

CREATING CLASSROOM COMMUNITIES OF PRACTICE:  
STUDENTS AS PRACTITIONERS OF CONTENT

by

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## ABSTRACT

This paper examines effective practices for designing a community of practice in a secondary school content area classroom using the lens of apprenticeship and situated learning models. In the volatile concoction of the quagmire of adolescent identity formation with the problem of waning student engagement, a solution may be found in application of the pedagogical aspects of the learning taking place in communities of practice. Through discussion of the historical context and a critical review of the body of research, strategies are presented for creating communities of practice in public school classrooms in order to encourage students to incorporate content area identities. Rather than learning about language or theatre arts, students are asked to BE writers or actors within a collective of other writers, editors, directors, technicians, etc. As secondary students must change hats generally every hour at the ring of a bell, the goal for the teacher is not to convince every student to choose her content area as a permanent vocation, but for the course of study to be an authentic experience – one which will engage the adolescent and ultimately help him to make an informed decision as to what occupation or future education would best suit him.<sup>1</sup> By teacher modeling of what it is to be a professional person in practice, scaffolding, coaching, and ultimately fading support so that students may move into independent practice, students experienced a significant increase in motivation and engagement in the content area.

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<sup>1</sup> Throughout this manuscript I consistently utilize female pronouns for “teacher” and male pronouns for students. This is not a political statement nor support for the notion that teachers and students are typically gendered as such. As a female author and teacher, this was a language choice I made in order to more personally apply my research to my practice as well as a simplification for clarity in reading.

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## CHAPTER 1: INTRODUCTION

### Statement of Purpose

The utmost aspiration a teacher may have is to create a community of lifelong learners. All the rest, passing standardized test scores, meeting grade level expectations and benchmarks, readiness for the workforce or continuation to undergraduate education, is possible for each student if teachers make constructing classroom communities where students love to learn the top priority. In order to achieve this ideal, a teacher must elevate the concept of what it means to be a student. Lifelong learners are powerful, active and creative because they are not allowed to be passive or subordinate in the traditional classroom sense. The will to learn is fostered as students find space to experiment, construct and possess knowledge. In order to support students, a classroom environment must be designed to encourage engagement and intrinsic motivation.

The research presented in this manuscript proposes that effective strategies to increase student engagement and motivation are to provide authentic opportunities for students - opportunities that encourage them to be practitioners, or people in practice in whatever content area they are studying. Practice, too, must be expanded as a concept beyond merely repeating activities, drills, or tests. Certainly, repetition may be integral to skill acquisition, but it is in moving beyond learning the basics that a student truly experiences practice. In his foreword to *Situated Learning*, William Hanks asserts, "Learning is a process that takes place in a participation framework, not in an individual mind. This means, among other things, that it is mediated by the differences of perspective among the coparticipants" (Lave & Wenger, 1991, p.15). In other words, a (student) practitioner who works in a classroom community alongside fellow amateurs,

more advanced practitioners and who is given the opportunity to perform regularly, develops the ability to anticipate problems, to improvise, and ultimately, create something new. Regardless of the trajectory of the student after he leaves the classroom, these are the skills that will be transferable to other areas in the student's life, making him a valuable participant in any future education or career. Given these variables, this paper seeks to explore thoroughly the following question:

#### Master's Paper Question

How can teachers create classroom communities of practice where students can become practitioners of content?

#### Rationale

In most high school core curricular classes (Language Arts, Math, Science, Social Studies), the classes are organized by grade level: sophomores study with sophomores, seniors with seniors, etc. In what are often labeled "elective" classes (e.g., the performing arts and visual arts), the high school student has a unique opportunity to learn with other students who are at different grade levels and who often hold a wider variety of experience in the content area. For instance, a freshman may enter a general theatre class with seniors who took the class for the subsequent three years. In many of these classes, students serve as mentors or even teachers to each other. A stronger sense of community develops in the classroom as students work toward producing authentic projects together. It is in these types of classes that I, as a student, experienced the greatest motivation, engagement, and significant learning.

For many centuries, students successfully learned through similar constructs of apprenticeships. A novice entered a professional community and worked with more

experienced peers and a master. Initially, the apprentice learned by way of observing and completing minor tasks. Tools and language of the trade were not taught directly, but instead acquired through participation in authentic practice. Slowly, the apprentice took on more responsibility and completed more integral tasks as he moved away from being an amateur into being a more experienced apprentice and then a master himself (Lave & Wenger, 1991).

The two types of learning described above exhibit the tenets of constructivist learning theory, or the idea that humans learn through their experiences. Constructivist pedagogies call for active students to have a dynamic interaction with the learning goals and environment. In constructivist approaches, the social and cultural backgrounds of the students bear great importance in designing curricula. Students participate in collaborative processes and often learn by teaching. Teachers serve more as facilitators than instructors and assess through authentic measures such as completion of projects rather than information recall in an exam. All of these qualities are seen in the above learning situations of the mixed level high school theatre class room or in a craft apprenticeship.

Constructivist researchers, Rogoff and Lave, introduced the concept of Communities of Practice in the 1980s. During the 1990's, in studying various apprenticeships, Lave paired with Wenger, another constructivist theorist, to develop the concept of Situated Learning. The history behind these two frameworks is more thoroughly discussed in chapter two, however, understanding their definitions is necessary to grasp the scope of this manuscript. As exhibited in both the high school theatre classroom and the standard apprenticeship, a community of practice consists of a

group of people striving towards common goals. Consequently, the members experience the process of social learning, shared sociocultural practices, and artifacts that emerge and evolve from collaboration. While a more complex concept, situated learning can also be observed in both the high school theatre classroom and in a standard apprenticeship. Situated learning is learning that occurs in the same context in which it is applied (Lave & Wenger, 1991). Obviously, the apprentice carpenter is working in the field with a master carpenter. Less obviously, a theatre student participates in a real community of practice, collaborating to create a joint product to produce in a real theatre (albeit usually inside of the high school). A non-example in the high school looks like the following scenarios: calculus students without a joint enterprise or authentic task, science students who repeat the same experiments with known outcomes, language arts students learning through completing grammar workbooks.

In my experience in teaching theatre and language arts, it is this decontextualization that poses the greatest problems for students in terms of motivation and engagement. Too often the students ask “Why do I have to learn this and what good is it going to do me?” without receiving a clear answer beyond “The state requires you learn this so I teach it to you.” This paper argues that if an educator designs the classroom carefully so as to construct a community of practice where students participate in situated learning, then most students will experience a greater engagement in the content area. Consequently students will be more motivated to contribute to not only their own learning, but to the learning of their classmates. Following is a basic outline of the strategies presented in the research for engaging and motivating students through the use of communities of practice and situated learning.

There are countless groups that can be labeled as a community of practice: the professionals in a hospital, Alcoholics Anonymous (Lave & Wenger, 1991), the Freemasons, a theatre company, etc. While not the usual practice of a high school educator, a secondary classroom can become a community of practice. In order to do so, teachers need to design a context where students are mutually engaged in common goals. This is generally implemented through the commonality of the skill set learned in a particular content area. One way of cementing this mutual engagement is through the development of a joint enterprise (i.e., in theatre: writing, designing or performance of a play; in science: a school-wide recycling initiative project). Through these ventures, the classroom community of practice uses the language, discourse, and artifacts of the professional community of practice.

The teacher must concentrate more on being a person in practice with students than on providing direct instruction. If an educator is to teach music, she must also be a part of the musicians' professional community of practice outside of the school, whether through performing, conducting, composing, or other professional roles. When the teacher does not have the professional experience to teach a particular topic, perhaps a professional member of the community of practice can be invited into the classroom as a visiting teacher. For example, a theatre teacher who does not have much experience with stage lighting may invite the lighting designer from a local theatre as a visiting artist to the classroom. Additionally, the teacher will start the year heavily scaffolding the learning of the students while eventually fading out the support provided so that students can experience the journey toward independent practice.

Students can learn effectively not only from observing a “master,” but by working with peers and near-peers, those who have slightly more experience (Wells, 1999). Eventually, as the student becomes more experienced they become a core member of the community of practice, working in designing and directive roles rather than the peripheral roles of small task completion. A freshman in a stagecraft class may do more of the grunt work, painting sets and cutting pieces, while working alongside the more advanced student who creates the set design and delegates tasks to less experienced students. This feature makes possible the continuation and evolution of the community of practice as advanced students graduate and novice students become advanced students, providing sustainability to a program such as theatre arts in a high school.

Research studies presented in this project addressed at least one of the above components of classroom communities of practice. Within the wide variety of studies presented, each researcher approached the study through the lenses of situated learning and/or communities of practice.

### Conflicts and Limitations

The following chapter presents the history of the theoretical frameworks of situated learning and communities of practice. Beginning with an investigation of the age-old success of apprenticeships, connections are drawn between the aspects of apprenticeships and what was removed from education with the creation of the public high school. This contrasting analysis serves as a foundation for the history of Lave and Wenger’s research on situated learning and communities of practice which initially focused on contemporary apprenticeships. Through the work of Lave and Wenger (1991) as well as their predecessors such as Dewey (1938) and Vygotsky (Wells, 1999), a

blueprint emerges outlining the necessary components of situated learning and communities of practice.

Chapter three then uses these components to outline the beneficial outcomes when students are learning in a Community of Practice. This research not only informs the drama teacher, but any educator who desires to: break down systems of tracking, utilize collaborative group work, engage students in content area discourses, and break down systems of privilege, power, and difference. However, there are two major limitations. First, not all outcomes in situated learning are beneficial. Some research pointed out that there are students who do not respond well to a situated learning approach. Students with disabilities in regards to social functioning will need extra resources and support if they are to succeed in such collaborative classroom activities. Also, unless the teacher takes significant measures, the lack of agency and capital (e.g., economic, social, and cultural) can lead to exclusion from, or failure in a Community of Practice for marginalized populations. However, collaborative creativity also offers an unparalleled opportunity for deconstructing these inequities.

The second limitation is that in the body of research on Situated Learning and Communities of Practice, the nature of the topic was exhibited in the researchers' emphasis on qualitative analysis – with minimal quantitative data in many studies. With a strong focus on case studies, small but detailed analysis of sample populations, and an intention to prove that situated learning is the panacea; collecting a body of research that can be considered transferable and generalizable is challenging, but not impossible. This author intentionally chose studies that represented a wide array of methodology, demographics, contexts and content areas.

Finally, Chapter four summarizes the research in order to clearly identify patterns. The goal then, is to determine how aspects of situated learning can then be applied in a secondary school classroom despite the institutional decontextualization experienced by high school students. The resulting construction of a classroom community of practice allows students to be practitioners of content and ultimately life long learners.

## CHAPTER 2: HISTORICAL BACKGROUND

### Introduction

An examination of the history of “situated learning” involves less than twenty years of research beginning with the work of Lave and Wenger (1991). They insist that situated learning "...is not an educational form, much less a pedagogical strategy" (p. 40). However, it can be viewed as a style of learning that can be identified in use as far back as medieval apprenticeships in Anatolia and Europe. While the field of developmental psychology may churn out new terms describing investigations of the way humans learn, the practices investigated are nothing new. It is, instead, the contrived setting of the public school and in particular the separation by discipline in secondary school that is relatively new. Young people in modern times are expected on any given day to switch hourly between many required as well as a few chosen subjects or content areas. Centuries ago most adolescents were expected to become literate in multiple subjects by way of one discipline through an apprenticeship (i.e., learning the math, science and language arts of metalworking) while today they are to explore subjects that are disjointed and separated from each other. As chapter three will focus on the body of research sparked by the work of Lave and Wenger, it begins with an outline of the history leading up to their studies and findings.

### The Seeds of Situated Learning

In the late Middle Ages a form of vocational training and most importantly cheap labor emerged in the creation of apprenticeships. Young people aged anywhere from 10 – 25 went to live with a master craftsman (i.e., tailors, bakers, blacksmith, carpenter) in hopes of becoming masters themselves. Craft guilds and town governments served as

supervisors. The process of learning in medieval apprenticeships contained concepts that educational theorists return to again and again – concepts that make it possible to outline a plan for motivating modern day students to become literate in multiple disciplines instead of mastering just one.

Apprenticeships involved the learner in the actual physical context of practice. Through observing a master, guided practice and a master's gradual release of responsibility an apprentice migrated from peripheral novice roles eventually becoming a master.<sup>1</sup> A modern example of role migration is described in Lave and Wegner's (1991) study of Yucatec midwives: the young girl will observe births, listen to stories, then begin running simple errands, followed after many years by administering massage to a laboring woman. Jordan (1989) described this process in Lave and Wegner's *Legitimate Peripheral Participation*: "As time goes on, the apprentice takes over more and more of the work load, starting with the routine and tedious parts, and ending with what is in the Yucatan the culturally most significant, the birth of the placenta" (Lave and Wegner, 1991, p. 69). The apprentice eventually becomes the master training new apprentices, thus, perpetuating the field.

Apprentice-style learning endured the test of time. Both medieval apprenticeships and current counterparts in Asia, Africa, Europe and the Americas follow the same basic components outlined by Barab and Hay (2001). They explain the process as follows: "1) the development of learning contexts that model proficiency, 2) providing coaching and scaffolding as students become immersed in authentic activities, 3) independent practice so that students gain an appreciation of the use of domain-related principles across multiple contexts" (p. 72). This outline will also be used to organize the research

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<sup>1</sup> I chose the male pronoun here as medieval apprentices were generally male.

presented in chapter 3 and ultimately provide a blueprint for the secondary school educator to follow when designing her own classroom community of practice.

While there is a lengthy world history of apprenticeships, the focus of this paper will shift to the history of the education of adolescents in the United States. Spring (2008) writes that in the 17<sup>th</sup> century American colonies "...the majority of boys were placed into apprenticeship[s], but the sons of the elite were sent to grammar schools and on to college" (p. 14). During the apprenticeship which typically lasted seven years, masters were responsible for the education of their apprentices not only in their field, but in reading and writing as well. Instruction in reading and writing only became required with the enactment of the "Old Deluder Satan Law" in 1647. The educational trajectory of the poor and the elite served to maintain the existing social order. While the grammar schools offered the wealthy instruction in Latin and Greek "...as part of a Renaissance conception of the educated person" (Spring, p. 16), the content of an apprentice's instruction in reading and writing was entirely of a religious and moral nature.

A major shift in the education of adolescents occurred with the inception of the high school. Nineteenth Century high schools served approximately one in five children. In the later part of the century the function of schooling shifted to the development of a competitive workforce, spear-headed by Horace Mann. In a major ruling of the Michigan Supreme Court, support of free public high schools solidified. The decision stated that not only was taxation to provide these schools legal, but that public schools must provide "elements of classical education" bringing the aspects of the elitist grammar schools to the masses (Spring, 2008, p. 254).

In 1892, the National Educational Association formed the Committee of Ten on Secondary School Studies for the purpose of standardizing the college admissions process. Reports published by the Committee of Ten concluded that poor children have just as much of a right to a full education and therefore there should be no class education. While the trend remained that children from wealthier families tended to follow college preparatory tracks while those of lower socioeconomic status took more vocational routes, this change in access was significant. However, decisions of the Committee of Ten have been criticized for being elitist and devaluing the importance of vocational options (Spring, 2008).

The purpose of education in the early 20<sup>th</sup> century focused on social efficiency, or the high school's goals of creating effective workers. Though complicated by issues of standardized testing and placement according to scores, these social efficiency doctrines not only emphasized the availability of multiple trajectories toward college or vocation, but movement towards equality in a youth's opportunity for choice of such trajectories. A 1913 National Education Association commission issued the *Cardinal Principles of Secondary Education*; an argument for comprehensive high schools that provided youth with "...a wide variety of contacts and experiences to obtain a basis for intelligent choice of his educational and vocational career" (as quoted in Spring, 2008, p. 260). The standard curriculum in the public high school was compartmentalized as content areas became more defined such as science, math, social studies, and language arts. Teaching positions became specialized by field of study. During the 20th century, the daily life of high school students became increasingly more complex as they gained the opportunity to

try out many content areas and thus the development of new identities in order to choose a path for themselves.

Though transmission models of teaching now labeled traditional, such as lecture and presentation, dominated 20<sup>th</sup> century education, learning through experience was not completely discounted by theorists and practitioners. John Dewey published *Experience and Education* in 1938 which argued that instruction lacking in hands on experience and without a focus on inquiry is not effective. His work sparked an education reform movement in the United States. Dewey also argued for multi-disciplinary approaches so that students would better be able to make connections between what he learned and his own life. This coincides with the learning of multiple disciplines within the authentic context of an apprenticeship (e.g., metalworking apprentices learning the math, science and language arts of metalworking) rather than the compartmentalized approach of the emerging high school.

Across the Atlantic, Swiss psychologist and philosopher Jean Piaget also greatly impacted education reform. While much of his work focused on early childhood development of knowledge, his arguments that learning is an active social process supported the work of Dewey in the U.S. Piaget also emphasized the impact of a learner's past experiences and culture on current and future learning. This coincides with the concept of the student's funds of knowledge discussed in chapter three of this manuscript. Piaget's research supported the idea that teachers must learn about, and design curricula that considers students' funds of knowledge, or the sum of their experiences, talents, desires, cultural and social connections – every seen and unseen unique quality that the learner brings into the classroom with them.

Even further east at the Moscow Institute of Psychology, a young researcher named Lev Vygotsky founded the school of cultural-historical psychology (which informed the work of Rogoff in regards to social learning, tools, and artifacts discussed later in this chapter). Concepts still taught in most teacher education programs include, Vygotsky's theory that learners flourish when working with a more capable peer, allowing both the beginner and the more advanced student to make more progress towards their learning goals than they would be able to make working on their own (Wells, 1999). This idea of the "more capable peer" was an integral aspect of ancient and modern apprenticeships as well as the modern theories of social learning as applied in the contemporary classroom. In the final section of chapter three, research demonstrates that students having access to and eventually serving as more capable peers is important aspect of their journey towards independent practice and increases engagement, motivation, and the students' perception of success in the classroom.

The Cooperative Education Movement also began in the early 20<sup>th</sup> century. Through a partnership between a school and a professional environment such as a dental or veterinary practice, students left the classroom to be learners and participants in authentic contexts. Often students found the learning and networking involved in cooperative education helped to solidify a career in a given field. Though it applied mainly to post-secondary programs, its emphasis on school-to-work opportunities represented a continuation of apprentice-style education for young adults. Cooperative Education gained momentum in the 1960's with a more recently increase in presence in both alternative and mainstream secondary schools.

