on a higher continuum of need.

Conclusion

In conclusion, there is still a lot of research needed to determine the best practices for incorporating constructivist-inspired instructional strategies into EBD classroom and how traditional constructivist strategies should be modified to be most effective. Despite almost 30 years of in school intervention for students with EBD, these students are still achieving poor academic and social outcomes in adolescence and into adulthood. Almost all instruction for students with EBD is currently based on behaviorist-inspired teaching practices, like behavior

modification and direct instruction, which are rooted in external structure and motivation. Although these types of strategies are sometimes able to modify surface behavior they are not able to address the underlying factors, or drivers, that motivate the negative behavior from inside the child. This lack of attention to the underlying mental and emotional states, means that students are not able to develop the types of internal control and support that might help them achieve better long-term outcomes after the external support is removed. Constructivist-inspired practices are concerned with the internal landscape of the child and how they are making sense of the world. They support students development of internal control, critical thinking skills, and intrinsic motivation, which will help these students increase and/or maintain their social and academic gains in adolescence and into adulthood. Although constructivist-inspired strategies are more fluid, students with EBD have a number of unique needs that require some important modifications that are similar to many behaviorist-inspired structures to be able to successfully apply these skills. Finally, although the majority of the research into effective practices with students with EBD deals with behaviorist-inspired practices there are a number of related educational and therapeutic spheres that demonstrate strong positive outcomes through the use of constructivist-inspired practices, especially work with students with SLD in the special education field. This is encouraging the success of these practices in other areas seems to indicate that there is a strong likelihood of success in this area as well. Further research is needed to determine just how transferable those models might be, or to determine alternative constructivist inspired instructional models for work with students with EBD.

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Approaching Independence: Supporting Students with Autism Spectrum Disorder in the Development of Autonomy

Kate N. Winkley

Abstract

Transitions, organization, and social skills are all necessary factors that contribute to the independence of students with autism spectrum disorder. Yet for these students, navigating how to develop independence through these three avenues can be extremely difficult. Consequently, it is important that general education teachers are equipped with strategies to support students in developing independence in the classroom. The articles surveyed in this literature review highlighted three support strategies that can help students in the development of independence. These three support strategies consist of helping students with transitions, organization, and building social skills. The findings suggest the following components: (i) transitional supports through visual cueing systems effectively aided students with transitions with limited adult prompted redirection, (ii) organizational systems helped to decrease the time it took for students to locate requested items and reduced the number of missing assignments, and (iii) refined social skills supported students to independently pilot conversations while learning appropriate peer interaction.

Approaching Independence:

Supporting Students with Autism Spectrum Disorder in the Development of Autonomy

Teachers will inevitably have students in their classrooms identified as having autism spectrum disorder (ASD). As a result, it is necessary for educators to develop an understanding of how to effectively work with these learners. Acquiring a concrete description which details characteristics of ASD is of immediate importance. Banda, Grimmett, and Hart stated, "ASD is characterized by a qualitative impairment in at least two of the three following areas: social interaction; communication; and restricted repetitive and stereotyped patterns of behavior, interest and activities" (2009, p. 16). ASD is a spectrum development disorder, meaning that those living with it are not necessarily impacted in the same way. For instance, some students may be highly functioning with language development at or above grade level, while others may be classified as non-verbal.

The number of children diagnosed with ASD has increased substantially. Currently the United States Center for Disease and Prevention (2011) established that one in every 110 children falls somewhere on the autism spectrum. This represents a 600% increase since 1990. While many factors were identified as contributing to this rising statistic, most research indicates that this increase is primarily due to improved awareness. This increase in children with ASD is not just represented in the general population, but in the classroom as well. Not all ASD students in schools are placed in self-contained special education programs. Many are in general education classrooms (Rotheram-Fuller, Kasari, Chamberlin, & Locke, 2010). As a result, responsibility resides with general education teachers to integrate pedagogy to support ASD students in their academic development.

Teaching Toward a Better World

The first time I taught a student with ASD was as a student teacher in a second grade classroom. My student, "Brad," was diagnosed at age of four with ASD. At the beginning of the year, his Individual Educational Plan (IEP) was evaluated by a team consisting of his teachers, family members, and education specialists. The team decided Brad would remain in a general education classroom while receiving additional services to support his communication skills. It was at this time that the team determined that Brad no longer required support from the paraeducator whom he had grown accustomed to working with for the past two years.

