

COOPERATIVE LEARNING:
A Review of Classroom Teaching Strategies

by

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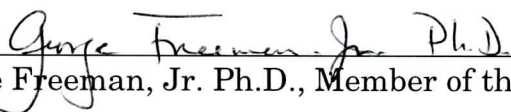
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Abstract

This paper investigated the effects of cooperative learning on academic achievement of elementary school students. A detailed description of various cooperative learning methodologies is provided. A brief historical overview of the orientation of cooperative learning was given to allow the reader to develop a historical perspective of the issue at hand. The independent variables in the studies involved measuring the academic achievement of the following: mainstreamed academically handicapped and nonhandicapped students; minorities; high- and low- ability students; and students in traditional versus cooperative classrooms. The results indicated that academic achievement of students in cooperative learning classrooms is at least equal to traditional classrooms, although the degree of its success is inconsistent.

Preface

The following review of the literature involving cooperative learning was conducted to satisfy the master's paper requirement of the Master in Teaching program. The topic of cooperative learning was chosen as a means of determining the effectiveness of this classroom teaching methodology for the benefit of the students in my classroom. I value this responsibility as completing the project has demanded that I research the true theories of cooperative learning. Thus, after completing the project I have a newly developed understanding of cooperative learning, as I'm sure those who continue to conduct research will develop as well.

I thank Terry Ford for her patience and suggestions during the initial quest of researching and writing this paper. I also must thank Marie Churney, Sam Lockwood, and George Freeman for providing substantial insight and resources to enhance the final product. I must thank David and Roger Johnson, Robert Slavin, and the many other researchers who contributed to the foundation of this paper by conducting the research that demonstrated the effects of cooperative learning.

A remarkable acknowledgment is given to my family and close friends for their undiminished support during this momentous time in my life. However, I must dedicate this book to my daughter, Bailey, who is my ultimate inspiration for completing this project.

Introduction

"Students are excellent teachers." (Hamm & Adams, 1992, p. 142)

I walk into my observation classroom during fall quarter and witness students working among one another at learning centers. The chatter among students at the tables is at a boisterous level, although it is perceived the students are completing the assigned material. The students work at five learning centers, with four to five members at each table. The make up of the groups are mixed with regard to ability, gender, race and social skills. My first thought is, "How wonderful. All but one of the groups works independently of the teacher at intervals of around 20 minutes. When a problem arises the students proceed to ask one another for help. When a student asks for help usually another student willingly donates that help to his/her peer. The students are not mistreating each other based on ability or social skills. The work is getting done and the students appear to be having a good time simultaneously. Now this is the type of teaching that is right for me. I can teach students something and allow them to have a great time doing it."

While off in dreamland a student calls out my name and uses a finger to signal me over to their desk. "Ms. Parker," the student says, "I need help with this. Will you help me?" Due to the number of other students at the learning station I am a little surprised by this request for teacher assistance. Until this point I am under the impression that the students are indeed

helping one another along with their work. I proceed to reply to the student's request, "Well, can you ask a neighbor to help you answer your question?" The student then reluctantly proceeds to request help from a peer, who willingly dispensed the information the student needed to answer the problem. Once the question is answered both students continue to work individually at the learning center.

After witnessing a number of such instances, I began to question cooperative learning strategies: if cooperative learning strategies are effective, then why was this student resistant to ask another student for help during station work? Did the student feel it was inappropriate to ask a neighbor for help? Did the student dislike the peers at the station with him? The student was comfortable asking for my help, so why not a fellow student? These students work with each other at learning centers each day, why was the first impulse to ask a teacher for help rather than a peer working next to the student? Thus my initial interest in conducting a review of the research on cooperative learning teaching strategies and environments was developed. This paper will address the following questions: first, what is cooperative learning? And, what are the effects on academic achievement accumulated in cooperative learning environments for children in elementary school classrooms?