### Legitimate Peripheral Participation

Around the same time the cooperative education movement became more relevant in the 1960's, US educational and psychological theorists rediscovered the constructivist works of Lev Vygotsky. Situated learning arrived on the heels of this rediscovery. A similarly socio/cultural/historical view of learning, studies framing this perspective centered on apprenticeships with a focus on learning through a more capable peer – whether that peer was the master or a more advanced apprentice. Rogoff and Lave studied learning in apprenticeships in the 1980s followed by Lave and Wenger coining the terms “situated learning” and “legitimate peripheral participation” in 1991.

In a study of five various apprenticeships (e.g., tailors, midwives, butchers, quartermasters, and recovering alcoholics), Lave and Wenger argued that learning is situated in a historical and cultural context within a particular physical environment. Lave and Wenger describe apprenticeship learning as “legitimate peripheral participation” within a “community of practice”. In other words and connecting back to descriptions of medieval apprenticeships, learning is observing and working alongside a master and more capable peers (or legitimate peripheral participation) in an authentic contextualized environment (or community of practice). They note that unlike a typical classroom, an apprentice's learning takes place in the same context in which it is applied. Knowledge is not transmitted from one person to another through abstract and decontextualized means. Instead, knowledge is co-constructed through social processes (Lave and Wenger, 1991).

Legitimate Peripheral Participation leads to learner movement that can be visually represented by a spiral with the learner moving from the outside to center. Newcomers

become members of a community initially by participating in simple and low-risk tasks that are nonetheless productive, necessary and further the goals of the community. Through peripheral activities, novices become acquainted with the tasks, vocabulary, and organizing principles of the community. Gradually, as newcomers become old timers, their participation takes forms that are more and more central to the functioning of the community. The community evolves as old old-timers leave and new old-timers migrate to the central roles (Lave and Wegner, 1991).

In apprenticeships, a community of practice must have both a “master” and a social group. If newcomers can directly observe the practices of experts, they understand the broader context into which their own efforts fit. Newcomers who are separated from the experts have limited access to their tools and community and, therefore, are limited in growth. Likewise, the process of social learning occurs with shared sociocultural practices that emerge and evolve when people who have common goals interact as they strive towards those goals.

### Cognitive Apprenticeship

Legitimate peripheral participation in a traditional apprenticeship often involved a great deal of implicit instruction where the student is rarely given verbal cues or explanation of the tasks. While coaching and modeling was not completely absent in standard apprenticeships, the research of Lave and Wegner’s contemporary, psychologist Albert Bandura (1997) supported the notion that these practices help apprentices find greater success. In order to avoid the moral disengagement of struggling students, teachers must “...bring these tacit processes into the open, where students can observe, enact, and practice them with help from the teacher...” (Collins, Brown, & Newman,

1987, p. 4). The teacher then can gradually fade out support as the student becomes more autonomous. Cognitive Apprenticeship theory helps address the problem of alienating students who may lack agency in the classroom. Modeling and Coaching is further discussed in chapter four.

### Conclusion

The purpose of apprenticeships has always been to perpetuate that particular professional craft or practice. The purpose of the high school has never been as cut and dry. Shifting throughout history, social efficiency theorists argue along the same lines of the purpose of apprenticeships – high school is intended to churn out an effective new workforce. Others, like Dewey (1938), argue instead that the goal is to produce thinkers and experimenters in order to further the plight of the human race. The means to the varying ends are similar though. Both call for hands-on authentic experiential education. Through the combined history of apprenticeships, the public high school, and Lave and Wenger's research on Legitimate Peripheral Participation, a pattern emerges for educators who want to create motivated and engaged students – one that can satisfy both the desire to renew the workforce as well as creating life-long learners who can be innovative members of professional society. The following chapter presents research that presents these patterns in such a way that secondary school teachers can design their own classroom communities of practice.

## CHAPTER 3: CRITICAL REVIEW OF THE LITERATURE

### Introduction

While Lave and Wenger (1991) focus their research on legitimate peripheral participation through case studies of non-school apprenticeships, this chapter critically examines research that addresses components of apprenticeships. Each study investigates a learning community focusing on at least one component of apprenticeships or situated learning such as joint enterprise, coaching, or student as teacher. A researcher would be hard pressed to find fully significant application of apprenticeship pedagogy in the public school curricula. This author conjectures this may be due to pressure on schools to churn out passing standardized test scores or decreased educational funding negatively impacting teacher/student ratios or access to special programs. However, with the overall shift in the educational climate towards constructivist practices (as discussed in chapters one and two) one can find aspects of apprenticeships implemented in classrooms. Still, research on legitimate peripheral participation as applied in a K-12 setting is lacking in empirical studies. Included in this discussion are apprenticeship-like educational settings such as: extra-curricular, camp, vocational, university, and other post-secondary schooling.

The organization of this review of literature is informed primarily by Barab and Hay's description of cognitive apprenticeships:

- (1) the development of learning contexts that model proficiency
- (2) providing coaching and scaffolding as students become immersed in authentic activities
- (3) slowly removing scaffolding as students develop competence
- (4) providing opportunity for independent practice so that students gain an appreciation of the use of domain-related principles across multiple contexts. (2001, p. 72)

The above outline follows the trajectory of newcomers entering a community of practice (CoP) as legitimate peripheral participants as they become core participants: first the learning environment is described, then the student experience as a novice, followed by the student's role as they become more experienced and move into independent practice. A final section closes this chapter with examination of the growth and renewal processes required of a true community of practice. Most of the research utilizes a mixed methodology approach with complex codification in discourse analysis. A sincere attempt at providing a wide range of educational settings, participant populations, research styles, and in particular content areas was successful in choosing studies to discuss in this chapter.

#### Community of Practice: Learning Contexts that Model Proficiency

To begin this discussion we must again distinguish between *learning about* and *learning to do*. In a Community of Practice, learners acquire and apply skills within authentic contexts. What does a Community of Practice look like? What distinguishes contextually relevant learning from the typical public school classroom? Wegner's (1998) three minimum requirements of a community of practice offer the educator a blueprint for how to implement legitimate peripheral participation in the classroom: "mutual engagement, joint enterprise, and a shared repertoire" (Wenger, p. 73). Each of these three qualities is investigated in the following sections.

#### *Mutual Engagement*

Communities of Practice are communicative and collaborative. Members of a CoP must share overlapping values, beliefs, and histories. By working towards the same goals, members not only learn to do, but to do together. This is not to say that members

of a CoP must be homogenous. Given the diversity within any given classroom, mutual engagement is possible when students are invited to share their own existing identities. When individual students are expected to communicate their own goals and desires, the CoP can coordinate a group plan. Conflict and diversity is indeed a necessary catalyst for action within a Community of Practice.

Barab, Barnett, and Squire (2002) begin this section with a study of a university pre-service teacher training program that outlines the benefits of learners as participants in collaborative learning communities. The researchers were interested in examining the tensions or "...internal contradictions in a system that characterize a system and drive innovation and change within a system" (p. 504). In this grounded study four participant-observers collected data within the Community of Teachers at the School of Education at Indiana University over two academic years. Barab et al. used an ethnomethodological approach, meaning that the four researchers developed a close relationship with the community while remaining in the margins of the community life.

Three seminar groups were researched and each had about 15 students, 60% of which were female, with 90% working towards their undergraduate degree and the remaining 10% as graduate students returning to complete their teaching certificate. The number of participants for each seminar was approximated as 3-4 students because some students graduated and were replaced during the course of the two years of the study. Students were radically heterogeneous ranging in age from undergraduate freshmen to parents returning for a second career as well as diversity in regards to race, ethnicity, ability, and socio-economic status. Seminar facilitators consisted of one male and one female faculty as well as one female doctoral student.

Researchers participated in all three seminars over the first year of the study (over 135 hours per seminar) making observations, conducting semi-structured and as informal interviews, and analyzing Community of Teachers documents (i.e. e-mails, portfolios, and questionnaires.) In the following year, two seminars were observed in addition to nine visits to the high schools in which participants apprenticed with mentor teachers. In total 300 pages of single-space data was imported into NUDIST, codifying and analysis software, and researchers spent over 60 hours in analysis after the study concluded.

Researchers met weekly for peer debriefing and to "...develop grounded interpretations of each aspect of community life" (Barab, Barnett, & Squire, 2002, p. 503). The four main domains used for sorting data included: ecology, social organization, cosmology, and developmental cycle. Additionally, thick descriptive manuscripts were also reviewed by the researchers' colleagues and the faculty and student participants. Data analysis revealed four core tensions characterizing the community life within the Community of Teachers. First, instructors served as facilitators and gatekeepers to the profession of teaching rather than disseminators, which was embraced by some students and challenging to others due to expectations of a more traditional learning environment. The tension between learning theory and doing practice also emerged as a majority of faculty and students considered getting into the field right away to be most desirable while other students countered that learning theory must precede the practice. The Community of Teachers followed the growing trend of using portfolios rather than examinations as an accountability device and to encourage reflective practice. Student understanding of such assessments wavered between these two goals. While some students viewed the portfolio as merely red tape, others valued the process as a reflection

of their experiences. The final tension identified was stability and change or the developmental cycle of the Community of Teachers. Students participated for 2-4 years and the role of veteran members was integral to the survival of new members. “Even though the multi-generational nature of the community produced tensions between old-timers and newcomers, these tensions, on the whole, were regarded as healthy by the community” (Barab, Barnett, & Squire, 2002, p. 524).

Barab, Barnett, and Squire (2002) argue that these tensions may seem initially like obstacles, but instead when embraced by the facilitators, served as catalysts for learning. They describe communities as complex systems with inherent dualities that drive its dynamic activity,

It is in participating in these dynamics that allows students to move from “agents to be changed” to “change agents”. This perspective implies that learning is intertwined with uncertainty and change rather than certainty and satisfaction with the status quo, and that learning is nurtured through the posing of teaching and learning problems and working to determine how to solve them. (p. 528)

Through negotiating these core tensions a group of individual members becomes a community, something often overlooked in the school classroom.

This ethnographic study is relevant. The article opens with a detailed account of the theoretical framework and biases of the authors, however, a fuller description of the researchers would be valuable as they became so embedded in the community as participant observers. The data collection and analysis methods are clearly defined. There could be included a more detailed description of the numbers and diversity within the student population as well. Examples given to support each of the four core tensions adequately take into account a multitude of perspectives providing triangulation to the study. Researchers were careful to repeatedly perform member-checks and peer

debriefing and suitably adhered to the requirements for grounded theory development. While possibly not generalizable due to the nature of the ethnographic study, the results should be considered dependable and transferable.

While the authors' goal was primarily to inform those who may be designing a teacher education program, implications for a K-12 classroom are significant. This study opens the review of literature as it covers the main components of apprenticeships and situated learning in general. As an argument for mutual engagement, it does not discuss situated learning as a treatment per se, but provides thick descriptions of the power of learning situated within an authentic community.<sup>2</sup>

After a general view of mutual engagement, one comes to the question of how to engage a group of students in a community. This is the focus of Guldberg and Pilkington's (2006) study. In an investigation of an online learning community of parents and carers of persons with Autism Spectrum Disorders, Guldberg and Pilkington ask the following questions: How do students develop as a learning community, to what extent does collaborative activity contribute to the creation of a community of practice, and finally, what impact does participation in the Community of Practice have on the learners' identities? This mixed method analysis utilizes various coding schemes.

In a year-long study of a 265 member cohort online community of parents and carers of persons with Autism Spectrum Disorders, all online postings were analyzed using mixed methods. Guldberg and Pilkington approached the data through the same lens of Lave and Wenger's (1991) tripartite definition of a community of practice that this author uses to organize this chapter: mutual engagement, joint enterprise, and shared

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<sup>2</sup> It is worth noting that the author of this manuscript is completing this writing within a Community of Teachers very similar to the one described by Barab, Barnett, and Squire. It is participation and support of the community that sparked this author's delving into the topic of communities of practice.

repertoire. Both the learner's appropriation of professional discourse and the learner's collaborative engagement with contributions made in online discussion were considered the most important in analyzing the data for meeting the Lave and Wenger definition.

Quantitative analysis included counting the number of posts (e.g., questions and concerns as carers of persons with autism spectrum disorders posted on an online bulletin board as well as responses to other's posts), the proportion of posts per participant, and creating box plots to display participation for each section of the curriculum. Qualitative analysis was based on methodology of researchers listed above and included coding data for: statements within messages as social, cognitive, or metacognitive (including 100 distinguishing subtypes of these three), evidence of development of shared values and repertoires, and clarifying questions or challenges. While there is a mention of face-to-face tutorials as an aspect of the course, the study appears to only analyze the data from online discussion.

Students who register for the online course included parents, qualified and unqualified practitioners all of which are carers of persons with Autism Spectrum Disorders. The cohort consisted of 265 students from all over the UK, the Republic of Ireland, the Channel Islands, and a group from Sweden. Students are divided geographically into 13 online tutor groups with between 15-20 students in each. Each tutor group had a tutor as facilitator in the discussion. There was no mention of the tutor's background.

Due to the nature of the study, students already enter the program with a developing identity as a carer of persons with Autism Spectrum Disorder. Through discussion of similarities and differences in experiences, the development of a group

identity emerged over time as the focus from interpersonal shifted to inter-community. Through processes of resolution, the group identified common values and goals in contrast to those outside of the community of practice. Group identity further developed through the exploration of new ideas and challenging workplaces and institutions to change. Many students voiced a desire for continuity of the community after the end of the course. This was even brought to action as many students continued to participate in a program bulletin board after the completion of the course – one group even used a network to write a book together.

This study utilizes a mixed methodology that includes a variety of approaches to qualitative coding of data. There is a clear attempt to make the qualitative analysis more objective. The sample size (N=265) is larger than most mixed-method studies found. The data is effectively triangulated through the collection of a variety of data and the mixed-method analysis of the data. Unfortunately, there is no mention of peer debriefing or of member checks so the credibility of this study could be in question. Additionally, while the contributions of the tutors are listed as a major question in the study, it does not seem to be a focus in the data analysis beyond induction of discussion. There is no data about the backgrounds of the tutors. The researchers do mention the need to evaluate further the role of the tutor in future studies. Also, because participants enter the study with a developed identity as carer of persons with Autism Spectrum Disorders, the initiation of individual identity can not be evaluated in this study.

One must remain cautious in transferring the findings of this study to a classroom community as this is a study of an online network. Despite the weaknesses, other studies can support this one in asserting that before adoption of professional discourse can

happen, a tutor must facilitate finding common ground, establishing a safe and welcoming environment so that students will disclose experiences. The result will be students developing common values and developing a group identity. In a high school class, students not only take on the individual identity as theatre artist, scientist, or writer etc., but initiating the process of developing a group identity as an ensemble or collective of theatre artists, scientists, or writers etc. Another relevant aspect in this study is the goal of students' desire for sustainability or continuity of community of practice into the future. If the above conditions are met, is it a given that this will be a common desire of students? Community continuity will be discussed in the final section of this chapter.

The development of a Community of Practice is an integral part of providing an experience of situated learning for students. Guldberg and Pilkington (2006) emphasize discussion as a means for development of group identity. While discussion seems to contrast that with activity theory, in a virtual environment particularly, one could argue that discussion IS activity. Through discussion, the members of this CoP worked towards institutional changes for persons with Autism Spectrum Disorders and their care providers. The following study supports this notion that the development of a CoP is contingent upon a safe environment that welcomes the individuals' stories.

The importance of sharing overlapping histories, values, and beliefs does not suggest that members of a CoP must be homogenous. As Barab, Barnett and Squire (2002) argued, it is in diversity and the conflict of dualities where learning occurs. In order to discover and negotiate commonalities, the classroom must be an environment where students are welcomed and, in fact, encouraged to share their lives outside of the classroom. Moje, Ciechanowski, Kramer, Ellis, Carillo, and Collazo (2004) argue that

students' funds of knowledge must be invited into the classroom and linked to the subject at hand for learning within a community to occur. Questions addressed in their study include: What are the different funds of knowledge and Discourse that shape students' reading, writing, and talking about texts in their science classrooms? When and how, if at all, do students bring these knowledges and Discourses to bear on school science learning? How do teachers, researchers and curriculum or text developers design curricula and texts that draw from and respond to the many different knowledges, discourses and texts that young people bring to school? How do we construct third spaces when so many different spaces must be represented in the new space that is built?

In order to answer this battery of questions, Moje et al. (2004) utilize a constant comparative analysis. This mixed-method ethnography of classroom community focuses on literacy, culture, and identity practices. Embedded within other existing studies that had been taking place for 6 years prior, researchers collected data through: participant observation recorded in field notes, surveys, interviews (both formal and informal, individual and focus group) conducted in the school and community, document collection (i.e., curriculum worksheets), artifacts (i.e., student produced texts, stickers, clothing), and photographs.

Over a period of five years, researchers each made classroom observations in a bilingual science class once per week amounting to 2-3 visits per week per classroom. Formal interviews occurred outside of school and were focused on the youths' science learning, how they studied, what they read and wrote outside of school, what they did in spare time, and goals for the future. Researchers followed assigned focus groups longitudinally over time. Participant observation was the focus for in-school science

classroom research. Researchers also utilized data collected by the larger ethnographic study taking place in the community and met weekly to analyze data collected both through their own study and the larger study.

Participants included thirty youth (20 females, 10 males) from a predominantly Latino/a community in a public school in Detroit, MI. Subjects not only were voluntary participants, but 10 were recruited with a pitch by the researchers from those already participating in another study on project-based science curriculum development. Moje et al., (2004) speak to the unsuccessful attempt to recruit equal numbers of male and female students. Students were in seventh and eighth grade bilingual (Spanish/English) immersion programs. Participants were from lower or middle-class homes, and self-identified as Latino. All but three were from Mexican ancestry and self-identified into subgroups of Chicano/a, Tejano/a, Mexicano/a, and Mexican-American. The other three claimed Puerto-Rican and Dominican ancestry.<sup>3</sup> The researchers emphasized racial identity because the various forms of Spanish and English used by the students and the transcription of interviews impacts how the researcher interprets and the reader understands the data. All participants were fluent in both English and Spanish.

The researchers outline their own heritage more thoroughly than any other participant-observer study in this chapter. Three Latinas and five Anglo women routinely collected data over the five year period. A Latina, an Anglo and an African American researcher also participated in constant comparative analyses with the research team. Five of the researchers were fluent in Spanish and English, however, many interviews were conducted by pairs of researchers with different language abilities.

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<sup>3</sup> It is worth noting that both Johnson (2006) in *Privilege Power and Difference* and Perry (2002) in *Shades of White* argued that the ethnic identities claimed by the youth remained fluid and changed over time.