With limited background information in the area of working with students on the autism spectrum, I lacked specific strategies to help Brad succeed in the classroom. I attempted to reach out to the special education specialist as well as Brad's first grade teacher and former paraeducator in the hope that they might provide me with education strategies that had been successful in the past. In the end, I still had a limited understanding of specific support strategies. With no real direction of what strategies to utilize, I relied heavily on my own observations.

Over time I found that Brad was able to produce work with supports. Meanwhile, independent work, which is work created solely by the student, seemed to be a struggle. It occurred to me that prior to second grade, Brad's classroom experience had been sustained with assistance from one-on-one adult support through work with a paraeducator. This paraeducator helped Brad to remain on task and at the same time she also limited the amount of redirection required. At the end of first grade, the paraeducator's role was eliminated and Brad was left to independently navigate the school day.

As the classroom teacher, I wanted to craft a system within the classroom that would lend support to Brad as he learned to work independently. In order to improve my own practice, I

elected to research the following question: what support strategies help students with ASD develop independence in the general education classroom? While the studies I surveyed covered a number of support strategies, I elected to focus on three specific themes regarding students' development of independence: transitions, organization, and refinement of social skills.

Most research regarding ASD typically promoted the use of early intervention strategies to help students develop fundamental skills (Fox, Dunlap, & Pilbeck, 1997). With diagnosis often occurring at three years of age (Vaughn, Bos, & Schumm, 2011), families, preschool teachers, and primary elementary educators often assume responsibility for the initiation of the early intervention. When teachers lack general knowledge of intervention or support strategies this can be overwhelming and frustrating. Even though the research surrounding how to support students with ASD is continually growing, it is common to find inconsistent claims. After sifting through research, I found a recurring approach that teachers used most with students with ASD that helped them to learn how to become independent learners.

The purpose of this literature review is to explore strategies that support students living with ASD toward becoming more independent in general education classrooms. Due to the fact that most research around ASD supports early intervention strategies, the following studies typically highlight children in pre-elementary or elementary programs. Even though these studies tend to address this demographic, many can be tweaked and applied in secondary settings as well. Noting the misdiagnosis of many students prior to 1990, I choose to reference research only dating back to 1997. This ensured I had the most current information regarding support strategies. Additionally, I primarily evaluated peer-reviewed qualitative research because these studies had been put through a series of reviews prior to publication. The literature used in this

review was collected during the winter of 2011-2012 through academic searches using Educational Resources Information Center (ERIC).

Literature Review

The literature that I reviewed suggested that support strategies must be in place in order for students living with ASD to develop greater independence (Banda et al. 2009; Carnahan, Hume, Clarke, & Borders, 2009; Hume, 2004; Hume & Odom, 2006; Vaughn, et al., 2011). I found three key recurring support strategies to help students achieve greater autonomy in the classroom in the areas of: transitions, organization, and social skills.

Transitions are essential to any elementary classroom schedule. By definition they refer to the time in which students move from one activity to the next (Banda et al. , 2009). In a classroom setting, transitions can also appear on a smaller scale. For example, some transitions focus on moving students from one subtask to the next. In the literature I reviewed, researchers suggested that providing transitional support systems for students with ASD may help them develop increased independence (Bryan & Gast, 2000). One study advocated the use of visual supports such as activity schedules to help students with transitions (Banda et al., 2009; Bryan & Gast, 2000; Dettmer, Simpson, Myles & Ganz, 2000). I also located a study with a contrasting perspective that proposed supporting student transitions with the use of auditory prompts (McGaha Mays & Heflin, 2011).

For the purpose of this review, organization refers to the ability to locate and retrieve the correct materials from a collection of supplies when asked by a teacher or peer (Carnahan, Hume, Clarke, & Borders, 2009). In a classroom, the requested materials could range from an assignment to a pair of scissors. For students with ASD, the organization of materials can be rather daunting; however, it is essential that students develop these skills (Hume & Odom, 2006).