I began conducting research and critiquing the literature currently available on cooperative learning in the classroom. Needless to say my

perception changed! My initial understanding of cooperative learning was of the classroom I described previously. Students work next to each another at learning stations; when questions arise, students have the allowance of asking each other for help before going to the teacher; and, finally, in a cooperative classroom, students are placed in heterogeneous groups based on ability, gender, and race. Although this description includes many of the characteristics of a cooperative learning classroom, the students are still competing against one another for a limited number of external rewards given to the highest achieving students. This example does not describe a classroom environment that is cooperative, but actually describes a classroom that is either individualistic or competitive.

Three popular classroom structures currently are used in the educational system today; they are individualistic learning, competitive learning and cooperative learning environments.

Individualistic Learning Environments

In an individualistic learning environment, students work independently of other students and at an individual pace. The students are responsible for only themselves with the end goal of an individual reward (Adams & Hamm, 1990). "Individual goals are assigned each day, students' efforts are evaluated on a fixed set of standards, and rewards are given accordingly" (Johnson & Johnson, 1987, p. 4). In this learning environment students are concerned with personal benefits and ignore the achievements of

their peers. Each student expects to achieve his or her own goal and looks only to the teacher for support and assistance throughout the day (Hamm & Adams, 1992). Although students are not competing with each other directly, a sense of isolation is included in the individualistic classroom.

Competitive Learning Environments

In the competitive classroom environment "students work against each other to achieve a goal only one or a few can attain" and "are graded on a curve, which requires them to work faster and more accurately than their peers" (Johnson & Johnson, 1987, p. 4). Students work independently of each other, which has the possibility to create a negative interdependence in the classroom. The students monitor the progress of others, compare themselves to their peers and use the teacher as the major source for help (Adams & Hamm, 1990). Through participating in this competition students develop one of two schemas. Either the students work consistently to achieve higher than their peers and reap the reward or they lose motivation and cease to work because they believe they cannot out-perform the high achieving students (Johnson & Johnson). While students continue to compare themselves with their peers this interpersonal competition essentially works similarly to a test (Nicholls, 1989).

Although at various destinations in history each of the three learning environments was believed to have been successful, many students in today's school systems are unsuccessful in individualistic and competitive classrooms

(Totten, Sills, Digby & Russ, 1991). A determining factor of success is the individual grades that schools use to determine a student's ability. As Nicholls (1989) has noted,

(in a competitive classroom) when children want to know how smart they are, they will be more likely to reflect on how they compare with others and less likely to focus on whether what they are learning makes intrinsic sense or on whether their skills are developing. (p. 41)

The competition included in a competitive or individualistic learning environment proves detrimental to the student's learning ability. And, unfortunately, due to the way the system is currently working it seems as though students will continue to compare themselves against other students' achievement abilities.

Cooperative Learning Environments

In comparison to individualistic and competitive classrooms, cooperative learning environments emphasize a new range of goals and structures without stressing competition among students. The procedures in a cooperative group are structured so students engage in inquiry and discussion with peers (Davidson & Worsham, 1992). The idea is that students will encourage their peers to learn the material so the team will benefit all members of the team and achieve its goal (Adams & Hamm, 1990; Slavin, 1990). As the success of the team depends on each member, members are accountable to both their peers, as well as the teacher. The task structure is

cooperative whereas in traditional classrooms, that employ individualistic and competitive goal structures, it is individualistic.

A number of characteristics are included in the cooperative learning strategy. Johnson and Johnson (1987) list four main characteristics of cooperative learning: (a) positive interdependence; (b) face-to-face interaction; (c) individual accountability; and (d) interpersonal skills. Positive interdependence, which includes mutual goals, division of labor and materials, and joint rewards, is considered to be the most important factor in structuring situations that are cooperative (Johnson & Johnson, 1990; Johnson, Johnson, Holubec & Roy, 1984). Individual accountability holds students accountable for learning the assigned material. Face-to-face interaction promotes verbal exchanges, which builds positive interdependence. The final characteristics listed by Johnson, Johnson, Holubec, et al. are interpersonal and small group skills, which include collaborative working and communication skills. Davidson and Worsham (1992) also add the following characteristics of cooperative learning: (a) heterogeneous or random grouping (or some other grouping procedure); (b) explicit teaching of social skills and the process of socialization; (c) increased perspective taking ability; (d) shared leadership within groups; and (e) the use of various classrooms structures.