Other participants included: parents, teachers, and other students observed and informally interviewed in the classrooms, other adult and youth community members, but data collected from these sources was not the primary focus of the study. Teachers of observed classrooms were not selected based on their pedagogies and not instructed to work towards constructing third space (or the connection of school funds of knowledge and those outside of school).

Moje et al., (2004) used axial coding and selective coding in the analysis of data. They broke up the different outside school funds of knowledge as such: family, community, peer groups, and popular culture. In formal interviews the researchers found many experiences from these funds that had a direct bearing on the science they were learning in class; for instance, the air and water quality conditions and the impact in the work places of the students' families including: dry cleaning, construction, and mescal farming. These students however, rarely brought these things up in class, and were not prompted to do so by the teacher. While the teacher's curriculum did make a connection to a local stream in a unit on water and air quality, it was not really part of these students' funds of knowledge. In order to create third space, teachers must develop a deep understanding of the texts and experiences of many different communities, with local space being only one of the many that students examine. They must then actively engage students through experiments, discussions, and reading and writing activities that focus on this multitude of funds.

Teachers must make clear that connecting with these funds is welcome and desirable in class. One way to do so is by providing multiple texts and teaching students how to critically evaluate such texts. Youth display greater rhetorical and discursive

skills than one might expect in their everyday lives and actively create third space outside of school. Students tend to have a binary attitude about school and outside funds of knowledge. By bridging through welcoming the use of everyday language in secondary content area courses and connecting it to disciplinary words and phrases as well as connecting everyday funds with those in the classroom, teachers can encourage students to construct the desired third space.<sup>4</sup> Discussion within this study also encourages drawing from youth's increasing access and interest in technology.

The credibility of this study is good as the study was both prolonged, substantial, and persistent and researchers routinely participated in peer debriefing with exhaustive progressive subjectivity, member checks with participants, and triangulation through use of multiple and varied sources. The methods utilized to account for various dialects and the practice of code-switching were thorough and thoughtful. Researchers speak to the fact that the findings of this study should not be generalized to all Latinos/as, to all urban youth, or to youth in general. It is a picture of one group of students at one moment in time in one location. Unfortunately, despite efforts, the participant sample was disproportionately female in gender as well as the research team which decreasing the transferability of the study.

Creating third space is a necessary component if teachers expect students to try on the new identities of practicing within their content area. This requires far more than connecting to prior knowledge in five minute hook before a lesson. Teachers must listen carefully to students and provide a welcome atmosphere for sharing. Some students (especially in particular cultures) will be reluctant to share and it is the teacher's responsibility to be creative in methods to understand better the great array of funds of

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<sup>4</sup> Bridging will be more thoroughly discussed in a subsequent section.

knowledge students bring to the classroom. By designing curriculum that is interdisciplinary and teaching students how to critically examine texts, teachers can help their students try on a new content area identity (writer, artist, etc.) and integrate it into their many other identities (family member, community member, etc.) The structure of secondary school is one that compartmentalizes identities during a time in which youth are trying so hard to integrate their many selves. Educators must keep this in mind as each of the content areas places great expectations on students to “be” a scientist, a writer, an historian, an actor, etc. and not place all the burden of integration on the student. What does it mean for this student to “be” a scientist or an historian out in his own community? Connect the roles learned in the classroom to what is relevant in the community outside of school.

In remaining with the importance of making room for conflict and diversity Taylor’s (2008) study of carpentry apprenticeships outlines issues of agency for minority individuals within a community of practice. Key questions addressed in the study include the following: How do individual and structural factors come together to produce outcomes in the continuation of apprenticeships in a school to work transitional program? In evaluating what signs may foreshadow outcomes, what measures can be taken to improve continuation rates? This qualitative longitudinal case study with aspects of historical study (minimal review of past data) presents problems that can arise within a CoP when the environment is not welcoming or safe for diverse populations.

While the focus of the research was on five apprentices, interviews were also completed with parents of those five and 25 other youth from the cohort. Surveys were filled out by nearly all of the members of the 70 person cohort at the beginning of the

study (November, 2003) and cohort interviews took place several times over the course of the seven month study (though it is unclear how many times.) Researchers analyzed data utilizing interview transcription and application of N6 qualitative analysis software.

Of the five apprentices, one was a black male, one white female and three white males (thick description provided in the study) all participating in the Ontario Youth Apprenticeship Program in carpentry in an urban center in 2004. The sample was selected to reflect population (in regards to race and socioeconomic status) of cohort (though researcher selected the one female out of 70 for the focus group in order to draw attention to gender issues.) Data collected also involved their parents, 65 other cohort members, program instructors and directors.

Success and continuation in this apprenticeship program correlated with the individual's: race, gender, social, economic, and cultural capital, and parents' education. The results from the five apprentices in focus were representative of the cohort as a whole. Both the female and the black student failed to complete the program and were left feeling "lost" with negative impacts on their self-esteem. The three white male apprentices succeeded in entering the profession of carpentry. Students of minority status were told that it would be more difficult for them, but were not offered any extra support, while other non-minority apprentices were offered additional tutoring. Apprentices with collegiate parents excelled due to: having parents who advocated for them, an ability to advocate for themselves, and access to greater social, cultural, and economic capital. Apprentices with an academic coursework background excelled while those who had pursued technical studies floundered in mathematics, the main outcome predictor was

success or failure in this course. In short, bounded agency made the ability to take on the identity of carpenter difficult if not impossible.

Some would desire a random sample, but this sample was very purposefully and strategically chosen to be inclusive and yet still relate to target population. The description of participants is thick and includes gender, ethnicity, socioeconomic status, (dis)ability status, single or dual parent family, educational level and educational level of parent(s). Taylor (2004) continued to collect data from participants who dropped out which in fact became a focus in this study. Multiple cases were analyzed suggesting this study is transferable. This was a prolonged substantial engagement, however there is no mention of how often observations took place, peer debriefing, negative case analysis, progressive subjectivity, nor member checks so the credibility of this study should be considered externally valid yet not internally valid.

Having agency and capital is a predictor in whether a student will be willing to take on a content-area identity. Issues of Privilege, Power, and Difference must be addressed in the classroom in order to prevent failure due to lack of agency and capital. Informing those students lacking in these areas of the great challenges they will face without offering more support is destructive and can lead to not only failure, but negative consequences in the student's future self-concept.

### *Joint Enterprise*

A true classroom Community of Practice will inherently be a learning context that models proficiency. The preceding section provides an overview of the qualities and quagmires of this type of learning context. Moving beyond modeling proficiency students must also be doing some thing together. The following discussion analyzes articles that examined the descriptions and impact of a classroom environment that engages students in joint enterprises or collaborating to solve a common problem or complete a common project. This requires students to continually negotiate through planning and implementation often through great conflict as exhibited by Lopez and Allal (2007) in their study of how a community of math students develop and learn norms. In order for joint enterprise to be authentic, all participants must find a place of mutual accountability which can be seen in Betts' (2006) study of middle school extra-curricular multi-media arts students. Cheek, Rector and Davis's (2007) study presents the importance of joint enterprise in an experiential learning project with Master of Social Work students. Finally, Bottge (2006) offers insight on how joint enterprise in a situated environment can be beneficial for Adolescents with challenging behaviors.

Utilizing qualitative interpretative methodology, Lopez and Allal (2007) investigated the following questions: How are sociomathematical norms constructed and negotiated during whole-class discussions and what are the consequences for the regulation of students' problem-solving practices and patterns of participation? In a year-long observational study conducted in two third-grade French-speaking Swiss classrooms, students were presented with curriculum designed to transition from additive to multiplicative reasoning and to a mastery of multiplication procedures.

A large corpus of data was collected every two weeks over 17 and 22 sessions. The observational sessions alternated between regular observations of classroom activity as selected by the teacher and observations of two instructional sequences carried out with the same tasks and material in both classes. The corpus of data included: field notes concerning spatial, material and social organization of the phases of each lesson, audio recordings of whole class discussions, audio-video recordings of sequential lessons (including elements written on the blackboard), copies of students' worksheets, and audio recordings of detailed interviews with teachers after each lesson. For the first classroom, the norm introduced was seeking multiple solutions while in the second it was to seek the most efficient solution.

The two teachers had been employed in primary schools for 20 years and involved as professional development facilitators during the introduction of the new mathematics curriculum four years prior to study. They were selected in pilot studies based on the observation that they held contrasting views on how to hold a whole class discussion. The two 17 student classes were held in a suburban setting with 10 students of upper or middle socio-economic status and 7 of lower economic status. Students who were not Swiss had already been integrated into the classroom for years.

The first teacher encouraged multiple methods for solutions, provided more direct guidance and consequently there were less opportunities for peer involvement, while the second teacher emphasized the importance of effectiveness as a mathematical norm and promoted a large amount of peer participation and problem-solving. Construction of "taken-as-shared meaning" in any community of practice requires extensive encounters and interactions between co-learners which included both the students and the teacher.

The classroom micro culture is not only where these things take place, but also the product of classroom interactions. While the norms and practices were initiated by the teacher's pedagogy, participation patterns within the micro culture were ultimately agreed upon and exhibited by the classroom community and experiences.

There was a significant amount of pre-experiment research done in order to choose teachers who would meet the requirements for the study. The volume and diversity in the types of data collected is significant. One class was studied 17 times while the other was studied 22 times. It seems to me what they are really asking is – Is this situated learning? And their answer is yes. At first read, it seems they are comparing the two classrooms effectiveness in problem solving, but this is not the case. The researchers certainly exhibit a bias for situated learning as the panacea for the classroom.

Delving into the idea of learning by doing together was the first of two studies of the Multimedia Arts Education Program for low-income students in downtown Tucson. The focus of the Betts's (2006) first study is to find how was participation in the Multimedia Arts Education Program (MAEP) related to students' perceived self-efficacy and their literacy skills. Additionally, what practices were best for connecting school to work for students? Longitudinally the study also examined how participation in MAEP impacted success in high school, college, and/or careers. Researchers looked for any impact participation in MAEP had on students' extended families.

About 1000 students completed at least a semester of Multimedia Arts Education Program while around 300 completed the entire program. Over the five years of the study the average enrollment was 38-40 students with 6-9 students in each lab, with roughly equal gender distribution. As numbers shifted every year of the study, the

researchers provided one year as a snapshot (1998, N=44) of the demographic make-up: 42 were on free or reduced lunch, 54% were bilingual Spanish, 79% Hispanic, 7% Native American, 7% African-American, and 7% Anglo. Students were admitted to the program based on free/reduced lunch qualification in 6<sup>th</sup> grade, completing the program before beginning high school. Continuation in the program was contingent on maintaining a C average in school and successful program completion resulted in students receiving a computer of their own to put their new skills to use at home. Sixteen parents were interviewed as well as graduate students involved in instruction. A 2008 study investigated later in this chapter delves into the results from graduate student interviews.

Over an 18 month period, the principle investigator collected formative data on an early cohort as a participant observer. Betts (2006) emphasizes the professional practice atmosphere of the program in describing observations. Through administration of participant, instructor, and parent questionnaires, Betts determined significant changes in student abilities and attitudes. Parents noted an overwhelming increase in student commitment and responsibility as well as an appreciation of students sharing their new skills (and sometimes new computers) with family at home. Changes in students' perceived self-efficacy was measured through the use T-tests. The test asked students to rate their ability on a 5 point Likert scale and so the following T-tests reflect the increase between pre and post tests. Overall, after the Multimedia Arts Education Program, students' perceptions of their abilities in the following skills increased significantly: read a story, write a letter, follow instructions for household appliances, use a new technological tool, build something, draw a picture of something in their neighborhood, design a logo, or share ideas with a group. Also evaluated were artifacts such as

completed multi-media art and journals. While unavoidably a subjective interpretation, Betts speaks to the high-quality, nearly professional level work the students produced as they became more experienced.

Graduates from 1998-1999 (N=29) participated in a longitudinal study. Of the 29, eight were not reachable by the time they would be eligible for graduation from high school. Of the remaining 21, only one was just shy of the credits required to graduate due to a pregnancy that resulted in her postponing her high school career. Betts points out that this is a significantly high concentration of students graduating given the demographics and community. Elevated too was the ratio of students continuing on for post-secondary education. Also notable was the stories of students who chose to continue studying in fields related to the Multimedia Arts Education Program such as computer science or graphic design.

Betts (2006) likens the intersection of home and school in the Multimedia Arts Education Program to Moje et al.'s (2004) study of third space. In creating projects students were invited not only to bring in their outside funds of knowledge such as designing visual representations of their own neighborhoods, but also encouraged to use their new skill sets at home outside of the program, especially those who received computers upon graduation from the MAEP.

Likewise in Cheek, Rector and Davis's (2007) study of an experiential learning project with Masters in Social Work students, we see evidence of equivalent if not increased success of activity theory in practice versus traditional transmission approaches. Their study asks the question: What is the impact of an intimate experiential learning project on Masters in Social Work (MSW) students? Cheek et al., recruited a

non-probability purposive sample of MSW students in a southeastern U.S. university. Of the participants (N=31), 21 were first year full-time students, and ten were in the second year extended study program, and all were female ranging in age from 21-50 with a wide range of experience in social work. No other information was provided regarding demographics and diversity. Students worked with victims of domestic violence in the Clothesline Project: a collaborative art therapy process culminating in the public exhibition of clothing that artistically tells the victims' stories.

Five focus groups were led by two of the authors after the close of the project. Five open-ended questions were asked in a semi-structured discussion that lasted one hour. Thematic analysis methods were then applied to analyze the verbal responses of participants. Questions addressed the impact of Clothesline Project on: the students, their awareness of domestic violence and sexual assault, their desire to work with this population in the future, their learning plan, as well as the impact on survivors who participated in the project.

Analysis of student responses revealed that students highly valued their time participating in the Clothesline Project. They left with a better understanding of domestic violence survivors that many said they could have never developed in a classroom. Though many participants determined they did not want to work with this population in their career, the only way to find this out for one's self is through an intimate activity such as the Clothesline Project. Often the students who communicated this decision did so because interaction with the survivors triggered the student's own painful memories. Cheek et al., (2007) warn that instructors must be sensitive to the classroom population when presenting such a potentially emotionally charged project. Though the focus of this

study was certainly not diversity of students, it ties back into Taylor's (2008) results that instructors must be more sensitive to the funds of knowledge and demographics of their students if they are going to ease them into authentic educational environments. Though in the Clothesline Project it was not a question of success in the program as it was with Taylor's apprentices, it is a recurrent concern.

Cheek et al., (2007) mention the inability to generalize due to the non-random sample. They also voice a concern for students provided what they perceive to be desired responses even though the researchers attempted to control for that by not including the instructors in the focus groups. Additionally, not a very large corpus of data was collected, such as interviews or artifacts completed before or during the project. Though purely qualitative, the highest critique harkens back to the weakness of a quantitative study when there is no pre-test for comparison. It would be valuable to know how students felt about working with populations dealing with domestic violence and their own capacity as a social worker before starting the project. Studies discussed later will corroborate through using these control techniques.

Students cannot truly begin to develop an identity within a content area without being provided with an authentic context. Whether Master in Social Work students who could not possibly know how intimate activity will impact their ability to provide social work, or a pre-service teacher who cannot truly know what it is to teach without teaching in a classroom, it is through activity in an authentic context that students not only begin to take on a content area identity, but to find that projected identity where their existing selves and their emerging content area selves merge. For example: Multimedia Arts Education Program students finding their niche in multi-media arts by completing

personalized projects, or MSW students who decide it is with victims of domestic violence they are meant to/not meant to work.

The findings of studies discussed in this section cannot be transferred to more diverse populations. Taylor (2008) addresses issues of agency for racial, ethnic, gender, and socio-economic minorities within a situated context, but does not speak about the impact of situated learning on those with challenging behaviors. Bottge, Rueda, and Skivington's (2006) research provides insight on the impact of authentic learning contexts on adolescents with challenging behavior. Through a mixed-method study, Bottge et al. investigate the impact of enhanced anchored instruction, an authentic problem-solving mathematics curriculum, on the perceived and actual math abilities of at-risk students attending an alternative high school.

Thick description is offered regarding the charter school set-up and student demographics. Within the sample (N=17) though there may not exist great racial nor ethnic diversity (white, N=16; Hispanic, N=1), the gender break down was roughly even (female, N=7; male, N=10) and the high school grade level exhibited some range as well (senior, N=6; sophomore, N=11; freshman, N=1). All students met the Wisconsin Department of Public Instruction's criteria for students at risk for not graduating. While the researchers completed interviews with the principal and instructors regarding each student's background, they warn that they did not have full access to each student's records for full review due to the sensitive and often serious nature of the students' histories. Consequently, the following numbers are most likely lower than actuality as the researchers only documented confirmed designations: (note: some of these designations overlap for individual students) diagnosed with Emotional/Behavioral Disabilities, N=10;

ADHD,  $N=2$ . All students had been suspended from their previous school at some point and many exhibited a lack of interpersonal skills and/or aggressive behavior. Bottge, Rueda and Skivington's (2006) discussion of the definition of "at-risk" is thorough and cannot be shared in its entirety here.

The curriculum focused on the design and construction of a skateboard ramp, a hovercraft application, and a hands-on activity centered on comets and the understanding of time, space, rate, and distance. The description of the curricula is far less detailed than that of the research design and it would be beneficial to have more information regarding instructional design.

A variety of measures were used to determine change from before, during and after involvement in the EAI including three criterion-referenced tests and two standardized math subtests. "The schedule of instruction and assessment with the two curriculum-aligned measures is shown below using standard design notation:  $\{O_{1A}, O_{1B}\} X_A \{O_{2A}, O_{2B}\} X_B \{O_{3A}, O_{3B}\}$ ." (2007, p. 399) Two different curricular units were administered: Fraction of the Cost (FCC) and Kim's Comet (KCC). Results of the two one-way analyses of variance through the three waves of curriculum-aligned tests were: FCC,  $F(2, 32) = 49.17, p < .001$  and KCC,  $F(2, 32) = 54.27, p < .001$ . Pre- to post instructional planned comparisons resulted in the following: FCC,  $t(15) = 7.93, p < .001$ , KCC,  $t(15) = 1.94, p < .001$ . A comparison of wave one and wave three demonstrates student maintenance and were: FCC  $t(15) = 6.87, p < .001$  and KCC  $t(15) = 9.21, p < .001$ . Overall, tests revealed a significant increase in student's mathematical abilities and maintenance of those skills after the program concluded.