Research implied that such organizational strategies support greater independence. Students who know how to locate materials will be more likely to remain on-task and require less adult prompting (Hume, 2004; Hume & Odom 2006; Dorminy, Luscre, & Gast, 2009).

Social skills are defined as the interpersonal capabilities that allow students to relate to one another (Rotheram-Fuller et al., 2010). Students with ASD may find that learning to navigate interpersonal relationships can be extremely difficult. Typically these students have trouble assessing social cues and their value in interpersonal relationships. These social cues include non-verbal communication, specifically body language and eye contact (Banda, Hart & Liu-Gitz, 2009). Consequently, students may have difficulty making and maintaining relationships, and frequently report feelings of loneliness. The research that I reviewed suggested that general education teachers can help students to develop social skills through support systems (Banda & Hart, 2010; Banda, et al. 2009). Supporting students on the autism spectrum develop social skills will not only improve their relationships in the classroom, but will also extend to relationships outside the classroom (Banda & Hart, 2010; Banda, et al. 2009). The three ways that teachers can support students in developing social skills include: peer-to-peer interventions, imitation, and practice responding to social situations.

Transitions

Students in elementary classrooms are required to transition on numerous occasions daily. Transitions involve individuals or groups moving from one activity or location to the next (Banda et al., 2009). Reflecting on my own teaching experience, I recall that students tended to transition at least five to six times within the first ten minutes after arriving at school. When they entered the classroom, students would be expected to complete a series of tasks such as depositing their lunch pail, putting away their coats, and turning in homework.

While transitions may feel natural to some students, for those on the autism spectrum the process of transitioning can be quite difficult. Banda, Grimmett, and Hart (2009) stated that students diagnosed with ASD struggle with transitions. This often leads to problem behaviors such as tantrums, non-compliance, self-injury, or physical aggression. These reactions may stem from students feeling confused, anxious, or ill prepared for the upcoming activity (Dettmer, Simpson, Smith Myles, & Ganz, 2000).

One support that can be used to decrease problem behaviors and help students establish independence is a visual system known as "activity schedules." Activity schedules are visual support systems that use images depicting events in a student's day arranged in sequential format (Banda et. al, 2009). Just as with any support system, activity schedules must be explicitly taught to students in order to be effective.

Banda, Grimmett, and Hart (2009) identified two specific types of activity schedules: between-activity schedules and within-activity schedules. Between-activity schedules predict the basic structure of the day, including: the start of the day, homework, spelling, and art. Meanwhile within-activity schedules include a list of the subtasks that a student needs to complete within a single activity. These subtasks include items such as: writing his/her name, writing the date, and reading the directions. Students who experience difficulty completing tasks with multiple steps may benefit from the use of within-activity schedules (Banda et al., 2009).

Teachers can develop and implement activity schedules using a twelve-step process. The components emphasized by Bandar, Grimmett, and Hart (2009) included identifying transitional issues, modeling activity schedules, expanding the use of these activity schedules, and eventually minimizing their size. The goal is that required teacher prompting will gradually diminish over time.

The authors promoted the implementation of activity schedules by citing research by Dettmer,Simpson, Myles, and Ganz (2000) who found that visual supports tended to help students with ASD perform tasks independently. They asserted that visual supports are critical to help students understand their environment by predicting events and preparing for changes that deter from the scheduled routine. Their study included a variety of visual supports including: activity schedules, subschedules, "finishing" boxes, and timers.

This study was designed with A-B-A-B methodology, meaning that there were four observational sections (Dettmer et al., 2000). In the first section an initial observation occurred to determine baseline data. After initial data was collected, the second section introduced the intervention so that comparison data could be collected. In the third component of the study, the intervention and baseline data was again recorded. Finally in the fourth section, the researchers reinstated the intervention materials and observed how students responded. This methodology enabled researchers to compare how student transitions were affected by the withdrawal and reinstatement of visual supports.

This study included two students identified on the autism spectrum. The first student, Jeff, was a seven year-old boy who functioned at the developmental level of a 32-month old. The second student, Josh, was a five year-old who attended an early education class in a suburban elementary school. Josh was assessed at the developmental level of a 50-month old. Both students experienced difficulty transitioning from one activity to the next during their daily routines. In particular, Jeff spent the majority of his day participating in community events, while Josh spent his time in school. Both of the students had caregivers to help them perform their daily routines.