The research on cooperative learning displays the many benefits of implementing cooperative learning strategies in the classroom. "The use of

cooperative learning moves away from the negative and often devastating effects of competition and aims at increasing the number of 'winners' in a class by bringing about the success for the greatest number possible" (Totten et al., 1991, p. 1). The group building involved in cooperative learning enhances self-esteem of the individual by enabling that student to realize the importance of their contribution to the group regardless of ability, thus developing a camaraderie and interdependence with classmates (Hamm & Adams, 1992; Lyman & Foyle, 1990; Madden & Slavin, 1983; Totten et al.). "These kinds of cooperative learning arrangements encourage pupils to learn by assimilating their ideas and creating new knowledge through interaction with others" (Adams & Hamm, 1990, p. v).

In the cooperative group, students work in small groups toward a shared goal, each student shares ideas and is responsible for the task at hand (Adams & Hamm, 1990). The team members are responsible for ensuring all members have comprehended the material, thus teachers must be willing to relinquish some control over how the students learn (Hendrix, 1996; Johnson & Johnson, 1987). The evaluation of a cooperative group is a criteria-referenced evaluation system (Johnson & Johnson, 1987).

Johnson et al. (1984) suggested cooperative learning experiences (such as group building and interdependence) could contribute to a solution to the socialization crisis currently happening in this country. Increasingly,

students reject or are antisocial to students who are less able based on achievement level.

Cooperative learning can also break down the walls of initial prejudice due to "desegregation and mainstreaming of handicapped" students and build constructive relationships (Johnson et al., 1984, p. 6). In addition to improving relations between mainstreamed academically handicapped and nonhandicapped students, cooperative learning is also effective in improving race relations. "Cooperative learning methods specifically use the strength of the desegregated school--the presence of students of different races or ethnic backgrounds--to enhance inter-group relations" (Slavin, 1990, p. 35). Some cooperative learning also moves students to an active form of learning by involving them in tasks that are relevant to their own lives (Hendrix, 1996; Totten et al., 1991). The skills developed in a cooperative environment are considered essential for contributing to today's workplace (Adams & Hamm, 1990).

According to Johnson et al. (1984), in comparison to individualistic and competitive learning environments, cooperative learning leads to: "(a) promotive interaction; (b) feelings of psychological acceptance; (c) accurate perspective-taking; (d) differentiated, dynamic, and realistic views of collaboration and one's self; (e) psychological success; (f) basic self-acceptance and high self-esteem; and (g) liking for other students" (p. 18). Davidson and Worsham (1992) also cite the following as possible positive effects of

cooperative learning: (a) increased academic achievement; (b) development of higher order thinking; (c) inter-group relations including cross-race friendships; (d) and social acceptance of mainstreamed students.

Many researchers have conducted studies that displayed such effects of cooperative learning. Research evidence indicated cooperative learning is beneficial to students and was indeed an effective teaching strategy for classroom use (Nath, Ross & Smith, 1996; Nelson, Johnson & Marchand-Martella, 1996). In contrast to the findings of some researchers that cooperative learning is detrimental to high achievers, research found that it was just as effective for high-achieving students as it was for low- and average-achievers (Slavin, 1989). In a meta-analysis conducted by Slavin (1991) research evidence indicated that 84% of studies conducted found significant positive academic achievement effects on a range of academics, including mathematics, reading comprehension and vocabulary, language mechanics and expression, history, geography, and spelling.

Johnson and Johnson (1987) also conducted a review of 122 studies. The meta-analysis revealed that "cooperative learning experiences tend to promote higher achievement than do competitive and individualistic learning experiences...in all age levels and all subject areas" (p. 34). In addition to improvements in academic achievement research also revealed benefits to self-esteem. Johnson and Johnson (1987), Johnson, Johnson and Holubec (1989), Kagan (1989) and Madden and Slavin (1981) reported that self-

esteem and confidence, in both nonhandicapped and mainstreamed academically handicapped students, increased with the use of cooperative learning.

I have described my interest in cooperative learning, as well as why researchers and educators are interested in such an environment. Along with this description I have included what research shows to be the effects of implementing cooperative learning in the classroom. Following this section are the definitions of some cooperative learning strategies involved in education today. The descriptions will aid the reader in developing an understanding of the treatments involved in the experimental groups included in the research studies in the following chapter.