While the test scores support the effectiveness of the situated hands-on curricula, what should be considered more significant are the student responses. In addition to improvement on math skills, student *perceived* mathematical abilities increased as well. Students overwhelmingly agreed that it was the hands-on activities that engaged them in the lesson in ways that traditional math studies had not done for them in the past. Most of these students verbalized a distaste of mathematics to the point that it was their least favorite subject and their pre-instructional standardized scores reflected this distaste. Instructors noted the unusual level of engagement in the task for this usually challenging population. Students in interviews communicated surprise at not only finding the activities fun, but in their own ability to apply new skills.

Similar to the research of Lopez et al., (2007), this study examines when aspects of situated learning are applied in a school age classroom. All studies addressing situated learning during the school day within school walls are not apprenticeships – they are instead a pedagogical array of educational methods. Both the Fraction of the Cost and Kim’s Comet activities involved some lecture and traditional instruction, but followed through with hands-on activities. As one student participant explains: “It’s like we’re learning math...I didn’t even understand until we built that skateboard ramp...To be able to get out and actually work with your hands and when it’s done, like wow I built that using the skills that I learned” (Bottge et al., 2006, p. 403). The largest commonality was that a majority of students exhibited an enjoyment and engagement in their studies otherwise not exhibited in traditional settings.

### *Shared Repertoire*

If mutual engagement is the act of students participating in a Community of Practice together, then shared repertoire can be seen as the impact of mutual engagement. In this section, the discussion shifts from a focus on the learning environment and authentic activities to the interpersonal aspects of a CoP and how participants affect each other. When a CoP is created or maintained, students work together closely and develop a shared repertoire. Students negotiate approaches to inter-communication, develop shared ways of doing/concepts, and find or create common tools and artifacts.

Relating back to this author's content area, McLauchlan (2001) investigates collaborative creativity in a high school drama class by asking the questions: What factors enhance the capacity of creative collaboration in a classroom setting? What are the educational benefits of collaborative creativity in a performance-oriented drama course? This qualitative observational/situational case study examines behaviors and reflections of 6 students who interacted with an ongoing group in order to provide a depth of perception. Research took place in a drama class in a large high school in a semi-rural community. The researcher was also the teacher and head of the drama department. The children's theatre course was split into 3 units: scriptwriting (through decision making process, improvisations, peer coaching and editing sessions resulting in creation of 60 minute work), readying a play for performance (character analysis and rehearsal, production in which each student assumed a variety of roles on a weekly rotation basis), and finally a performance tour of district schools.<sup>5</sup>

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<sup>5</sup> In 6 weeks 3000 spectators viewed the production – students completed weekly assessment sheets regarding growth.

Data collected included: daily observations recorded anecdotally in log format, student journals, written assignments, peer and self evaluations. Researcher conducted first interview (1-2 hours each); second was led by student teacher. Questions were developed based on interpretive analysis of observations. Data was coded and categorized. The evaluation of this data informed the content of the second interviews. McLaughlan chose a student teacher as the interviewer so as to minimize the effects of her presence on the students' ability to answer candidly. After interviews were analyzed, they were followed by an audio taped forum discussion led by a drama expert. The researcher did not attend the session for same reasons listed above. Eisner's notion of "educational criticism": description, interpretation, evaluation, and thematics were used in over 150 hours of data analysis with students.

A purposive selection of criterion-based sampling was chosen to span the major attributes of the 22 member class of third year (multiple grades – age 15-19) drama students in a children's theatre course. Almost the entire school population is white and proceeds to post-secondary institutions. Factors taken into account were age, academic ability, previous theatrical experience, and future educational or career goals. Danielle was the least experienced and a junior with hopes to study child development at the community college. Donna, 15, was the youngest and most accomplished in theatrical ability – a sophomore with plans to study drama or English in University. John was an academically gifted senior with considerable theatrical experience who planned on studying science in college. Josh was a class clown with five years experience and plans to be join the entertainment industry. Kelly was a relatively inexperienced junior with

plans to study social work in community college. Rod was identified as dyslexic and had goals to work with delinquent youth.

Factors affecting a collaborative culture included: teacher assignment of group tasks; balancing student freedom with teacher-imposed structure; support but not avoidance in face of student conflict – agreement on common goals, teacher as mediator, embracing both discord and harmony, competition encouraged excellence, direct teacher intervention; and routine stages in collaborative process – brainstorming, synthesis, reflective evaluation, rehearsed improvisation, and refining the evolving product.

This resulted in the following outcomes: shared point of departure (in experience and expectations), a work environment with a strong work ethic and an atmosphere of acceptance and tolerance, a high energy level, a focus on cooperation, student engagement, a sense of intrinsic rewards and accomplishment, varying levels of commitment sometimes leading to conflict, experiences of frustration and stress (that accompanies joint commitment to excellence and fuels conflict and anxiety), collective identity, peer interdependence to shared accountability, peer respect, student creation of class rituals and rules. As the researcher was also the existing instructor, McLaughlan (2001) knew the community very well and adequately acknowledged the limitations in terms of contextual factors. Consequently this was a prolonged substantial engagement with persistent observation, progressive subjectivity, and member checks making this a relatively credible study. Thick description of sample indicates it may be transferable. The researcher not only offers beneficial outcomes of this curriculum, but some negative results as well. She is not necessarily trying to sell the reader on the method, but to inform the reader.

Unfortunately, this closeness can also result in biases and perhaps difficulty examining from the outside. Though the researcher accounted for representing the array of differences in her class within the sample she choose, the school at large is rather homogenous with no mention of peer debriefing, negative case analysis and so the study is not generalizable.

Collaborative Creativity is one example of situated learning in a drama classroom with beneficial outcomes that create an environment that will encourage students to take on or further develop their identities as theatre artists. None of the students were newcomers, all had at least 2 years of theatre studies – and so cannot apply to the idea of mixed levels in a class in terms of newcomers. This is an all white class. Given Taylor's (2008) study on the impact of agency and capital on student continuation one wonders how a minority student would have done in this scenario.

Without generalizability this study cannot stand on its own, however with other case studies it can strongly support the idea that students collaborating in a Community of Practice develop their own ways of addressing conflict and creating product(ion)s together. While McLaughlan's (2001) study centered on students who were developing their shared repertoire, Pitri's (2004) case study focused on the norms and intercommunication of an established group of cub-scouts (N = 15, aged 7-10) when exposed to situated art lessons. The author taught weekly art lessons to a group of elementary school students in Cyprus and through action research collected observations of their intercommunication, negotiation and learning patterns.

These boys already knew each other and had a tight-knit bond with established rules of conduct when Pitri (2004) introduced the situated lessons. He approached the

boys and found they had an interest in the Olympic Games that were going on at the time. This was more an observation of existing intercommunication when a community is introduced to a practice or goal. By continually providing opportunities for students to share their funds of knowledge through discussion and sharing of home artifacts, Pitri facilitated the design of each lesson based on the desires of this small community. Through focusing on the learning context, Pitri not only invited the worlds of his students in, but also went out into their communities with them, making art all the while.

This is another case study that cannot stand on its own, but shares a story. Gather enough stories and patterns emerge. Pitri's (2004) manuscript shares student dialogue that a teacher dreams of hearing. While the author does not share enough information about his methodology including sharing data with colleagues or participants and how data was analyzed, this is a piece of evidence in the argument that students within a developed Community of Practice when creating a shared repertoire are more respectful and inclusive of each other. The cub scouts never shot down any one's ideas and repeatedly created artwork that included an aspect of every idea discussed. Pitri describes many of the students' moments of metacognition (or thinking about their own thinking) on the process of collaboration.

Because the studies discussed in this subsection are excellent stories, but questionable in their transferability and generalizability, this section closes with a solid study conducted by the Barab and Hay team with Barnett and Squire (2001). Barab et al. trace the emergence of common understandings and artifacts within a technology rich, inquiry-based, collaborative, participatory learning environment with a particular emphasis on student – resource interaction, but also student – student as well as student -

teacher. Through a network methodology, the researchers track the historical development of learner practices in a one week camp where the goal was for students to create virtual worlds in small groups.

A total of 18 high school students (male (N = 14), female (N = 4)) from 15 different schools attended a week long intensive summer camp on an urban university campus. Students used Virtual Reality (VR) tools to design a VR world to be used by middle school students in the future. This study focuses on two of the three student group projects: designing a virtual theatre (N = 5, all male), and a virtual solar system (male (N = 4), female (N = 1)). For five days student groups worked with one technology teacher and one education teacher for 3 hours in the morning, lunched together, and working another 4 hours in the afternoon. On the sixth day students presented their projects to students family members, teachers, university personnel, and welcomed interested community members through some poster publicity. Students had a clear deadline and goal to work towards.

Qualitative data collected through naturalistic inquiry was used to get a overall view of the Virtual Reality camp. The outside evaluator, Barab, kept field notes that were debriefed nightly with the participant observer, Hay (who was also the camp director,) as well as conducting interviews with students and instructors. Four video cameras collected footage the entire course of the camp. Barab et al. (2001) collected data that documented resources and practices, captured discussions, documented student project progress, followed processes, students, and artifacts over time with a grounded theory approach.

Two researchers joined the team in coding the data and “constructing networks of action-relevant episodes” (Barab et al., 2001, p. 60). Nodes were identified and category types created using Glaser’s constant-comparison method. With an overall 80% agreement between coders, analysis should be considered significantly consistent. A thick description of several examples of tracers over the course of the five days precedes the cross-case comparison.

Several interesting patterns emerged in relation to student shared repertoire. The theatre group gained more creative designer skills in their freedom to generate the ideas and plan together in contrast with the solar system group who had the constraints of instructor expectation to get the astronomy and mathematics correct. One could argue that the solar system group may have developed better mathematics skills as a result, but on the contrary, the theatre group still had to use most of the same mathematical operations in the Virtual Reality they designed. The theatre group still operated within constraints. The authors’ discussion of reproduction versus creation reminds educators to give students opportunities for creative generative processes. Both procedural and conceptual knowledge serve their place in legitimate peripheral participation, as modeling will generally be followed by imitation; but every apprentice will eventually become the master, hence the designer, eventually.

Barab et al., (2001) suggest that the theatre group process was a more legitimate case of situated learning. The instructors for the solar system group were described as imposing their expectations of what the project should look like. They operated as disseminators more than as facilitators and initiators. In the theatre group over 90% of the nodes were initiated by students while only 56% were initiated by students in the solar

system group. Also interesting in terms of identity formation is that students in the theatre group got to try on multiple identities in playing the director, the technical director, the costumer, etc. Ultimately, the theatre students were more engaged and more successful in their interpersonal group dynamics and well as in their presentation. The conclusion offered by Barab et al., purports that it is the more authentic context that makes communication and the creation of group norms and artifacts possible. The authors exhibit a clear bias for learning-through-design.

The corpus of data is exhaustive and widely varied. Of all qualitative analyses presented in this paper, it is the work of Barab and Hay (2001, 2002) that takes codification and systems theory to an impressive level. Still it is difficult to take essentially a case study and make it transferable and generalizable, but Barab et al. perform extensive member checks, triangulation, and peer debriefing making the results very strong.

Barab et al.'s (2001) work provides support for other case studies that also attempt to prove that students in an authentic environment when given a common goal and allowed to bring in their own funds of knowledge to solve a problem or create, are more engaged and motivated to learn. This leads to the development of interpersonal, communication, and conflict-resolution skills as they navigate their Community of Practice as well as an invitation to try on a new hat, whether it is the hat of a social worker, an artist, or a writer. This section outlined the overall student experience in a CoP. Overwhelmingly it is in truly situated environments that students perceive their own increased self-efficacy and engagement as a student and often as the identity presented in the content area course. This author would like to suggest that it is due to these increases

that we see significant statistical increase in actual ability. In *The Art of Changing the Brain*, Zull (2002) describes how the amygdale or emotional center of the brain makes it so that learners have greater facility in acquiring new knowledge when in a safe environment. Safe environment is mentioned in much of the literature, but not thoroughly defined. It is safe to assume that students feeling like they can succeed and curricula that is inviting to their other identities and considerate of overlapping communities are necessary ingredients to a safe classroom environment.

#### Role of the Teacher: Modeling, Coaching and Scaffolding

If an educator wants to create a classroom community of practice, she will find herself in different roles than in a typical traditional classroom. The first section of this paper outlines what a CoP looks like as well as how students are impacted. So what should the educator take from this? This section outlines what teaching in a CoP looks like. The first subsection investigates the notion that teachers must be practicing experts in their field. For teachers who want to teach about a topic on which they have not developed an expertise, inviting experts in as visiting teachers is beneficial to the authenticity of the classroom practice. This connects to another role: teacher as a facilitator and guide who coaches students through their individualized development process. This requires purposefully designed scaffolding on the part of the teacher. When students are assisted with the support beams of learning, they can build amazing structures on their own.

#### *Teachers as Experts and Experts as Teachers*

In any apprenticeship, a student learns not only through the social interactions with members of the community of practice, but by observing and interacting with a

master of whatever trade or craft he is learning. Teachers who consider themselves artists often encounter the old adage “Those who can do, those who can’t teach.”

Apprenticeship theory counters this argument with the insistence that teacher must be able to do, must regularly do, and must model doing for their students. Beginning with Silverman’s (2006) survey of emerging teaching artists, this section discusses how teachers see their role as experts, following up with the impact of teachers as experts on students.

In a Northeastern U.S. university, the researcher Silverman (2006) taught a course to educators entitled: Educators as Artists intended for practicing teachers to reclaim their artistic identities. Through his interviews Silverman expresses his bias in the first paragraph. He wrote “Now, in the humble position of working with current and future classroom teachers, I want to instill in them the belief that artist and teacher are not mutually exclusive, and that they give strength to each other” (p. 26). Teachers (N = 26) gathered as students for his class for four hour meetings, once per week from late May through the end of July. The teachers make an artistic plan, share works-in-progress for critique regularly, culminating in performances and/or exhibits at the close of the course.

Data collected included weekly journals, participant observer field notes, classroom discussion, and artistic artifacts. Exceptionally weak in transparency, Silverman does not outline any attempts at peer review or member checks nor does he share descriptions of the participants beyond their career as teachers of the arts. This is a descriptive survey to provide a bigger picture of teachers as artists and the concerns that are related to the dual identity. This article is used here as an opening discussion of teacher attitudes about their own identities as professional artists.

One concern that popped up repetitively for the teachers is the feeling of a lack of time to be creative. With 150 students and all the imposed accountability structures, how can a teacher find time to be an artist as well? Silverman through sharing transcripts and journals exhibits how teachers developed new habits and “harnessed time” to make space for their artistic practice. With the call for research-based practitioners, educators often neglect that this research must include what it is to be a person in practice in the field or content area one wishes to teach students.

Teachers in Silverman’s (2006) course also struggled with the pressure of critique: a standard educational process for all post-secondary art programs and increasing in popularity in secondary schools. How can a teacher intimately know the creative process in which she asks students to be vulnerable without being creative herself? Many of the teachers voiced their difficulty and insecurity in sharing their work. It is easy to forget how intense sharing work for critique can be without putting the self through the same process.

Studying the impact of teaching artists on piano apprentices in a Danish music academy, Nielsen (2006) uses interview material and participant observation to describe how students learn by imitation of their master/teacher. While Nielsen also focuses on student performance in addition to teacher modeling, for this section the discussion will emphasize his results in terms of the teacher role as it is indeed the center of Nielsen’s work as apprenticeships look different in Scandinavia than in Anglo-Saxon countries. He writes “In Anglo-Saxon countries, focus is placed on how the apprentices learn from being part of a community of practice. However, in Scandinavia apprenticeship can be

translated as ‘master learning’ and focus is placed on how the apprentice learns from working with the master” (2006, p. 3).

As a pianist and follower of the career of one of the apprentices, Nielsen was already introduced to the transparent musical culture at the Academy of Music in Aarhus. At the time of the study the academy had approximately 240 students and 35 teachers which Nielsen observed lessons, concerts, master classes, and exams in addition to conducting 16 semi-structured interviews with students and teachers (female students (N = 7), male students (N = 7), one male teacher, and one female teacher.) The teacher interviewees volunteered while the students were purposely selected to provide for varying levels in the apprenticeship process (newcomer vs. old-timer.) The average length of interviews was 90 minutes and research questions centered on learning, social context, knowledge, identity, teaching, practicing, performing, evaluation, and career. Transcripts were verbatim and analyzed.

Apprentices spoke of how inspiring it was to have a master teacher who was actively a concert pianist. Students agreed that the academy provided an authentic apprenticeship with master teachers who modeled the career they were striving to enter. Students also found great value in the requirement to attend formal concerts of both their teachers and other professionals in order to model the identity they were working towards achieving. It is through modeling master that students found new ideas and approaches that they were eager to add to their own repertoire.

Nielsen (2006) points out the controversy in the role of imitation in education. He writes “There has been a tendency to understand imitation as a mechanical activity with an idea of ‘taking over’ knowledge unproblematic from one person to another” (p. 7). In

the music academy and in many apprenticeships, is through imitation that teachers can coach a student's performance. It is through the student's reconstruction of particular practices and performances that he constructs something new, selecting and integrating that which he determines valuable into his own performance.

One interesting result of modeling Nielsen (2006) observes is that students of a particular master will emulate their teacher. According to one apprentice,

I was talking to somebody yesterday about looking at students in the corridors. You can almost pinpoint who the teacher is, you can see it when you know the student. The same goes for their way of playing, you can hear it – that it is somebody's pupil, they have certain characteristics, a little trivial thing but Otfried's pupils all sit very still on the piano bench in comparison to Victor's pupils, they move around much more. (p. 9)

Imitation includes not only a the conscious learning of new skills, a way of relating to the content area, but also the subconscious act of taking on non-music related habits of the master with whom a student works closely. This suggests that the teacher/master must be conscious of what identity as a master they are presenting to the student.

Nielsen's (2006) study speaks to the student's development of professional identity when working with a master, but does not measure the acquisition of skills within such an environment. Moving away from the arts where it may be more difficult to subjectively measure such advances, Handler (2006) investigated the effectiveness of skill acquisition and perceived ability of students when working with expert scientists. In a five-day research immersion study, high school students (N = 45) studied hammerhead sharks in Oahu, Hawaii. Four cohorts were observed in the summer of 2002 and consisted of 8-12 students from grades 9-12 recruited from local high schools on Oahu. While there is no demographic breakdown, Handler states that in selection of the applicants there was

representation of private and public school students, various ethnic and socioeconomic backgrounds as well as genders.

Students worked with professional marine biologists by collecting life history data on young hammerhead sharks including catching them to sex, measure, weigh, tag, and investigate umbilical scarring in order to determine age. In addition to recording daily weather water column depth and GPA readings, students were responsible for preparing the boats for use, setting up equipment, and cleaning the boats.