Due to the fact that these students were expected to transition under different circumstances, the researchers attempted to be strategic in implementing visual supports. Jeff used visual supports in the car that allowed him to refer to these supports as he transitioned between community activities. At the same time, Josh used visual supports in the classroom. Data was collected to identify: 1) the amount of time that it took to transition between activities; and, 2) the number of prompts that were required from the caregiver. Findings indicated that when visual supports were implemented, the transition time from one activity to the next decreased for both students. In addition, when the visual supports were in place, the number of verbal prompts required from the caregiver decreased (Dettmer et. al., 2000).

Bryan and Gast (2000) also suggested that helping students to develop greater independence would be beneficial. They investigated how employing visual activity schedules, with graduated teacher guidance could help students remain on-task. Four students, ranging from seven to eight, were included in this study. All of the students had been diagnosed with ASD and spent half of their school day in the general education classroom and the other half receiving help from a special education teacher in a resource room. Students were selected for this study because they were identified as being dependent on their teacher's verbal prompting to remain on-task. The researchers elected to conduct this study in the resource room to cause the least disruption. During this study, students received a 45-minute block of Language Art instruction that included four stations: writing, reading, listening, and art.

For the intervention, each student was given a picture activity schedule, which consisted of a 4x6-inch plastic photo album filled with pictures of upcoming activities. When it was time to transition, students flipped the page to determine their next activity. Students were expected to use their activity schedule to remain on-task and efficiently transition from one activity center to

the next. The researchers used a one-minute timed recording system to document on-task or offtask behaviors. Observational data was collected over the course of 31 sessions. Similar to the Dettmer et al. (2000) approach mentioned previously, Bryan and Gast (2000) used an A-B-A-B methodology. Findings suggested that activity schedules allowed students to operate independently and tended to be on-task more often while using materials effectively.

While most of the literature that I reviewed suggested the use of visual supports, it does not necessarily mean that these materials are helpful for all students. MaGaha Mays and Heflin (2009) presented conflicting information by suggesting that visual or pictorial prompting may not be effective for all students on the autism spectrum. Some students seemed to respond better to auditory rather than visual prompts to transition. The researchers suggested that with the use of self-operated auditory prompts (SOAPs) like tape recorders, students may gain selfmanagement strategies that help them to develop classroom autonomy. When making recordings, teachers must include adequate wait time between each cue to allow students time to complete individual tasks without having to stop the tape. The researchers wanted to see if the implementation of SOAP systems would help students to complete self-care tasks.

The students in this study included two males, ages six and eleven, and two females, ages seven and eleven, who attended school in a self-contained autism class. Students were elected by their teacher to participate in this study based on their positive response to auditory cues. Students used SOAP systems which directed them through the process of brushing their teeth and washing their hands. Researchers used observations and checklists to identify whether students could follow directions provided by the SOAP without additional support.

The first portion of the study served as a baseline to understand student abilities to operate independently. Students were observed brushing their teeth and washing their hands.
During the first portion, students did not use a SOAP system. In the second portion, students were introduced to the SOAP system and taught through modeling how to use them. Findings from MaGaha May and Heflin's study (2009) suggested that students were able to complete subtasks more efficiently by the end of the fourth session. In fact, during the final session two of the students were able to complete both of the tasks with 100% efficiency. To enhance the qualitative data, the researchers conducted interviews with their parents and all four surveyed mothers mentioned these same tasks were completed with less adult prompting.

The previous studies agree, suggesting that independence in the classroom can be developed with transitional supports. Pairing transitional supports with organizational tools may also help students develop independence.

Organization

In order to develop independence a person must learn basic life skills necessary for autonomy, including how to develop and maintain organization. Hume (2004) noted that organization was essential to acquiring independence. Real world scenarios such as going to work, paying the bills, and going grocery shopping require organization on the part of the individual. While the general population may have successfully developed organization skills, students with ASD may find this a daunting task (Hume, 2004).