Student teams achievement division (STAD).

The STAD model was developed by Slavin (1977) in the mid-1970's. The generic learning technique can be used for any grade level and subject area. Ideally, the teams of 4-5 students are heterogeneous in ability level, gender, and race or ethnicity.

In the STAD model the teacher presents the material to the students. The students study the material through peer tutoring in their mixed-ability learning teams. When all students in the team have mastered the material the students then take individual quizzes. The individual scores from the quiz then contribute to an overall group score. "The only way the team can succeed is to ensure that all team members have learned, so the team

members' activities focus on explaining concepts to one another, helping one another practice, and encouraging one another to achieve" (Slavin, 1992, p. 158). The students' points are tallied based on their own improvement from past performance on tests. "Team success is rewarded by means of a weekly class newsletter, which emphasizes team scores but also mentions individuals who have contributed substantially to their team scores" (Slavin, 1977, pp. 2-3). This learning technique is "designed for use over periods of time of at least eight weeks" (p. 3).

Team-assisted individualization / Team accelerated instruction (TAI).

TAI was developed by Slavin (1985) and his colleagues in the late 1970's. TAI combines cooperative learning with individualized instruction. This instructional strategy is designed to be used to teach mathematics to students in upper elementary level (Slavin, 1991). Students are pre-tested to decide at which point the individualized program should begin in the unit. Students are assigned to heterogeneous, mixed ability teams of 4-5, in which the students complete work at an individual pace. Teammates check each other's work against answer sheets for the unit and make sure that each member is prepared for the test (Slavin, 1985). The tests are taken individually and scored by other students. The teacher checks the number of units completed by the team members and computes a team score. This team "score is based on the average number of units covered by each team member and the accuracy of the final tests" (p. 183-184). The teacher then gives

rewards to teams that achieve above the established criterion referenced level.

Although the majority of time in the TAI instructional model is individualized there is still some group instruction. For 5-15 minutes a day students are taught in ability groups to introduce major concepts (Slavin, 1985). In addition to teaching groups, "every fourth week, the teacher stops the individualized program and teaches a lesson to the entire class covering such skills as geometry, measurement, and sets" (p. 184). TAI is beneficial because of its ability to increase time allowed to the teacher to help low achieving students and mainstreamed academically handicapped students (Slavin, 1985).

Learning together / Circles of learning.

Learning Together was developed by R. and D. Johnson in the mid-1970's (Knight & Morton Bohlmeier, 1990). In the LT model competitive and cooperative incentive structures are used with group process and group evaluation (Slavin, 1985). Students work together on a project in four-or-five member heterogeneous groups. One completed product is turned in by the group; rewards are given based on group performance, not individual scores (Adams & Hamm, 1990). Team building is emphasized before beginning the cooperative learning exercise (Slavin, 1991).

Generic cooperative learning.

Although generic cooperative learning is not listed as a specific strategy, it includes the four basic elements included in implementing favorable cooperative learning named by Johnson et al. (1984): (a) positive interdependence; (b) face to face interaction; (c) individual accountability; and (d) interpersonal, small group skills, and group processing.

Cooperative integrated reading and composition (CIRC).

Developed by Slavin, the CIRC method is used as a comprehensive program used to teach reading, writing, and language at the primary level, namely third and fourth grades (Stevens et al., 1987). In the CIRC environment the activities begin with a teacher presentation of material to students in the ability-level reading groups. Teacher-guided practice activities with the group follows the introduction. Once the students display understanding, they return to their seats and engage in practice activities (such as story-related writing, practicing words out loud, vocabulary and spelling) and peer assessment. The students perform individually during these activities, which are then checked by the teacher or a peer. Feedback is given and the students continue to cycle through additional practice. At the end of the cycle quizzes on "story comprehension, vocabulary, comprehension skills, and language mechanics" are given to measure student achievement (p. 438). Individual scores are then compiled to form a team score, which serve as the basis for team recognition of achievement.

Teams-games-tournaments (TGT).