Surveys were administered to the students to assess what concepts and skills they gained through the program. A paired 5-point t-test determined the change in content knowledge before and after the program. In the pretest students reported they knew .55 (plus/minus SD .887) of the seven skills surveyed well enough to teach the skill. The posttest revealed a significant difference of 4.05 (plus/minus SD 2.605). All categories displayed a positive percentage change with an average of 65-70%. In order to control for inaccuracies of student self-assessment and to assess long-term retention of skills, nine participants returned several months later to teach at a science teacher's workshop. Professional science teachers assessed the students' ability to understand and teach skills as well as the student's self-evaluation. The blind matching corroboration of 79% on both the teacher and the student evaluation suggests that students were indeed capable of accurate self-evaluation and even more significantly, retained the skills learned in the program after several months well enough to teach it, a result difficult to find in a public school science classroom.

Two studies by Barab and Hay (2001) examine another participatory science learning summer camp. As the publication year is the same, this author will distinguish

between the two by name order. The second study bills Hay first then Barab and so will be cited as such: Hay and Barab (2001) The first presented here was referenced in quite a few other studies and provides an overview of the Scientists Apprenticeship Camp (SAC). In this two week long camp middle school students ( $N = 24$ ) were engaged in 'real' research in small groups of four students, one 'real' practicing scientist, and one science teacher. The focus of this study is to determine a set of characteristics for evaluating other participatory science learning environments. Additionally Barab and Hay describe how science teachers support 'reflection-in-practice' and 'reflection-on-practice'. It is certainly interesting to see the terminology of 'real scientist' vs. science teacher. For the sake of this manuscript the concentration will be on the impact of the 'real scientist'. Can a teacher fulfill both of these roles?

Naturalistic data was collected by an evaluator who was present for all 10 days and the final presentation day. In addition to evaluator collected data, two other researchers also videotaped learners, conducted interviews, and collected field notes. The researchers admit that their hypotheses were not solely determined by the data collected, thus not truly naturalistic research; however their work does meet the requirements of Glaser's constant comparison model. Researchers met daily to discuss data collected and data was heavily triangulated providing credibility.

Participants were of varying academic ability and came from a variety of socioeconomic backgrounds. Eleven girls and 13 boys came from 13 different schools. No information is provided regarding ethnic and racial demographics. Participants wrote an essay describing which research group they wanted to participate in and why. Selection was purposeful rather than random which seems to be somewhat a strength and

somewhat a weakness in the nature of the studies on situated learning. Six middle school teachers (3 male, 3 female) were selected through resume submission and/or relationship with the researchers. All had at least five years experience teaching. Six scientists (1 female, 5 male) agreed to participate based on a letter sent by their academic dean.

There were six different research contexts though Barab and Hay (2001) only outline the four groups with the most complete datasets: methamphetamine, insecticide, sonar, and laser. Students spent 2 hours each day working directly with scientists in a university laboratory. Extensive time was spent readying the students before and debriefing after their time with the scientists. Students were not set up with 'educational' laboratory investigations, but instead were assisting scientists in completing their existing research. Students took pictures, collected notes, participated in discussion with scientists, teachers, and peers, carried out laboratory practices within the restrictions of liability (i.e. students in the methamphetamine group would not actually inject the drug into rats,) and collected data which they eventually submitted for analyses. Using their electronic apprenticeship notebook, students would input data and communicate with scientists in order to organize a presentation of findings for the final day of the camp.

One limitation outlined by the author is that the scientists served as representative of the scientific community, but there was a lack of presence in the scientific community at large. In a true apprenticeship, the learner's Community of Practice would be embedded in the CoP of practicing scientists. This was evident in the final presentations as they were generated for the camp audience and came off as not quite authentic. Perhaps, this would look different if the audience had included more members of the scientific community outside of the 6 camp scientists. This brings up an

interesting dilemma as it implies that one teacher expert is not sufficient for representing that the classroom CoP lies within the professional content-area CoP. Differences in constructionist and apprenticeship learning are further outlined in the Hay and Barab (2001) but this study critiques the presentation part of the SAC as an inherently constructionist form (theory that poses that students learn the most when creating a concrete object in the real world) of assessment rather than those seen in an apprenticeship. This leaves one to wonder: can there be assessment in a true apprenticeship? Students even communicated that the presentations felt inauthentic and that "...these presentations aren't real...they are like school" (Barab & Hay, 2001, p. 92). Once the scientists verbalized the importance of the presentations and that they were counting on them, students' perceptions of the presentations shifted.

Barab and Hay (2001) found that the students continually participated in rich discussion leading to social construction of scientific knowledge. In one example the students come across an error in their data and a conversation takes place with the scientist on how professionals negotiate and document this. In contrast, in a typical science classroom, inaccuracies would be blamed on student error, when in reality, scientists deal with this issue regularly in their professional Community of Practice. Students came to a new understanding about the value and treatment of mistakes in the laboratory.

Scientists and their graduate assistants did the scientific practices alongside the students, though they also participated in some coaching activities (i.e., reminding students to document information and asking some guiding questions). While there was an emphasis on imitation as students aided scientists in their actual experimental

research, this instilled students with a feeling of importance and accountability. In general students viewed their own work as authentic and valuable and themselves as legitimate participants in the Community of Practice of scientists. Scientists likewise valued the contributions of the participants and in fact one was invited for an internship with a scientist in the upcoming year.

Another limitation as far as students actually becoming part of the scientific community lies in the time restriction. Only so much progress can be made in a two week apprenticeship, no matter how intensive. Interviews indicated that students did not feel like true members of a scientific Community of Practice, but that this experience would most likely impact their choices in the future in regards to academic and career choices. While this represents a challenge for those organizing short-term summer camps, there is promise in this result for school teachers. With an entire semester or academic year to work with students, the likelihood of true induction in a CoP is more likely. Without migration to core participant, the Scientists Apprenticeship Camp cannot be considered a true apprenticeship, though they did make strides in progressing from legitimate peripheral participant towards core participation.

Despite some weaknesses as a full apprenticeship, the Scientists Apprenticeship Camp was compared and contrasted as an example of apprenticeship to another summer camp representing a constructionist learning environment in Hay and Barab's second (2001) study. The goal in this study was to move away from comparing constructivist and traditional learning environments, with a shift to comparing the various theoretical frameworks that fall within constructivist practices. Hay and Barab discussed the distinctions and similarities between the Scientists Apprenticeship Camp as outlined

earlier, and Future Camp 97 centering on issues of power, ownership, authenticity, and task structure.

For Future Camp 97 Hay and Barab (2001) collected both naturalistic and quantitative data. Two cameras for each of the three groups recorded data. Two researchers: one designer/participant observer, and one simply observing met daily to discuss data including the video tapes, student generated documents, interviews and field notes. Future Camp 97 lasted for one week (in contrast with the 2 weeks of the Scientists Apprenticeship Camp). High school students (N = 18) worked in three groups of six. Though not named in the study by Barab et al., (2001) this author is making the assumption due to exceptional similarities that the Future Camp 97 is the same camp as described in the earlier critique of the Virtual Reality camp where students designed a Virtual Reality solar system and a Virtual Reality theatre. Demographics of students are not provided in this study, but can be reviewed in the data provided for Barab et al. (2001). For the focus of this study, Hay and Barab (2001) discuss only the solar system group, though there is mention of the theatre group.<sup>6</sup>

It is interesting that Hay and Barab (2001) chose to focus on the solar system group as a representative of constructionist learning environments as in Barab et al. (2001) they critique the solar system group as being more replicative than generative than the theatre group, where in this study they label the solar system group as generative and the Scientists Apprenticeship Camp as replicative. On a continuum the Future Camp 97 solar system group had more opportunity for creative construction and emergent practices than the apprentices of the Scientists Apprenticeship Camp, but perhaps the researchers wanted to compare two types of science learning which was not as inherent in Virtual

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<sup>6</sup> Please see the prior critique for discussion of participants and methodology in studying the SAC.

Reality world created by the theatre group. While the solar system group had an instructor with expectations of what the Virtual Reality world would look like, students still had to solve programming problems for the most part on their own.

Critique of Future Camp 97 included that it was not a Community of Practice and did not connect with any CoP outside of the camp (i.e., astronomers, 3-D animators, VRML experts, etc). There are however benefits in a learner-controlled activity group. Hay and Barab (2001) state, “Effective participation in the real world is the general goal of all education. Community of Practice represents a specific construct for the goal of education” (p. 292). Future Camp 97 participated in an activity group, but not a Community of Practice, lacking authenticity. They go on to say, “In a very real way, the [Future Camp 97] camp participants were a world unto themselves, cleaved on meaningful relations with the authentic community” (p. 293). However, systems of accountability are inherent in both an activity group and a CoP.

As discussed earlier, there was great similarity in the culminating presentation with the Scientists Apprenticeship Camp leaning more towards constructivist practices instead of those of an apprenticeship. While participants completed quality presentations Barab and Hay (2001) found that the project’s probability of success was much higher for Scientists Apprenticeship Camp participants. Future Camp 97 students had to rely on new tools, student control, and emergent practices and had difficulties completing their project as they had developed some ineffectual practices as a learner-controlled activity group. This speaks to the importance of an expert as model and beginning with imitative practices before those involving design. While student controlled generative projects are

an important aspect in situated learning it is only once they have begun the migration to core roles that this is to be applied in a learning environment.

In order to compare what students learned, Hay and Barab (2001) administered pre and post t-tests to campers at both the Scientists Apprenticeship Camp and Future Camp 97. The solar system group improved in their knowledge over the course of the camp ( $t(3) = 5.05, p < .05$ ) in the following areas: comprehension and construction of scale models, size and distance of planets and astronomical phenomena, though when asked to draw scale models of the solar system, only one could accurately depict scale. Though not complete (understanding given only a week to work) the final project was overall accurate and successful. A t-test of the Scientists Apprenticeship Camp group exhibited successful learning as well ( $t(20) = 2.73, p < .011$ ) It is important to note that while some knowledge for Future Camp 97 participants came from instructor lecture, there were no lectures in the Scientists Apprenticeship Camp. The final presentations were considered of higher quality in comparison with the Future Camp 97 presentation. Scientists Apprenticeship Camp students did not exhibit an increase in their application of the scientific method ( $t(20) = 1.88, p < .05$ ). Hay and Barab hypothesize that this is due to the fact that problems and procedures were defined by the scientists rather than the students.

There were different kinds of learning taking place in the camps. This comparison and contrast study shows strengths in both constructionist and apprenticeship learning environments. In application in a school year classroom, one can safely assume that it would be most effective to offer students a situated Community of Practice environment first so that they may feel authenticity and understand a discourse before

asking them to participate in generative practices. An exception can be seen in the research of Bottge et al., (2006) with students with emotional and/or behavioral disorders who respond better to the access to student control and power that is part of generative activities.

### *Scaffolding*

As seen in the behavior of the scientists in Barab and Hay's (2001) research on the Scientists Apprenticeship Camp and Taylor's (2008) work with carpentry apprentices, a Master fulfills several roles for the newcomer. The previous section discusses teacher as expert, but research shows that an effective master will also provide coaching for her apprentices. Modeling what it is to be a professional in practice is simply not enough. In order to facilitate student learning in a Community of Practice, instructors must also consider what support each student needs in order to grow. By providing a framework, or a scaffold, students can more easily socially construct knowledge in a CoP. In the Hay and Barab's (2001) comparative study students in the constructivist learning environment were not as successful due primarily to lack of scaffolding. Sticking with the construction metaphor, in a CoP teachers do not build the house for the student, nor do they really give the blueprints of what the house should look like, but instead provide basic support especially in learning how to use building tools. Eventually scaffolding is followed by a gradual release of responsibility on the part of the instructor as she fades out, allowing the student to migrate towards more central roles in the CoP. Following are discussions on scaffolding and fading closing out this section on the teacher's role in a Community of Practice.

In Owens' (2008) study on math identity, the question is presented: In what ways do pre-service teachers develop their identities as mathematical thinkers? This qualitative study incorporates aspects of grounded theory, but is really participant observation. Students were observed in their semester-long basic mathematics course in a teacher education program (by one of their lecturers). The pedagogy of the classroom leaned toward a constructivist approach with an emphasis on real-life problem-solving through community projects. Data collected included: descriptions of class activities, records of assignments, topics, observations, and anonymous self-reports provided mid-way through the semester. Reflection on this data and data collected in earlier study was used by researcher to develop a theoretical framework on identity formation.

The students (N = 49) were enrolled in first year primary teacher education degree. Many were "mature aged" and brought a wide array of backgrounds, experiences and confidences in doing mathematics. Participants were informed they were taking part in this study and the final self report evaluation was voluntary.

Owens (2008) research suggests that identity formation is dependent on scaffolding in becoming a self-regulated learner. In the cognitive sense this is achieved through a series of classroom experiences focused on problem solving and in particular choosing their own community problems to solve. Being given choice, students develop skills in goal-setting and planning. Students also completed self-evaluations and revised their plans. Vygotsky's theories on more capable peers were heavily utilized in structuring the learning environment and provided social assistance. Becoming a self-regulated learner meant providing realistic environments for active learning encouraging students to: determine what they need to learn, manage their own learning activities,

contribute to each other's learning, and develop a metacognitive awareness. The researcher suggests that in order for meaningful learning to take place it is important to: connect to prior knowledge, provide multiple ways to learn the content, use activities to promote higher level thinking, encourage the review of multiple perspectives, encourage creative and flexible problem solving, and provide a mechanism for students to present their learning.

Facilitating the creation a community where students feel safe to share their problems and triumphs with each other is integral as well. Sometimes students needed to be shown by an instructor, but many times they taught each other. Students needed to be able to have some success in order to develop confidence. These are the practices that led to all students taking on the identity as a mathematical thinker and teacher.

For this kind of qualitative study the sample size is decent and Owens (2008) participated in a prolonged substantial engagement and persistent observation. Though the researcher was also the lecturer, this fact could be considered a benefit as it provided a more keen insight to the context of the data collected. The theory presented by the researcher on the process of identity formation however presented a well-developed synthesis of other literature and studies examined. Unfortunately, there is no mention of peer debriefing or member checks and a lack of negative case analysis and progressive subjectivity. The researcher exhibited a clear bias for the type of constructivist curricula she utilized and possibly sought only to prove its effectiveness, failing to state any of its faults, or concessions. While this appeared to be a grounded theory study it failed to follow the nomenclature of such studies. Owens did not supply information regarding the coding or analysis of data, in fact did not speak of coding methodology or of using

coding at all in collecting data which is fundamental in the beginning stages of a grounded theory study. The researcher appears to be biased by pre-research examination of literature. The researcher was a lecturer in the program and so a peer and not an external evaluator – being more than an observer in a grounded theory study is undesirable.

Overall, this study is heavy on the outcome/theory and light on the process to getting there. There was only one survey completed on a voluntary basis by some of the students and it was in the middle of the semester – no mention of how many students completed the survey. The researcher presents biased research that her teaching methods were effective. Given that many other research studies back up these findings, one can infer that a socio-cultural/constructivist approach is conducive to positive results in encouraging students to take on content area identities. It is important to have a balance in utilizing an expert instructor and learning with and from peers. Identity is fluid and socially constructed. Choice and projects are integral to drawing students into participation in a Community of Practice.

While there were significant weaknesses in this study, the idea it purports is supported by the thorough work of Barab and Hay (2001): that without teacher scaffolding a student will fail to develop a content-area identity. For instance, students in Future Camp 97 did not have enough instructor support to properly learn the tools being used and so were unsuccessful in not only successfully learning the material, but also in assuming identities as part of a larger Virtual Reality Community of Practice.

Without proper scaffolding students, failure in content-area identity formation will ultimately result in a students' failure in terms of role migration. In a mixed

methodology study Choo (2007) investigates: what the experiences and learning outcomes of students are when presented with an activity-based learning environment and what the experiences of lecturers are upon implementing an activity-based learning curriculum. Quantitative and qualitative analysis of student survey findings as well as qualitative analysis of lecturer interview data informs Choo's findings.

Six classes of one module (Career Development and Planning) pursuing the National ITE Certificate (Nitec) underwent curricula changes from a lecture-based program to an activity-based program. Two lecturers were trained in how to administer the curricula to students. A third lecturer taught another class in the standard curriculum as a control. Class observations conducted during the first activity-based class to ensure lecturers had been trained properly to administer the new curriculum and corrections were made accordingly. Both surveys and interviews were conducted at the end of the school term.

Surveys were conducted online, created with a five-point Likert scale and open-ended questions about the students' learning experiences. The students' participation in the survey was voluntary and anonymous. Test scores of assignments throughout the course were compared between the control group and those participating in the new curriculum using a t-test.

A convenience sample of second year Nitec students was used. Of the six classes participating in the activity-based curriculum 82% were male and 67.7% were between the ages 18-19. These are the only aspects of demographics mentioned in the study. These students had been up to this point in a lecture based learning environment. The two lecturers chosen were veteran teachers trained for a half a day on the new curriculum

2 weeks prior to the course began, which proves eventually to be insufficient for lecturers to take on their own identity shift as facilitators in an activity-based learning environment. No other information was presented on lecturers demographics.

Results of the online surveys revealed the following: more than 90% of participants showed a greater interest in learning the material and were confident working with their peers, more than 80% reported an ability to think more deeply about the topic, ability to participate more actively in the learning, and an ability to learn more independently. Among many other results the overall result of survey demonstrated that over 90% agreed that they enjoyed learning through the activity-based approach more than the lecture environment. Ninety two percent reported that group work made them want to learn more. Students also communicated an insufficient time allotted for activity-based approach suggesting the duration of lesson be extended so they could “learn from their peers” with more time for short breaks.

Test results revealed students exposed to activity-based approach scored significantly higher. Lecturer interviews revealed feelings of inadequacy. Instructors complained of the following: planning is time-consuming, class size should be reduced, new curriculum requires more time than allotted, and lecturers need more preparation. Although instructors report that students were more conscious of their own learning and more independent, it is significant that a lack in scaffolding in teaching the lecturers how to shift their own identities away from being lecturers resulted in a deficiency in scaffolding for their students as well.

Choo (2007) addressed both student and instructor experience of activity-based learning and included control groups. Participants in new curriculum were second year

and so had experienced the standard curriculum and were better informed to make a comparison. Again, the nature of this topic lent to the weakness of utilizing a convenience sample. The control group data was not presented in regards to attitudinal reactions to curriculum – were they surveyed too? As far as the test-results “students who used the activity-based learning packages scored significantly higher (67.3 +/- 11.3) than those who used conventional method (61.7 +/- 2.4)” (Choo, 2007, p. 201).