Carnahan, Hume, Clark, and Borders (2009) supported Hume's argument that an important goal for all children was functioning independently. The researchers suggested helping students to develop independence by way of an organizational strategy known as "work systems." TEACCH (Klinger & Mabe, 2012) described work systems as a set of materials that visually communicated four vital pieces of information: 1) what the work is; 2) how much work there is; 3) when the student is finished; and, 4) what the student should do when he/she is

finished. It is important to mention that all four of these parts must be in place in order for a work system to be effective. Hume (2004) recognized three specific work systems that could be adapted depending on the developmental level of the student including: left-to-right work systems, matching work systems, and written work systems.

Hume and Reynolds (2010) described each work system, expressing that students on the autism spectrum could benefit from the implementation of effective organization systems. In left-to-right work systems, a student would sit down and find their assignment to the left of them. After completing this assignment, the student would then move to the next task located to the right of their first task. They would continue until all tasks were completed. Hume (2004) recommended using left-to-right work systems with students who have limited language.

The second type of system was a matching work system which operated in much the same way as a left-to-right system. Instead of moving in a literal fashion (left-to-right), the students were required to match visual pictures in order to determine what task needed to be fulfilled. Matching work systems typically included picture cards so that students could identify which activity they were required to complete. Before implementing this particular work system, teachers were required to first evaluate the developmental level of students because this system is more abstract than the left-to-right support strategy.

Finally, Hume and Reynolds (2010) identified a "written list work system," that is similar to a check list or to-do list. Due to the language requirement, teachers need to identify student reading comprehension level in order to determine appropriateness. Compared to the other work systems, writing list work systems tend to be more advanced due to the language development required for access.

To support these systems Hume and Reynolds (2010) relied on research by Hume and Odom (2006). Hume and Odom suggested that a student might be capable of engaging in an activity; however with a lack of adult prompting they may fail in the execution. In designing their study, the researchers wanted to evaluate three things: 1) whether an individual work system increased on-task behaviors and work completion; 2) whether the implementation of a work system decreased student dependence on adult prompting; and 3) whether the individual work systems resulted in socially important outcomes.

Three students who had never been introduced to a work system were selected for this study. Two students, Scott and Chris, were kindergarten boys both of whom were classified as nonverbal. They attended school in a self-contained special education classroom. The third student was a 20 year-old male, Mark, who participated in the school's Community Transitional Program, though still was classified as non-verbal. The researchers selected specific settings for the students based on their daily objectives. Mark's intervention was conducted in his office, while the intervention for Scott and Chris took place in their classroom. The researchers evaluated each student's cognitive abilities to determine which work system would be the most effective. They deemed that the matching work system would be the most appropriate for Mark and that both Scott and Chris should use the left-to-right work system.

Hume and Odom (2006) elected to use an A-B-A-B methodology to evaluate how successful each student was with the employment and withdrawal of their work system. During the intervention, data was collected related to: 1) whether the student was on-task; 2) the amount of adult prompting required to keep the student on-task; and 3) student completion of the task. After collecting the first set of baseline data, the researchers implemented the first intervention in which students were trained how to use work systems. After the initial intervention, a second

baseline was conducted when the work systems were removed. Finally, the researchers implemented a second intervention where they reintroduced work systems to the students. Data was collected on an average of 30 times a day for 21 to 24 days. Findings implied that work systems effectively increased all three students' on-task behaviors, independent organization of materials, and percentage of completed tasks.

Dorminy, Luscre, and Gast (2009) advocated that organization also required students to gather necessary tools from a selection of materials within a reasonable amount of time. In order to help students with this task, the researchers suggested using a formal filing system which aimed to teach students organization skills. Four males ranging from nine to ten years-old, who had been identified as having difficulty organizing their materials, were selected to participate in this study. All students attended a fulltime general education classroom, yet they also received special education assistance at specific times during the day. The researchers selected to do this study in the students' general education classrooms noting it would create limited disruptions.

Data related to two components was collected: the ability to retrieve the correct item and the amount of time that it took for the students to find the item. After the baseline data was collected, an intervention was employed to teach students how to organize their materials by using seven filing folders and the finishing box located next to their desk. After the initial intervention, students were expected to use the file folders and a finishing box daily. Findings from this study implied that the amount of time it took for all four students to find specific items decreased by 100% (Dormity et al., 2009). Findings also suggested that, with the system, students were able to retrieve the correct item from corresponding file folders with more consistency. Adding to the qualitative data, the researchers of this study conducted interviews with student families who all commented that, once that filing systems were in place; their child

had reported no missing assignments. While it was true that students were able to increase their organizational abilities during the intervention, it does not necessarily imply that they were able to maintain these organizational skills.