The introduction to this study described activity-based learning as the most important aspect of providing a situated learning approach. Aspects included the use of Vygotskian more capable peers and scaffolding and the use of a virtual environment relevant to the desired learning outcome. Suggestions for improving the effectiveness of scaffolding in this activity-based learning environment included: small class size, properly trained instructors, more time built into curriculum.

While one could safely infer that students found this method more enjoyable and engaging (as the treatment group was in itself to a certain extent a control group as they could compare this experience to prior experience), one cannot infer that activity-based learning is more effective as the data from the test scores is spurious. Other studies mention focus of situated learning is an activity-based curriculum. It need not be an apprenticeship in professional context to be considered situated learning – but can be a carefully contextually designed virtual environment, as long as teachers provide the necessary scaffolding to their students.

How can a teacher determine if the scaffolding she has designed is effective? In a study of undergraduate scientific reading and writing course, Kolikant, Gatchell, Hirsch, and Linsenmeier (2006) look at just that. Through the administration of pre and post

assignment surveys and analysis of students' writing assignment scoring on a detailed rubric, Kolikant et al., take an approach lacking in many classrooms. While this study is looking specifically at how they can improve the scaffolding for this particular course, it outlines the type of research all teachers should be investigating in their own classrooms. Of the 42 students enrolled in this junior-level animal physiology course, 24 participated in survey sessions and 22 evaluated papers were analyzed to locate common difficulties in addition to instructor-generated guiding documents. This was the first opportunity for 63% of students to be in a class with an enrollment size small enough to allow for a significant writing assignment.

The writing assignment was to identify one animal characteristic (i.e., infrared sensation, hibernation) to examine in a scientific literature review. The instructor split the anticipated work into manageable tasks and provided scaffolding for each task in the form of posted documents and focused discussion. Kolikant et al., (2006) describe this cognitive apprenticeship approach as consisting of the following steps: modeling, coaching, student articulation, reflection, and exploration.

Surveys administered tracked student perceived understanding and importance of the tasks and concepts required for this assignment. Measured on a four point Likert-like scale, the results displayed which scaffolding was effective and which could use some improvement. When compared with the instructor's assessment of the same tasks and concepts outlined in the evaluative rubric of the final paper an interesting pattern emerges in relation to student motivation. Those items students scored as low in importance of usefulness in students' post-academic career were the evaluative criteria where most students lost points. For example, students viewed analysis and synthesis of a topic as

important to professional scientists and so scored high marks while they perceived analysis of the scientific literature as inauthentic and invalid. Consequently 82% of students lost credit on that section of the rubric. Kolikant et al., (2006) reminded us that this student perception is a fallacy, that understanding and composing scientific writing is the cornerstone of professional science and that not only does the scaffolding regarding this notion need some work, but perhaps the authenticity of the assignment is in question.

There was, unfortunately, a lack of information regarding member checks and peer debriefing, although some triangulation existed as several different types of data were analyzed. Because a lack of credibility and validity, this study is not included to argue a point in regards to scaffolding. Instead, it rounds out this subsection as a reminder to educators to be research-based, reflective practitioners, regularly conducting research in order to determine the effectiveness of curricula. Allowing research to inform future decisions will allow the educator to provide the most effective scaffolding to her students.

### *Fading*

In the Scientists Apprenticeship Camp (SAC) studied by Barab et al., (2001) and Hay and Barab (2001), expert scientists served as masters who modeled and coached, but due to time constraints of the camp, the goal of an apprenticeship could not be reached – moving towards independent practice. It was hypothesized that the students made no advancements in terms of their ability to apply the scientific method because they had no input on empirical design and never moved from the imitative to the generative types of learning. In a study completed by Charney, Hmelo-Silver, Sofer, Neigeborn, Coletta, and Nemeroff (2007), a four week camp followed by projects that spanned the academic year offered an opportunity to view what that transition may look like. Imitation and

scaffolding in a situated learning environment will not bear results without teachers who can purposefully fade out their support, handing over the responsibility to the student. The Waksman Student Scholars Programme at Rutgers University provided an opportunity for students to work alongside practicing scientists and to eventually critique, design and implement their own research design with an authentic culminating presentation for assessment purposes.

Charney et al., (2007) explored to what extent students began to develop ways of thinking like a scientist when immersed in laboratory practices within a cognitive apprenticeship. Specifically, data analysis addressed not only the students' concepts of the nature of science, but also their ability to generate hypotheses, consider alternate hypotheses, implement models and argumentation in their explanations, connect ideas and raise questions in the science they observe.

Students from fifteen high schools throughout New Jersey (N = 30) applied and were selected to participate in the Waksman Student Scholars Programme (WSSP). The rising 10<sup>th</sup> and 12<sup>th</sup> grade students came from both urban and suburban areas and from varying socioeconomic statuses. Within the group, 12 were Caucasian, 9 East Indian, and 9 of Asian descent. Also, 13 were male and 17 were female. Though they were considered bright students, they did not necessarily academically sit at the top of their class. The four week camp component of the WSSP was attended Monday through Friday, 8:45 – 3:45. Students discussed central research issues in the morning with an expert scientist. There was also an original research aspect involving scientists mentoring students as they investigated the gene function in *C. elegans*. Seminars, discussions, and laboratory practice involved scientists modeling their thinking on a problem, coaching

students through verbal and written scaffolding, and allowing time for students' independent practice. During the academic year, six follow-up sessions with a final presentation took place.

Beliefs about the nature of science (through administration of a checklist and modified questionnaire) as well as conceptual knowledge were measured in a pre and post test. Student responses to the former were coded based on epistemological sophistication on a scale of one through three. Inter-rater reliability was found to be of 87% agreement. To determine advancements in conceptual knowledge students completed open-ended essay tests taken from the Advanced Placement biology questions. For the post-test, isomorphic versions of the questions were developed. Both attitudinal and conceptual post-tests were completed at the close of the summer session. Additionally, students completed daily journals, two of which were analyzed closely by the researchers, though all were considered.

In the introduction Charney et al., (2007) cited the work of Stake and Mares (2001) in that traditional science activities (purely imitative, where results are pre-determined) elicit no change in school-based beliefs on what science is. Gifted students exposed to enrichment programs with authentic empirical activities exhibited a significant shift. Charney et al., likewise chose two highly capable students to focus on in their study. This is an indicator of a recurring problem in public education. Gifted students are often the population that receives opportunities for enriched educational environments, as if they are the only students who would be able to comprehend or to benefit from such activities. As Bottge et al., (2006) argue Emotional/Behavioral Disordered students also benefited from enriched activity-based environments.

What is most significant here was the comparable success in student acquisition of authentic identities as scientists. What was lacking in the studies where students did not experience significant change was the aspect of fading. This author feels it is safe to infer that modeling and coaching will not elicit change without the eventual fading of the instructor so that the student may graduate into independent practice. Conversely, independent practice without preceding teacher scaffolding will also be unsuccessful at inviting a student into a legitimate and larger Community of Practice of the field in which he studies.

In a case study with a quantitative comparison aspect, Darabi (2005) described the principles of cognitive apprenticeship as it was applied in a graduate course on performance systems analysis. The focus of the study was to determine not only student success, but client (professional agencies with which the students situated their work) satisfaction, and most importantly, to look at the difference caused by a shift from traditional instruction to Cognitive Apprenticeship instruction. Darabi served as both the researcher and the instructor, an issue of reliability discussed earlier in this manuscript with the work of McLaughlan (2001). Darabi taught the course in its traditional form and administered student surveys ( $N = 28$ ) to evaluate the curriculum. After noticing the possibilities for application of Cognitive Apprenticeship theory, Darabi rewrote the existing syllabus, taught the revised syllabus in the following semester, and finally administered the same post-course survey to the second group of students ( $N = 12$ ).

While a description of the complex curricula for performance systems analysis would require more discussion than appropriate for this paper, the fading procedures as outlined by Darabi (2005) are quite helpful. In a gradual removal of support, Darabi

evaluated each student and diminished the number of emails, phone calls, meetings, and feedback sessions as each student became more self-sufficient as a performance systems analyst. Tasks evolved from simple to complex (which students noted in survey responses as developmentally appropriate) and meetings lost their initial intensity as they became simple reviews and occasionally problem-solving sessions. Instructor hand-holding during client interactions also disappeared entirely throughout the course as it became unnecessary.

Clients communicated satisfaction with their work with students and a willingness to continue the partnership in the future. Questionnaires illuminated a significant change in not only student learning (+27%), but in student perceived self-efficacy (+46%) interest and enjoyment of the course (+11%), rating of the instructor (good and above rating increased by 80%). Also there was a 38% increase in students who felt the course challenged them intellectually, which is certainly an important part of learning. The course organization also received higher marks: general (+84%), sequencing (+72%), direction outlined (+69%). Most substantial is the increase in students who said that the course contributed to their personal educational objectives (+67%). Unfortunately, as this was a college course, Darabi (2005) utilized a convenience sample of those who happened to enroll for both semesters. There is a serious deficiency in the information about the participant population which impacted the credibility of this study.

Despite its deficiencies as a credible study, Darabi (2005) offered discourse on the teacher's point of view in application of Cognitive Apprenticeship in a way no other study offered. Although the impact on student learning and motivation was incredibly positive, Darabi conceded that instructor preparation requires substantially more

preparation, observation, and reflection and therefore more time and effort. In order to scaffold and then fade appropriately, the instructor must regularly determine the learning state of each individual student. Darabi shares the point of view of the cognitive apprenticeship instructor by stating, “The challenge was monitoring the progress of the course according to the plan, staying involved with the students and clients, and keeping the course on track in the face of challenging circumstances introduced by the authentic aspects of the experience” (p. 59). One difficulty this author never considered that Darabi pointed out was in the initial difficulty in recruiting clients who were willing to sacrifice their time to work with students, creating quite a time-consuming challenge in advance preparation.

As a historical predecessor to cognitive apprenticeship, cooperative education has been utilized since the middle of the 20<sup>th</sup> century. In Canada, at least 10% of high school juniors and seniors participate in an extended cooperative education experience. A case study of one such student by Chin, Bell, Munby, and Hutchinson (2004) discussed epistemological appropriation in student learning while engaged in Cooperative Education. Researchers collected ethnographic data regarding the experiences of a student named Denise in her semester-long placement in a dental office. The research began two weeks after her program initiated and concluded six weeks before the end of her placement and was collected twice weekly for two hours totaling approximately 36 hours in collection of observational data. Additional data analyzed for triangulation included: field notes, researcher journal entries, as well as many informal and three formal on-site interviews with Denise, the dentist and a preventative dental assistant who also served as Denise’s mentor and supervisor. Supplementary documents reviewed by

the researchers included: Denise's educational training plan, cooperative education log sheets, Denise's journal entries, and performance assessments.

This particular dental office had a reputation as effective teachers. The purpose of this study is not to argue that cooperative education is the most effective education practice, but instead to add to the literature another snapshot of what student progression within cooperative education looks like and how it happens. Chin et al., (2004) included two frameworks, one as presented already in this section outlined the teacher role as scaffolding, modeling, and coaching that they corresponded with respectively the student role as submitting, mirroring, and constructing.

While there was much discussion on scaffolding/submitting, and modeling/mirroring, great attention was placed on the process of coaching/constructing, which is comparable to fading. It was in the removal of coaching that Denise finally gained confidence and began acquisition of the identity as a preventative dental assistant. Later observations revealed a completely different student, competent and calm in practice. Eventually, Denise could effectively assist both the mentor preventative dental assistant and the Dentist without instruction or any coaching at all and appeared to be a professional member office and of the dental Community of Practice at large. There were even several instances where Denise not only taught the researchers about what she was doing, but where the mentor preventative dental assistant learned from Denise. The mentor preventative dental assistant and the dentist shared anecdotes about how Denise managed to get to such a point in her education, describing her independent actions (doing things she was not instructed to do) and making educated guesses. Because both the dentist and especially the mentor preventative dental assistant were so skilled at

scaffolding and coaching, Denise's ability to move into the constructive phases of her learning was seamless.

This research of course suffers from the same weaknesses of any case study, but it also presents a story that included the most thoroughly developed trajectory for effective apprenticeships. Learning environments lacking in one or more of the three components discussed by Chin et al., (2004) had holes and weaknesses exhibited by student learning outcome and/or student's perceived self-efficacy. Denise was entirely successful as an apprentice and not only was she pleased with her progress, but her supervisors/mentors were impressed as well – though they were not surprised as they communicated experiences of similar results. They clearly warranted the reputation they had developed. Fading is done in order to achieve the constructive phase, so that students may move on to applying their skills in independent practice, which will be discussed in the following section.

#### Students Journey Toward Independent Practice

One of the defining characteristics of apprenticeships and legitimate peripheral participation is role migration, or the act of growing out of newcomer status and into old-timer roles, from the periphery to the center of a Community of Practice. While this process must be seen as progression on a continuum, for the sake of this manuscript the process was split up into three sections: authentic learning contexts or entry/creation of a CoP; scaffolding, modeling, and fading or the initial teacher-heavy aspect of a CoP; and finally migration into student-oriented action including student as more capable peer, and student in central roles. After gradual release of responsibility on the teacher's part, the student's graduation into independent practice is what completes the cyclical aspect of

learning through legitimate peripheral participation. And this is how Communities of Practice evolve: through the advancement of newcomers as brand new students join the CoP.

### *More Capable Peer*

Many theorists suggest that learners perhaps learn the most through the act of teaching. More experienced students can indeed offer their peers access to growth that may be as effective, if not more so in some senses, than teacher-centered instruction. In Betts (2006) earlier study of the Multimedia Arts Education Program (MAEP) the focus was on the middle school participants. In regards to teachers as experts we return to the MAEP focusing instead on the Student Teaching Artists introduced in a later year of MAEP. In this second study, Betts (2008) asked: What improvements can be made to the Tucson multimedia arts education program? What are the best practices in multimedia arts education? How does introducing a dual apprenticeship into a formerly single apprenticeship program impact all tiers involved? In this qualitative, formative experiment at the MAEP (described at length in the first section of this chapter) the researcher studied a dual apprenticeship structure. Middle school students attended the program taught by multi-media experts. This study centered on the introduction of Student Teaching Artists as apprentices to the experts and teachers to the students. Students attended labs after school four days per week and were motivated to treat the program as a job by provision of a small semester stipend and promise of a computer and printer upon completion of five semesters. Student Teaching Artists entered in the second year of the program and attended three times per week over three semesters. Data collected included: participant observation by the Student Teaching Artists, researcher

journals that Student Teaching Artists shared that provided views of the daily activities in the labs, and interviews conducted by the researcher with Student Teaching Artists, middle school students, and the teaching artists or experts.

Betts (2008) focused on the five Student Teaching Artists (male (N = 3), female (N = 2)). Three were graduate students serving as teaching assistants on campus (two in education, one in creative writing.) Of these one was from Turkey, one from Boston, and one from Tucson. Two were undergraduates in education w/ informal experience teaching middle school students, one a Navajo from CA, and one born in Mexico. All had interest in experience in education. None were multi-media experts, but all had a working knowledge of software and the learning curve. Other participants included five teaching artists and 60-70 “at-risk” middle school students from disadvantaged families in Tucson, AZ; many of which were English Language Learners.

The Student Teaching Artists valued the apprenticeship relationship and the relationship was reciprocal. Teaching and learning occurred for both Student Teaching Artists and experts. The middle school students benefited by this relationship and subsequently were better able to grasp the content. Student Teaching Artists development of technical skills, knowledge of aesthetic criteria, and pedagogical skills benefited from practice in a real-world context. While Student Teaching Artists noted the benefits of the constructivist approach of the program they also remarked that providing some lecture may be beneficial to students’ understanding of the material. As the Student Teaching Artists set goals and took action to fill their own knowledge gaps and gain technical skills, they modeled self-regulated learning and problem-solving to the students. Having to both learn and teach much of the technical skills and tools they were using in the

MAEP caused Student Teaching Artists to reflect on the importance of teaching how to learn. They acquired new teaching skills and classroom management techniques and subsequently new confidence in their abilities as teachers. Student Teaching Artists commented on enjoying the process of learning by watching another teacher's teaching style. Based on the observations on dialogue reported by the Student Teaching Artists, a strong rapport developed between both the students and Student Teaching Artists and between the Student Teaching Artists and the experts. As discussed in the earlier Betts (2006) study, there was a positive impact on the students' high school careers and in many cases beyond. Working with professional artists in the MAEP contributed to the Student Teaching Artists understanding of professional applications of the skills they were helping students to learn.

This was a prolonged substantial engagement (three semesters), with persistent observation, progressive subjectivity, regular member checks – and in general transparent, credible and transferable. Drawbacks include no mention of peer debriefing. However, Student Teaching Artists served as observers and Betts (2008) met with them regularly to go over notes and thoughts. While there is contact and professional information in a sidebar about the author/researcher, he does not talk about his own impact on the study as a recorder and interpreter of data especially considering he has years of experience with the Multimedia Arts Education Program as the earlier study indicates.

In application of apprentice perspective learning in a high school classroom one can propose that having upper level students both learn from an expert teacher and teach newcomers will positively impact the learning of all parties involved. As the Student

Teaching Artists suggest, constructivist pedagogy may be best served by incorporating pieces of teacher-centered direct instruction and presentation. Or is modeling enough? The Student Teaching Artists are much older and more educationally experienced than most upper level students in a secondary school. Unfortunately one cannot be sure Betts is not reporting a data analysis for improvement of the program that is based on his own ideas of best practices. This study is not necessarily trying to prove a point (though at times it reads like a report turned into a grantor.) Instead Betts are trying to make the program better.

Apprentice perspective learning as applied to a high school classroom would involve the teacher as the teaching artist, master craftsman and more capable peer to beginning and advance students; the advanced theatre students as the old-timers, student teaching artists, and more capable peer to beginning students; and beginning students as newcomers. While this study does not offer information on sustainability of Community of Practice or role migration, it does speak to the benefits of old-timers teaching newcomers instead of being separated from them.

In a three-tiered peer assisted learning scheme like that described by Betts (2008), it is simple to see who delineation between newcomer and old-timer. The work of Standal and Jespersen (2008) addressed a very different population when faced with the use of learning through and with a more capable peer. The purpose of their study was to find out what kind of learning occurs in a rehabilitation context with people with disabilities. With a qualitative, explorative, phenomenological, and hermeneutical approach, the researchers followed two rehabilitation programs called Wheels in Motion. While the first group of data collected was intended to be a pilot study, they researchers found it

important to include that data as they made no substantial changes to the research design after the pilot.