These reviewed studies all suggest that independence in the classroom can be developed with organization supports. Organization supports and transitional support, in conjunction with developing social skills may help students develop even greater independence.

Social Skills

One key characteristic of many students with ASD is communication impairment (Vaughn et al. 2011). Researchers Banda, Hart, and Liu-Gitz (2010) noted that students with ASD may have a hard time connecting with peers due to difficulties recognizing things such as: nonverbal body language, making eye contact, and responding correctly during conversations. Many researchers suggest that helping students on the spectrum develop these social skills would prove beneficial.

In a study conducted by Rotheram-Fuller, Kasari, Chamberlain, and Locke (2010), researchers sought to investigate peer relationships for students with ASD. The researchers wanted to see how relationships for students on the spectrum transformed across grade levels. The researchers decided to create a survey designed to evaluate the social involvement of students with ASD within three elementary school grade bands: early (K-1), middle (2-3), and intermediate (4-5). This survey was conducted in 75 different elementary school classrooms where at least one student had been identified as living with ASD. All students, even if they were not identified as being on the spectrum, were asked to identify: 1) who they considered a part of their social circle; 2) who they did not consider a part of their social circle; and, 3) who

they considered to be their best friends. The surveys were then collected, compared, and evaluated.

The findings suggested students with ASD are more often accepted by their peers in the early (55.0%) and middle (57.9%) grades, rather than in the intermediate grades (23.8%). The researchers predicted that this significant drop could be a result of increased competition on the playground (Rotheram-Fulleret al., 2010). Noting that students with ASD are isolated one can see the necessity of providing them with support strategies that improve social skills in the educational community. In the literature that I reviewed, I found peer-to-peer interventions to be one strategy to help students acquire social skills.

Banda et al. (2009) suggested peer-to-peer intervention may be an effective strategy to help students develop social skills. The researchers of this study noted that one of the most important goals for teachers in educational settings was to help improve the social skills of students with ASD (Banda et al., 2009). In order to achieve this goal, these researchers commented that there must be an intervention in place. The researchers constructed a qualitative study that sought to investigate the following question: can children living with ASD develop social skills through direct instruction from their peers and/or adult figure?

Two six year-old, kindergarten boy who had been diagnosed with autism were selected for this study. Alex attended a general education class in a public school and was described as having little interaction with his classroom peers. Bert attended the same school as Alex, but was in a different class. He was characterized as communicating far below the language level of his peers. The study took place in the general education kindergarten class of each student to limit disruption.

Baseline data was collected to identify the students' social skills prior to the intervention. Data collection was done via observations and evaluated components including: initiation and response. For this study, initiation is defined as peer-to-peer interaction in which the students posed a question his peer. Response was defined as peer-to-peer conversational; interaction which could include a number of items described as dialogue. After collecting baseline data, the researchers employed the first intervention lasting four to five minutes while these skills were directly modeled to students. When students asked questions or responded appropriately they received praise. By contrast when students were not able to ask or respond suitably, an adult would model the appropriate interactions for the students. In the second portion of the intervention, the researchers collected data over ten minute observational sessions.

Findings hinted that the intervention was successful and suggested that both students were better able to communicate with their peers after the intervention. Due to the fact that Banda et al. (2009) were under a time constraint when performing this intervention, no maintenance data was collected. Therefore, one cannot assume that students were able to maintain this social skill support after the researchers stopped recording the intervention effects.

Research conducted by Banda and Hart (2010) runs parallel to the previously reviewed study. The authors echoed the idea that students with social deficits, such as students with ASD, need adult or peer modeling to learn appropriate social skills. Banda and Hart designed a study aimed to evaluate if direct instruction of a student with ASD and a peer would increase social initiation, peer-responses, and sharing behaviors.

Two eight year old students living with ASD were selected for this study. The first student Maria was identified as exhibiting behavior problems that isolated her from other children. The second student Grace was also identified as having behavior problems as well as a

speech delay. Aside from the two students living with ASD that were selected for this study, the researchers also identified two peers to participate. No specific information was released related to the identities of the peers; however, all of the students were identified as attending same special education classroom where the researchers conducted the intervention.

During the primary portion of the study, data (Banda & Hart, 2010) was collected related to the three highlighted components, this information served as the study's baseline. Next, the researchers employed an intervention devised to teach all four students through direct modeling how to include these social skills while playing. After receiving direct modeling, students then moved to the second portion of the intervention where they were observed during 15-minute play sessions over the course of 24 days. During these sessions researchers recorded data related to the number of social initiations, responses, and sharing behaviors displayed by the students. Findings suggested that both Maria and Grace increased their ability to initiate play and share materials while playing. The data did not suggest any information that corresponded with student improvement in addressing peers.

Aside from teaching students with ASD social skills through peer-to-peer interaction, some of the literature suggested acquiring social skills through learning to imitate. Ganz, Bourgeois, Flores, and Campos (2008) found that individuals with autism lack imitation skills that are natural to most of their peers. As a result, these individuals do not obtain the social skills required to fit into the exterior environment.

Ganz et al. (2008) study set out to determine if an imitation training package, which included visual cues, would result in an increase of prompted and unprompted imitation. The researcher also wanted the imitation training package to decrease teacher prompting. Finally, the

researchers wanted to explore whether amount of imitation displayed would differ depending on the activity that the student was involved in.

Four students were selected to participate in this study (Ganz et al.,2008), all of whom had been diagnosed with ASD. The first student was a nine year-old boy by the name of Nico; however, this student was pulled from the study due to a significant lack in progress and difficulties with compliance. Santo, an 11 year-old boy was elected to replace Nico. Santo was identified as learning concepts at a significantly lower rate than his peers. The third student in the study was Henry, a 13 year-old male identified as having average cognitive abilities. Henry would typically engage in echolalia, which is the repetition of words or phrases. The fourth student in the study was Aidan, an eight year-old boy diagnosed with high-functioning autism. Aidan was described as having average cogitative skills however he was identified as typically playing apart from his peers.

This study took place in a private school for children with ASD. Ganz et al. (2010) collected baseline data. For this portion of the study, the three main students were given materials to play with including: modeling clay, crafts, and magnetic boards. A trainer briefly modeled for the students how to use the materials then told the students to begin playing. As the children played with the materials, the researcher observed them and collected data in 15 second intervals over the course of a four minute session.

After collecting this baseline data, the researchers employed an intervention which consisted of a multi-component, visual cueing imitation training. During this intervention, the trainer requested that students take turns being the leader. After watching the training, the leader would then model for the other students what they were supposed to do. During this session, all non-leaders were observed for two minutes. If the students were not following along, the trainer

prompted them by using a formulaic five-step process. Each student in the study took turns being the leader. Findings of the intervention suggested that three of the four students increased their ability to imitate behaviors. Data also implied that the amount of prompting required to remain on task decreased significantly for three of the four students.

Part of building social skills requires learning acceptable ways to interact with others. For students who have an inability to register appropriate behaviors, interpersonal interactions can be quite difficult. Pierson and Glaeser (2007) highlighted that typical students with ASD lack the essential language to express how they are feeling. As a result, these students require the aid of adult figures to help them navigate appropriate ways to handle social situations.

Pierson and Glaeser (2007) suggested that one way to help students with ASD build social skills is through "comic strip conversations." A comic strip conversation allows students to review and discuss how an appropriate social situation may play out. This helps students to develop and foresee appropriate responses and reactions when they interact with others. Pierson and Gleaser set out to see if comic strip conversations were an effective method for teaching students how to manage and maintain their relationships.

This study consisted of three students, age six to eight, all of whom had been identified as children in need of support to develop social skills. The students attended a suburban school located in Southern California and received half of their daily instruction in a special education resource room. Individual social skills that needed development were selected for each student. Student 1's goal was to keep his hands and feet to himself on the playground. Student 2's goal was to make eye contact and use appropriate voice level with social greetings. Student 3's goal was to accept fault when he acted inappropriately (Pierson & Glaeser, 2007, p.462).