Of the total 21 individuals admitted into the program, only one refused consent to participate in the study. There were nine participants in the pilot and eleven in the main study. All participants had been using a wheelchair for a range of three weeks to 30 years so there certainly was a wide spread in ability and identity as a wheelchair user. Eleven of the participants had suffered spinal cord injury while nine were in a wheelchair for other reasons - mostly neurological diseases. Age range was 26 to 60 with an average of 43. Eight of the participants were interviewed in depth about their experience in Wheels in Motion toward the end of the program with a purposeful sampling based on maximum variation to get diverse perspectives. Two peer consultants were also interviewed as they were included in part of the peer learning process.

Standal and Jespersen (2008) collected data through naturalistic means in the 2 ½ week long program that emphasized the active use of wheelchairs. The content of the Wheels in Motion program included wheelchair techniques and maintenance as well as participation in various sports and recreational activities through three to five hours of daily training. Across-disciplinary team of rehabilitation professionals ran Wheels in Motion. Through close observation methodology, the researchers observed the participants three to six hours per day for both sessions. Data collected included semi-structured informal interviews and field notes which were analyzed using Kvale's meaning condensation method. Next, they read through the data for disconfirming evidence effectively playing devil's advocate. Finally, the coded data was organized into themes. Triangulation of data and between investigators as well as regular member

checks strengthened the credibility of the study.

Each of the less experienced participants communicated how highly they valued having old-timers working alongside them. They learned as much is not more from their peers as they did from the peer consultants. The old-timers communicated their awareness of being more capable peers and appreciated the sense of duty it instilled in their approach to learning and teaching. Additionally newcomers often worked with newcomers on a particular skill and found great value in helping each other learn while more advanced peers were not around to watch them make errors. Participants helped each other by sharing their views and making suggestions for improved performance.

Inclusion of peer consultants improved the participants' willingness and ability to develop their own identities as users of wheelchairs as being coached by able-bodied consultants is a regularly occurrence in the world of rehabilitation. Also, as safety has been a recurring theme throughout these studies, participants commented how much more willing they felt to participate given that the consultants were also experienced users of wheelchairs. Wheels in Motion offered a unique opportunity to contextualize the acquisition of skills within a real but less intimidating environment. Through more capable peer interaction, participants developed their own techniques and intercommunication. Participants who had formerly felt estranged by the terminology used by the medical professionals highly valued the common language developed among their peers. This connects directly to discussion on the development of common tools and especially the work of Rogoff in the eighties. The most notable benefit of the generational encounter was that newcomers could observe veterans who displayed in

what Standal and Jespersen (2008) (citing Wenger) described as “...living testimonies to what is possible, expected and desirable” (p. 221).

The embodiment of learning is a theme recurring in activity theory learning. *Wheels in Motion* was an excellent example of what embodied learning can do for a person. With visible goals to work towards in observing veterans, participants could set their own expectations and aspirations with a clear vision of achievability in improvement. Also significant is the finding that it was not only the peer consultant who served as a more capable peer, but also old-timers to old-timers, old-timers to newcomers, and even newcomers to newcomers depending on the task at hand. This is important to remember that learning through a more capable peer will not only take place in intentional pairing, but naturally between those who develop or participate in a Community of Practice.

Also investigating the purposeful use of a more capable peer is the work of Longfellow, May, Burke, and Marks-Maran (2008) in their study of the Peer Assisted Learning programme at Kingston University in the UK, a two-year pilot program designed to enable first-year students to develop their academic writing skills. Through the administration of student surveys and analysis of additional data, the researchers sought to determine the effectiveness of the Peer Assisted Learning as well as examining student response to the curriculum. Students attended hour long meetings with a trained more capable peer in addition to lectures with an instructor.

The use of a more capable peer in this program was purposefully designed with beginning students working alongside successful level three students who had been trained to be Peer Assisted Learning leaders. Evaluative research study of this designed

scheme included student surveys, assessments (writing) and researcher field notes. The student satisfaction questionnaire included Likert-like and open-ended questions yielding both qualitative and quantitative data. Two cohorts were studied with 60 and 26 responding to the voluntary survey (from total populations of  $N = 120$ ,  $N = 96$  respectively).

Findings from the student surveys and assessments illuminated the capacity of successful students to pass on writing skills to novice students exceeds that of a lecturer. The Peer Assisted Learning programme had a positive impact on the way students perceived their learning in the following areas: understanding new knowledge, development of writing skills, reducing feelings of intimidation, and construction of a safe learning environment. Overall, the Peer Assisted Learning programme enabled students to become better learners.

Because students took part in both instructor lecture and the peer-assisted learning scheme, it is difficult to evaluate assessments in order to determine success of the use of more capable peer beyond student opinion. Although the researchers purport it was the time with the more capable peer that was more effective in improving student writing, one cannot infer the same based on the methodology. Student attitudes toward the more capable peer aspect of the Peer Assisted Learning programme were overwhelmingly positive and in conjunction with other studies on student appreciation of learning through a more capable peer considerably significant. It is safe to infer that a peer assisted learning scheme can be a large part in finding the safety called for but inadequately described in other studies on Communities of Practice.

So then, what can the use of more capable peer look like in a grade school classroom? In a case study of one female fourth grade student placed in a heterogeneous reading group, Moller (2004) traced student progression in the group from a member who needed support into a more capable peer herself. Through an inductive and interpretative case study, Moller collected the following data: observational field notes, written artifacts, 27 audio-taped literature discussions, as well as audio-taped interviews and presentations.

While this is a case study of one student, the classroom population must be considered as it was through interaction with peers that this student learned. The total classroom population was 25. Of the 25, 22 were European American, two were African-American and one was Vietnamese. Nearly all of the students lived near or at poverty levels. In order to choose the discussion group with which Moller (2004) worked, the classroom teacher aided in purposeful criterion-based selection to account for range in several areas (female N = 3, male N = 3; African American N = 1, European American N = 4; low socioeconomic status N = 3, stable socioeconomic status N = 3, and a range in reading ability based on standardized test scores and teacher assessment).

Moller (2004) read three novels with the literature group. The novels varied in cultural and historical diversity, familiarity of setting and in genre. The literature group met 27 times with discussions ranging from 20 minutes to 79 minutes (with an average of 48 minutes.) Additionally, Moller observed other classroom activities three to four times per week for three to four hours each session.

Analysis of data followed a generative design, ever-present during the process of data collection. Data was coded regularly in order to inform future data and analyses.

Initial categories of student level of struggle and participation were constructed to inform codification. Though originally not intended to be a case study of one student (Ashley), it turned out to be her story that stood out the most as representative of what can happen in interactions with more capable peers in a classroom, especially in small group work.

The intention of this study appears to be to challenge existing attitudes on deficit models in reading and ability-grouping arguing for heterogeneous group work in a classroom. However, results on the impact of heterogeneous grouping are significant and pertinent to this manuscript. First it is important to note that role migration within this group was non-linear for Ashley. This type of design did however require some scaffolding on the part of the teacher in addition to shared expectations. It was the teacher's expectation that Ashley could both learn from and aid her reading group, which she did in supporting others understanding and raising questions and challenging other group members. Moller (2004) offers a closing story about a student who was not successful in another study of heterogeneous grouping and warns that without teacher scaffolding, use of more capable peer design in a classroom can leave some members of the group in the dust. Adversely, when properly designed and supported, this kind of grouping can also pull those who may lack agency into the mix in a way ability grouping or whole-class activities cannot.

In an investigation of high school students' participation in a summer science apprenticeship Grindstaff and Richmond (2008) explore through discourse analysis the impact of a paired peer assistance scheme on student perception of learning and the participation process. The research apprenticeship lasted seven weeks and two separate sessions were observed (2003 and 2004). All participants worked in pairs in conjunction

with an expert mentor to write a research proposal, conduct an experiment, and report findings to the community. An interesting difference in this study was the intimate social context of sharing a dormitory room with one's partner over the seven weeks and the significantly longer program duration.

Participants were all rising juniors and seniors (N = 50) from the U.S. and American Samoa who were academically in the upper third of their class, but came from a rich diverse backgrounds representing a wide range in the following: socioeconomic status, race, ethnicity, type of school attended, gender, and state or territory of residence. All students had completed at least two years of both high school math and science courses. In the application process students ranked research project preference and most students received their first or second choice. This represents a trend in situated learning environments recognizing that giving students choices will increase intrinsic motivation.

Data collected included: pre and post program surveys completed by students, student journals and research papers, with a priority on discourse analysis of participant interviews. Thoroughly triangulated with member checks and peer review this study can be considered transferable and generalizable.

Patterns emerge from discourse analysis on the types of social support provided by peer partners: social-cognitive, social-emotional, and social-technical. These differences were dependent on the context especially the nature of the posed problems and previous experiences with communities. Just carrying out a task together will most likely elicit the latter two, but in order to achieve social-cognitive support in the partnerships, more scaffolding is required, especially for those less experienced in community learning.

Again, it seems enriched environments are only made available to those who are already academically successful. This is a recurring theme (particularly in science learning) in the body of literature. Perhaps this is because of the time investment required on the part of the instructor and the difficulty in recruiting and retaining experts who are willing to work with students.

### *Student in Core*

Unfortunately, student progression to core roles is a rarity in a secondary school classroom as far as the body of research. The first two studies have high school aged participants, but in a summer camp setting. In a longitudinal study a university high school summer science program Markowitz (2004) examines students' perceived abilities and interest in science. The participants attended the University of Rochester's Summer Science Academy between the years 1996-2002. Each summer the Summer Science Academy lasted from two to four weeks and enrolled 20-39 students. In contrast to the science camps researched by Barab and Hay (2001), this camp lasted long enough to allow students to both learn alongside a master and progress into independent practice. Students chose their research topic, designed their own empirical protocol, carried out their experiment, and reported findings to the members (including professionals) of the Community of Practice. For the purpose of this paper, the focus will be on how independent practice impacted student attitudes about science and self-concept as scientists.

Over seven years 216 students attended Summer Science Academy (SSA). Markowitz (2004) mailed a short follow-up survey to all participants and 96 responded with a response rate of 44%. The questionnaire consisted of self-reported questions on

student success in subsequent school science learning, student interest in pursuing a career in science, other science related extra-curricular activity, and future education plans. Students also indicated whether they were interested in being contacted for a follow-up interview. SSA Institute quantitative analysis was used upon receipt of completed surveys.

Markowitz's (2004) quantitative survey findings were as follows:

On a scale of 1 (*strongly agree*) to 5 (*strongly disagree*) 90% responded that the SSA improved their performance in AP Biology; 82% of the respondents said that the SSA program improved their overall performance in science. Approximately 67% responded that attending the SSA led them to take more advanced science courses. Approximately 49% responded that attending SSA led them to take advantage of additional science programs outside of school, such as summer research programs. Approximately 80% of those who responded indicated that attending SSA contributed to their interest in a career in science. Notably, several of the students who indicated that attending the SSA did *not* contribute to this interest in a career in science qualified their response with written responses that they were already interested in a science career prior to their attendance in the SSA program. (p. 398)

Also analyzed were changes in responses over the span of the seven years. Trends emerged showing an overall increase in all areas as the program matured. Perhaps this is indicative of the kind of evolution and development that can happen overtime within a Community of Practice.

Qualitative data analysis revealed some overall themes within the write-in-comments section of the survey. Students responded that they felt the Summer Science Academy gave them an "edge" over other students in Advanced Placement biology in effect making them more capable peers in their school classrooms. Seen as experiences they do not get in school, access to high-tech equipment and student choice remained the top differences noted. Of the 77 students currently or formerly in college, 68% are

science majors, 15 already graduated. Of those 15, 11 (73%) indicated they were currently pursuing an advanced degree in science or they were in a science-related career.

A limitation of this study outlined by the author is that the survey was not administered at the same time relative to completion of the Summer Science Academy for all students. Because the mailing was sent out at the same time, some students were completing a follow-up one year after attending while others had been away from the program for seven years. The low response rate also was mentioned as possibly being hampered by old contact lists of youth who tend to change address. Also, SSA participants applied and were selected based on academic achievement. The results cannot be transferred to the general population of students and corroborating studies are necessary outlining the impact of such a program on those who are not as advanced academically.

Investigating a broader population than is Light and Nash's (2006) case study. The researchers explore how youths' experiences in Communities of Practice outside of school (in this case surf clubs) compared with school learning experiences and how the distinctive nature of situated learning is played out in surf clubs. Data collected included: in depth semi-structured interviews, field notes, and observations. Light and Nash use a grounded theory approach in data analysis with a situated learning lens.

One surf club was observed over the course of the summer. Light and Nash (2006) interviewed four subjects in a series of three interviews each at different times in the summer season. Researchers observed most of every day throughout the summer season and participated in constant analysis of data and progressive subjectivity. Participants included four fourteen-year-old Australian surf club members chosen at

random from those who were available over the course of the study. They all entered the surf club as nippers at a young age (five to nine years old) and recently graduated into the cadet program. Two were male and two were female. Also, researchers informally interviewed three senior members of the surf club. All participants were referred to by pseudonyms. The four participants earned their Surf Rescue Certificate and recently began patrolling the beaches regularly. Two were locals and two were vacationing from another town. Two participants focused on competition during the course of the summer, while the other two preferred patrolling. The senior members interviewed consisted of a male nineteen-year-old university student who completed the peripheral role programs of nippers and cadets and was now serving as an instructor for the cadet program, another was in his thirties and a professional lifeguard, while the third was not described. This particular club had about 500 nipper members. All of the participants had several other family members who participated in the surf club.

The sense of being part of a community and preparedness to take on responsibility among surf clubs, school and sports clubs was greatest in surf club. Here is why: The possibility of participating at every organizational level as one migrates from peripheral to core roles. Sports clubs and schools are not true Communities of Practice because of this distinction – evolution and continuation of the CoP. Tangible markers for progress toward fuller participation in the club increased participant engagement and investment through instilling a sense of pride. Participation in practices served as a resource in learning a trade – in this case, lifesaving. Relationships with fully qualified lifesavers in master-apprentice type relationships led to learning through participation in an authentic and meaningful practice.

Like studies outlined in the first section of this chapter, ensuring a Community of Practice is safe and open through community building practices increased the likelihood of participants taking on a new identity as a member and created a sense that the CoP was like a second home. Providing opportunities for rich social interaction both with same-level and different-level participants encouraged participants to move toward full participation in the Community of Practice.

A key difference for the participant between the club and school was that they chose the surf club, but were required to go to school, resulting in engagement in the surf club that did not exist in their schooling. All participants mentioned the absence of 'rules' and not being under surveillance in the surf club or in other words, their freedom of choice, as desirable. They were, however, given far more responsibility than at school or in other sports clubs, and they commented that this increasing responsibility to others (rather than responsibility to only the self) was also a cause for their engagement. The four participants constructed identity through relationships and bonds of shared values and meanings provided by membership as a whole person in a social community.

The researchers were persistent in their observation and provided for progressive subjectivity. However they did not have access to students' schools and sports clubs and so had to base comparison on comments made in interviews of participants on those subjects. This was not a prolonged substantial engagement and there was no mention of peer debriefing outside of the research team or of member checks its generalizability is questionable.

Given the strengths of this study one can infer that evolution and continuation is a necessary component for a true Community of Practice and real situated learning.

Freedom of choice and increased responsibility with tangible benchmarks (built into the advancement of peripheral to core roles) helped to engage and motivate students.

This is unfortunately not a school – not public education – but thankfully the same age-range with which the author of this manuscript is concerned. As most of the studies I have read there is a definite lens of situated learning as the cure-all for what ails the educational system. This bias leads to researchers taking often insubstantial data and making substantiated claims however, corroboration from other sources makes this research more credible.

Like Light and Nash (2004), Chang, Chen and Li (2008) investigated role migration in a Community of Practice. In their mixed method analysis of an online learning community, research questions include: Does participating in an online CoP promote learners': knowledge sharing, movement from peripheral to core roles, improvement in abilities for each role? Can a teacher use peer assessment results to assess learners' learning performance? What are learners' attitudes towards this system? The data emphasis is on quantitative statistical analysis with a follow-up qualitative survey component.

Students enrolled in a course were encouraged to participate in an online web journal platform as it was a significant part of their final grade. The teachers and teacher assistants assigned the following roles: reader, author, reviewer, and editor. The order here reflects the movement from peripheral to core roles in this Community of Practice. Instructors assigned roles based on prior coursework. Most students began in the most peripheral role as readers while the instructors filled the core role of editor in chief. Data analyzed included: numbers of submissions, number of submitting students, trend of role

migration, assessment scores (both as students progressed toward core roles and a comparison of those in this study with those in a similar course not utilizing the theories of Communities of Practice,) and a qualitative analysis of survey findings on student and teacher attitudes following the course.

Cheng, Chen and Li (2008) utilized a convenience sample of 51 first-year computer science undergraduate students enrolled in the mandatory course “Basic Computer Concepts” at the National Central University, Taiwan. They also included teachers and teacher assistants in the qualitative survey component, but there was no indication of the size of that sample.

Indicators of knowledge sharing among students increased which may indicate that students can improve their own work through inspection of other’s coursework. Reading classmates’ journal articles improved students’ programming ability. Reading comments on articles improved students’ reviewing ability. Editors’ feedback can improve reviewers’ reviewing ability. Assessment methods in the online community of practice were comparable to assessments in a similar more traditionally administered course. In the qualitative survey students in general would welcome more use of these methods in future coursework but offered many suggestions for change – most notably that more time was needed for this type of practice. Teacher’s also provided some suggestions addressing the structure: a need for more experienced students to be ready for core roles earlier in the process and more support for those students as they take on their new role of editor. Chang, Chen and Li (2008) concluded that the advancement of student’s learning was comparable to traditional practices – not necessarily better or worse given the way it was administered.

Perhaps a greater difference would be visible given the changes suggested by students and instructors, which was the most important information presented in this study. Students need to have more buy-in in regards to role migration from peripheral to core participation. It is desirable for teachers to design their Community of Practice in such a way that some students may begin the course in less peripheral roles – some students are newcomers while some are oldtimers. This was what initially attracted this author to study situated learning – the unique capacity in the theatre classroom to have more experienced upper classmen in the same courses as new students who have not yet taken on the identity of theatre artist.

While this manuscript attempts to avoid studies on online Communities of Practice (though it has been difficult), this study was included because of its focus on role migration. As the research utilized a small convenience sample, it would be best to seek out further studies to back up some of the assertions made above. The researchers speak to the research limitations in that it is not the normal practice in a standard CoP for there to be so few students serving in core roles at the outset (the lack of student old-timers.)