This study took place over the course of six weeks. The first two weeks were spent establishing which social skills were in need of support. The researchers then developed a plan of how to implement the comic strip conversations for each student. During the next four weeks when a student behaved in a way that was contrary to their specific goal, the teacher or paraeducator would take the student aside and use the comic strip conversation to discuss socially appropriate ways to interact. Findings showed that all of students made significant improvement by the final week of the study.

Conclusion

Findings from the studies I reviewed suggest two important conclusions. The first conclusion is that researchers unanimously agreed that helping students with ASD develop independence in the classroom is of great importance. Secondly, the studies aligned in saying that to help students to develop independence in school, teachers need to implement support strategies to support independence. All studies indicated that it is crucial for real world application.

In theory, schools are designed not only to teach students facts and figures, but they are also a place that prepares students for life outside of the classroom. One strategy centered on teaching students independence pushed teachers to scaffold student independence through three specific avenues including transitions, organization, and social skills.

Research promoting transitional strategies endorsed the theory that when supports are in place, students are able to transition with greater ease. Consequently, students will rely less on teacher prompting. As far as the implementation of transitional supports, the majority of research recommended the use of visual supports. The necessity for visual supports is built on

the foundation premise that most students with ASD have communication disorders that limit their ability to follow auditory cues.

In my review, I found contrasting views that promoted the use of auditory prompting. The researchers suggested that not all students respond to visual supports. Therefore, the implementation of auditory prompting might be more beneficial to these students. This opens the door to future studies to determine the benefits of one access over the other.

The second component necessary for students to develop independence is organization. The research claimed that, when organizational structures are in place in the classroom, students are able to operate more independently (Carnahan, Hume, Clarke, & Borders, 2009; Hume, 2004; Hume and Odom, 2006). Work systems are an effective way to help students organize their materials and in-class tasks. Three models of work systems to appropriate for an individual including left-to-right, matching, and written list. When designing a work system; it is important to take into consideration students' cognitive ability and level of reading comprehension.

I found other organizational research suggesting that formal filing systems were an effective way to help students to develop organizational skills. Findings from Dorminy, Luscre, and Gast (2000) suggested that when students were taught to use formal filing systems; the percentage of missing items decreased completely. The research also implied that the time it took for students to find each assignment decreased substantially. Research suggests that this support system is not only appropriate for effectively supporting students with ASD, but it is something that can be universally used by all students.

Finally in order to help students develop greater independence, it is important that teachers help students to develop social skills. Students with ASD typically have difficulty developing appropriate social skills due to difficulties with communication. Three ways to

support students in developing social skills include peer-to-peer tutoring, imitation, and comic strip conversation. Research surrounding peer-to-peer tutoring found that teachers can model how to initiate conversation and share items; however, this model is not conducive to teaching students how to engage in conversations. Research related to imitation showed that students can imitate leaders when they are prompted concerning what materials they will be using and who they will be following. They note that imitation skills are helpful, students often follow others' reactions when they are unsure of how to react. Finally, comic strip conversations identified social skills that can be taught and reinforced using one-on-one interventions formatted through comic strips.

I will refer to these strategies and implement them in my own teaching practice because the research has led me to believe that the explored systems can be effective and beneficial to use with students with autism. In my future career as a teacher, I know that I will be working with students who fall on the autism spectrum – just like Brad. As their teacher, I will be required to provide students with support strategies –just as I was required to do for Brad. The difference is that, in my future work with students, I will now have a collection of strategies at my finger tips that I can implement to support students. In the future, I know that I will include visual supports to help students to transition, as well as work systems and file folders that help with organization. Peer-to-peer interventions will also be useful to help my students develop social skills. These components will support greater independence.

For future studies, I would suggest that analysis focus on larger populations of people. Most of the studies that I reviewed dealt with only a small sample of students. This small sample size may limit the amount of legitimacy when trying to create replicable models for intervention. I would also suggest that future research create longitudinal studies that explore the effectiveness

of certain supports over the course of the child's life. Most of the studies that I reviewed conducted their research for a few months which may limit a full understand of certain strategies and their effectiveness.

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