As mentioned previously, most of the studies herein presented utilize more qualitative methods than quantitative and this is not the case in this study. This article seems far less biased towards Communities of Practice as the cure-all and more focused on proving that it is another valuable effective practice, not the panacea. The researchers spent far more time outlining the research limitations and especially worth noting is that not all students were willing to participate in this type of system. While the researchers imply that this is due to the technological component and resistance to participating in an online Community of Practice, but do not say it outright.

## Conclusion

Using the lens of situated learning and the historical background of Lave and Wenger's (1991) research on legitimate peripheral participation in apprenticeships, the body of research laid out in this chapter presented the fundamentals of design for the educator to design her own classroom community of practice. Start by providing a learning context in which students are working together towards common goals, solving common problems, and/or producing collaborative projects. Students in turn will acquire and develop a shared language and set of artifacts. In a classroom community of practice teachers are mentors, facilitators, and hold the responsibility of connecting the classroom to the professional community of practice in their field. This is to be done by ensuring the teacher regularly participates in content area practices outside of the school setting, such as a high school orchestra conductor also taking time out of school to be a member of the community orchestra.

Another way to connect the classroom community of practice with the professional community of practice is by inviting experts into the classroom as visiting instructors. As cognitive apprenticeship theorists argue, students are most successful when they receive the proper initial support by teachers and more experienced classmates. As the student becomes more competent, this support is gradually released as he journeys toward independent practice. The student is no longer a newcomer, but a more capable peer, teaching other newcomers. Finally the student is able to take on the more creative and constructive roles of being an old-timer in the community of practice. No longer a player, but a director; the student successfully integrates the content area identity of scientist, artist, musician, etc. into his own plethora of identities. The

community of practice sustains itself through this cyclical pattern of the regular reintroduction of newcomers in the periphery who migrate toward central roles becoming old-timers who effectively take another set of new students under wing.

## CHAPTER 4: CONCLUSION

### Introduction

How can teachers create classroom communities of practice where students can become practitioners of content? Chapter one introduced the conceptual frameworks of apprenticeship theory and situated learning. By tracing Lave and Wenger's research on apprenticeships back to its roots in chapter two, a long history of success in skill and identity acquisition emerges. In the twentieth century a trend in the thinking on and application of situated learning in educational environments evolves into cognitive apprenticeships which emphasized the importance of providing a more direct type of instruction including modeling with scaffolding, coaching and fading. Through a review of the literature in chapter three, the educator can come to understand how situated learning looks in practice and what the benefits and challenges may be in application. The body of research presents a range of examples in different contexts with various populations. However, the research is still lacking in providing examples of situated learning in practice in a content area classroom in a public high school. Teachers can begin to imagine what they can glean from these examples and put to use in the application of situated learning with high school students. What then are the steps to designing a Community of Practice given a secondary school content-area classroom?

### Summary of Findings

In review, the aspects outlined by Barab and Hay (2001) used to organize the literature review within this manuscript follow. In order to be termed a Community of Practice, teachers must provide learning contexts that model proficiency. Students through mutual engagement begin a joint enterprise consequently developing a shared

repertoire. The teacher through modeling the concept of teacher's as experts must also design scaffolding to support students meaning making and gradually fade out that support. The student then is prepared for independent practice as he can both teach what he learned and produce professional quality work. (p. 72)

In a classroom community of practice Barab, Barnett, and Squire (2002) conclude that complex dualities cause tensions and it is through negotiating these tensions that a group of individuals become a community. Guldberg and Pilkington (2006) discuss the importance of determining common values and goals in order to engage members in the mutuality of the community of practice. In the classroom, teachers must facilitate finding this common ground within the community in order for it to be successful. Another responsibility of the classroom teacher presented by Moje, Ciechanowski, Kramer, Ellis, Carillo and Collazo (2004) is to provide opportunities for students to share their funds of knowledge and then use that information to tie the classroom curriculum to the multiple identities and communities of the students. Some concrete examples provided include: teaching students how to use multiple texts, using bridging language, and increasing the use of technology in the classroom. However, as Taylor (2008) points out, teachers have the responsibility to remain culturally relevant, taking into account the varying communication styles and educational needs of each individual student and their home communities. Equal and equitable practices are not one and the same as some students will require more support in the social setting required of situated learning.

A classroom community of practice also requires that students work collaboratively toward solving a common problem or completing a group project. The research of Lopez and Allal (2007) displays the act of establishing norms in and of itself

a joint enterprise, connecting the first section on mutual engagement to joint enterprise. They also emphasized the importance of common problem solving and discussion in developing a micro culture or classroom community. Betts (2006) study of the Multimedia Arts Education Program examined the more concrete joint enterprise of group creation of multimedia artifacts. Their study also supported the importance of connecting the curricula to the students' lives outside of school. When presented with the authentic context of working with victims of domestic violence to create the Clothesline Project, Masters in Social Work students identified themselves more readily as social workers in Cheek, Rector, and Davis's (2007) study. Bottge, Rueda and Skivington (2006) demonstrate that though Taylor warned lack of agency could lead to failure in situated learning environments, adolescents with students with Emotional/Behavioral disabilities also benefit from a collaborative hands-on learning activity that ultimately leads to a common goal.

The residual effects of mutual engagement and joint enterprise are the community of practice's adoption, creation, and/or evolution of the language of the practice and the use of existing and creation of new tools and artifacts. In McLaughlan's (2001) study on collaborative creativity in a theatre classroom, not only was production created for performance, but also class rituals and rules. Pitri (2004) suggests that when young people succeed in creating a community of practice with a shared repertoire, that students are more likely to be respectful and inclusive of each other. Students collaboratively designed virtual reality worlds for presentation to the community at large in a study by Barab, Hay, Barnett, and Squire (2001). Results revealed that while exact reproduction is

valuable, students are most engaged and learn the most when asked to creatively generate new artifacts.

Silverman's (2006) work with teaching artists reminds teachers of the importance of keeping up one's own participation in the professional community outside of the classroom. Students are inspired by and learn through imitation of their master as they observe her performing her craft as exhibited in the work by Nielsen (2006) at a Danish music academy. Students working with expert scientists in Handler's (2006) study were not only more likely to identify themselves as scientists, but also made great strides in acquisition of the skill set required of a professional marine biologist. In a study on science summer camp Barab and Hay (2001) illuminate the positive impact of the student's perception of authenticity through interaction with an expert on their motivation and engagement. Hay and Barab (2001) expand their research by emphasizing the importance of power and ownership outside of the expert instructor.

As students enter a classroom community of practice with a teacher who is a member of the professional community of practice, the role of the teacher beyond modeling professionalism is to scaffold. In Owen's (2008) study reveals that without scaffolding, students will fail to develop a content area identity. Similarly, Choo's (2007) study suggests that a lack of scaffolding will prevent student migration to more central roles and thus lead to the retardation of development in a content area. Kolikant, Gatchell, Hirsch, and Linsenmeier (2006) prove that in order to design effective scaffolding, educators must always be research-based, reflective practitioners.

Imitation of and scaffolding by an expert teacher is only effective if followed by coaching and fading. Charney, Hmelo-Silver, Sofer, Neigeborn, Coletta, and Nemeroff

(2007) demonstrate that students cannot graduate into independent practice and creative/constructive roles if the teacher does not gradually fade out support. Darabi's (2005) case study displays that fading gradually will result in student success in terms of ability and perceived self-efficacy. Additionally this research warns that the educator must be prepared for more preparatory work in facilitating effective fading. In an example of effective fading in a cooperative education setting, Chin, Bell, Munby, and Hutchinson (2004) emphasize that it is in the gradual removal of coaching that the student truly gained confidence and integrated an identity as a member of the professional community of practice.

As the teacher fades support students gain move into their own independent practice in more central roles within the community of practice. In Betts' (2008) study of the introduction of student teaching artists into the multimedia arts education program, all parties benefited (middle school students, student teaching artists, and expert teachers) from the use of learning through a more capable peer. Standal and Jespersen (2008) blur the lines of who can be a more capable peer as the findings of their study exhibit that learning through a more capable peer can be seen in relations between: old-timer and old-timer, old-timer and newcomer, and even newcomer and newcomer. The researchers imply that learning through a more capable peer rather than an instructor results in an increased willingness to identify as a member of the community of practice. The work of Longfellow, May, Burke, and Marks-Moran (2008) suggested that a fellow student as more capable peer can be more effective at increasing skill level than a hired instructor. In a fourth grade classroom, Moller (2004) finds that students who are served by more capable peers can develop into effective more capable peers themselves and that this may

not always be a linear process. In a study of a high school level summer apprenticeship camp, Grindstaff and Richmond (2008) remind us both student choice and teacher support is needed in the design of learning through a more capable peer especially in providing context and choosing the posed problems or projects carefully.

The final step in the cycle is that of the student migrating from peripheral roles into central roles within the community of practice. In another summer science program study, Markowitz (2004) demonstrated a positive correlation between immersion in an authentic science environment and the student's self-concept as a scientist. Light and Nash's (2006) case study of surf clubs in Australia demonstrated that learners motivation and engagement grows significantly when learners graduate into positions of responsibility to others in the community of practice. As Chang, Chen, and Li (2008) suggest, without a set of student old-timers in the community of practice, it may be difficult to get the ball rolling and provide authenticity. Evolution and continuation of the community of practice is a necessary component for situated learning. This may pose a challenge in the secondary school classroom.

#### Applications in the Classroom

Reminders beyond the above outline emerged in an analysis of the body of research. The importance of accessing students' funds of knowledge should not be underestimated. Positive results in all cases are seen when: students are invited to share their identities and communities in the classroom, the classroom Community of Practice makes connections with the outside communities and professional Communities of Practice, and information regarding funds of knowledge is recorded by teachers and used to inform curricular design. Also aiding student success is when a teacher assists the

classroom community in norm-making and goal-setting. As repeatedly mentioned, creation of a classroom Community of Practice and encouraging students to take on content-area identity is reliant on providing an authentic environment. This is not contingent on practices outside of the classroom. In the case of McLaughlan (2001), the students effectively created their own ensemble and Community of Practice before taking their performance out into the community, the Community of Practice existed within the classroom walls. Providing opportunities for discussion will also increase the likelihood of student success in terms of discourse and content area identity acquisition.

Moje et al., (2004) suggested providing multiple texts and teaching students how to critically examine them. This relates to the authenticity of the environment and incorporating the students' funds of knowledge in the classroom. Also emphasized by Moje et al. was the importance of using bridging language so that students can connect their own experiences with that of the classroom and larger professional community of practice.

With the exception of the work of Chin et al., (2004), it is difficult to find research on a true apprenticeship taking place within a secondary school setting. And even then, the cooperative education component takes place outside of classroom proper. In order to be a truly contextually authentic learning environment, does situated learning have to take place outside of the classroom? McLaughlan (2001) describes a legitimate Community of Practice, but certainly not an apprenticeship. Can we apply true apprenticeship theory within classroom walls or can we only learn from theoretical aspects?

The theatre classroom offers a unique opportunity to create a Community of Practice that is both authentic and situated within a professional Community of Practice. While most teachers would see instructing a class of all four high school grade levels at once as a burden, it can be a benefit to the theatre teacher when implementing thoughtful design. Freshmen or students inexperienced in theatre enter the classroom as novices and through working with more capable peers and mirroring a teacher who models the ways of being a professional theatre practitioner themselves become the more capable peers. In a theatre classroom I observed in North Thurston School District in 2009, the stage craft class was designed in such a way that by the time the first month of instruction was through, the teacher was able to release nearly all responsibility to the advanced students who in turn would more gradually release responsibility to their less experienced peers.

This approach can apply even if your classroom is not mixed grade levels as there will certainly be mixed ability levels in whatever content you may teach. For instance, as my endorsements are in both theatre and language arts, I may be teaching in a sophomore language arts class. I will use publishing as an example. Determining the publishing experiences (part of funds of knowledge) of my students will elicit responses including: none, blogging, informal publication, contributing in school publications, or perhaps even professional publication. I can then not only model as a professional person of practice my own publishing experience, but also assign central roles such as lead editor to more experienced students who can in turn work with those students with less experience. Together we will work toward a common goal such as a classroom literary journal or other publication. One must be careful to ensure this is not setting up a lasting hierarchical power structure in the classroom and ensure that all students, as they gain

experience, have access to central roles. Each student has different strengths and by determining those strengths, a clever educator can make sure each student has the chance to be the more capable peer.

#### Caveat and Further Research

All studies examined in this manuscript mention situated learning as part of their conceptual framework and rely heavily on qualitative analysis due to the nature of the topic. A great proportion of the research was in case study form and lacked quantitative data. The mixed method studies completed by Barab and Hay (2001, 2002) hold the key to the future of the empirical treatment of situated learning. While case studies tell stories numbers cannot, adding a quantitative component that is not an afterthought but a support to these stories will advance situated learning theory within the field of education.

Additionally, more research along the lines of Taylor's (2008) investigation of the impact of bound agency on the success of apprentices needs to be completed in order to find ways to make this successful form of instruction effective for all students whether they are lacking in social or cultural capital or otherwise not members of the majority group in the classroom. Another problem in the research is a higher proportion of studies on both Caucasian and academically gifted populations. In choosing which studies to include in chapter three, this author had to wade through a plethora of research on white and/or gifted students in apprenticeships in order to find the few studies on more diverse populations.

Some may say that teachers do not have the time to be professionals outside of the classroom. It seems unfair for the already heavy expectations placed on the teacher to grow. Already educators are expected to be research-based practitioners who involve

themselves in the community in which they teach. This takes more than forty hours per week. In order for this to be desirable the teacher must passionately love their own content area. This may too often not be the case. For this author, the thought of carefully coinciding school breaks with participating in summer stock or other performance and directing opportunities outside of the classroom is an exciting notion.

Creating a classroom community of practice takes incredible amounts of time and effort on the part of the teacher/facilitator. Each year the group of students will change and each year the unique qualities of each group and individual in the group must be considered in curricular design. The work is then frontloaded in the year, where the educator must plan and adapt continuously to meet the needs of the community, both displaying what it is to be a professional person in practice and facilitating group dynamics and tasks. This is clearly not the right method for all teachers, but for teachers who absolutely love what they do who are ready to step up to the challenge of increasing the engagement and motivation of students, it is worth trying.

### Conclusion

One may ask the old question: what is the purpose of education? Surely, one purpose especially for secondary education is to allow students to begin the long decision process in choosing an academic or career path. Allowing students to truly experience career possibilities in authentic content area contexts will aid students in making informed decisions about their future, but even more importantly, a majority of studies presented herein that apply situated learning theory help students to develop self-regulating and metacognitive skills, meaning they monitor their own actions and think

about their own thinking. These are qualities that increase every person's probability of success in school and life.

This manuscript presents the best practices for teachers who want to help students become life long learners through the lens of situated learning. Teachers can create classroom communities of practice where students become practitioners of content through investment of time and passionate interest in the subject. In chapter two the history of apprenticeships and the theorizing of apprenticeships do not align with the development of the decontextualized modern high school content area classroom. The problem presented then is how can teachers utilize such successful educational methodology in a classroom that is not conducive to such practices. The research reflects this difficulty in its lacking of studies on situated learning as applied in a high school classroom. More often, such authentic learning opportunities occurred in a summer camp or outside of class time for adolescents.

While the research presented does not address the same context in which this author wishes to apply situated learning, providing a variety of contexts with similar qualities gives the teacher many examples of what may be possible in the secondary school classroom, especially in mixed level classes. Through careful design, teachers can create classroom communities of practice where students take on the identity of writer, or actor, or scientist.

In developing a classroom community of practice, tension must be welcomed as a growth opportunity as the group determines common goals and norms. During this time the teacher serves as a facilitator, ensuring equal access and inclusion to all students. Another role for the teacher is to thoughtfully present the problem or project in which the

classroom community of practice will collaborate to solve or complete. Initial norm and goal setting can serve as the first observation of collaboration. Teachers must use these observations to inform future group work design. Through this joint enterprise, students will learn how to use existing language and tools of the trade while creating new artifacts that ultimately help the community of practice sustain itself and evolve into something different than it was before.

In addition to the role of facilitator, teachers must also be persons in practice. The ever-emphasized best practice of being a research-based practitioner expands to include being a person in practice. An art teacher can only truly model what it is to be an artist if she is connected to the professional community of practice through experiences as a professional artist. Another way to do this is to invite visiting artists into the classroom. As students observe the master teacher modeling her craft, they can begin to imitate. But modeling is not enough. The successful facilitator of a classroom community of practice will scaffold, providing explicit instruction as they model and then coach students in doing the activities themselves.

After students begin master basic skill sets, the role of the instructor must be faded out to provide mentoring, supporting choice on the part of the student, and gradually allowing the student to migrate into more central generative roles within the community of practice. Providing choice and giving power are incredibly effective practices to motivate and engage students in the content area.

Students learn from more advanced peers and more advanced students solidify their learning through the act of teaching. Given the opportunity to take on creative and generate roles within the classroom community of practice (after receiving the proper

scaffolding and fading) positively correlates to the likelihood that the student will identify as a member of the community of practice at large. If given the opportunity to be the set designer in a theatre classroom, a student is more likely to label themselves as a set designer. The results of following this cycle of situated learning in order are as follows: students who are motivated and engaged in their learning, students who can think through and solve their own problems, and an increased capability and valuing of group work.

Other suggestions originated from the trends in the study include the importance of connecting the content area curriculum with students' communities and families. Be incredibly careful to provide extra support to those students who may struggle socially or lack agency or capital. Remember to constantly monitor and evaluate the progress of each student, revise plans when necessary and provide extra support to those who struggle. A sink or swim attitude in application of situated learning will leave several students treading water, and some at the bottom of the pool.

Future research must not only include more qualitative data, but also address the above issue. Situated learning is not only effective for white upper middle class students with access to greater academic support. Future research must provide a more diverse set of examples in order to truly show the benefits of situated learning.

While the benefits are significant, creating a classroom community of practice will not be possible for all educators. Application of situated learning in the classroom will require of the teacher increased time, planning, and personal engagement. Only the educator who truly loves what she does will be able to succeed. Teaching is not just a job that one goes to day in and day out to receive a paycheck. Or at least it should not be that way. I would like to pose a challenge to all professional educators and teacher

candidates. We must look deep within our hearts and examine whether we are doing what we love. If not, find another career, you took the wrong path. We cannot properly encourage students to be engaged and motivated in the classroom without being engaged passionately in our own content areas. If so, our passionate engagement paired with best practices will be contagious and our classrooms will be filled with life-long learners.

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