This technique, developed in the late 1970's by DeVries and Slavin, is similar to STAD (Knight & Morton Bohlmeier, 1990). In the TGT model the method is the same as STAD, with this exception: at the end of the unit instead of taking individual tests, the students compete in a tournament with members of other teams with the same ability level. The questions in the tournament are "simple, relevant to the content, and designed to challenge the targeted group" (Hamm & Adams, 1992, p. 23). After the member competes in the tournament, the winner "at each tournament table brings the same number of points to his or her team, regardless of which table it is" (Slavin, 1991, p. 73). In order to maintain the quality of competition "winners compete with students of higher ability in the next tournament, while tournament losers compete with students of lower ability in the next tournament" (Knight & Morton Bohlmeier, p. 5).

Structured controversy.

Johnson and Johnson wrote about structured controversy in the late 1970s. In structured controversy the purpose "is to engage students in academic conflicts, thus resulting in critical thinking and problem solving situations" (Totten et al., 1991, p. 9). According to Johnson and Johnson (1992) there are six steps to follow in structured controversy. They are the following: (a) "research and prepare a position; (b) advocate for that position; (c) analyze, evaluate critically and rebut information; (d) reason deductively

and inductively; (e) take the perspective of the other position; and (f) finally, synthesize and integrate the information" (p. 129).

The groups should be arranged so that controversy will result in positive, constructive learning (Johnson et al., 1984). "In controversy there is advocacy and challenge of each other's positions in order to reach the highest possible quality decision based on the synthesis of both perspectives" (p. 129).

Jigsaw.

Aronson and his colleagues developed the Jigsaw model in the late 1970s (Knight & Morton Bohlmeier, 1990). In Jigsaw, there are two heterogeneous groups--the home group and the expert group. The teacher presents the material to the class then divides the class into four home groups. Students meet in their home groups and divide the assigned material into expert sections. The students then meet in their expert groups (students who share the same topic) to discuss the material in depth. The students then go back to their home groups to teach the group their expert material (Totten et al., 1991). The students are then given a test individually and given an individual score (Adams & Hamm, 1990). "Students are individually accountable for learning the entire lesson, although there is no group incentive for doing so" (Knight & Morton Bohlmeier, p. 4).

Jigsaw II.

Slavin modified jigsaw II from Aronson's original Jigsaw model. Slavin adapted the new method to include competition (Knight & Morton

Bohlmeyer, 1990). It is similar to the original Jigsaw except tests are calculated as team scores, not individual. Similar to the STAD model, team scores are calculated by the improvement of individuals. Again, teams compete for group rewards such as recognition in the class newsletter or other extrinsic rewards.

Next is a brief historical examination of cooperative learning, followed by a review of the research performed to determine the effects of cooperative learning. A summary of the research and my conclusions are included in the fifth chapter. A reference list will follow as the final chapter.

Historical Background

"It's language that makes us human, literacy that makes us civilized, technology that makes us powerful, and it's being in community with others that makes us free."

(Adams & Hamm, 1990, p. 139)

Although it may seem as though competition and individualism have dominated educational systems for as long as can be remembered, cooperative instructional strategies and beliefs are also evident throughout the history of education of American students. Johnson and Johnson (1987) name three early pioneers of cooperative education: the Talmud, Quintilian and Johan Amos Comenius. In the first century Quintilian suggested that students could learn from teaching each other. Later, Comenius (1592-1670) added similar beliefs that students could benefit from teaching and being taught by other students. Comenius believed that by enabling students to help and advise other students in the classroom it would prompt students to be more involved in receiving their own education (Cremin, 1967).

Toward the end of the 19th century theories of competition and individualism began to disappear. Johann Pestalozzi's theories of relating instruction to "the real world, learning by doing, and on the importance of activity, as opposed to sitting at a desk" became important to instructional theory (Spring, 1994, p. 134). In addition to Pestalozzi, Colonel Francis Parker used instructional methods promoting cooperation among students

(Johnson & Johnson, 1987). Parker was a cooperative learning advocate and superintendent of schools in Quincy, Massachusetts for five years, 1875-1880, during which more than 30,000 visitors witnessed his cooperative learning procedures (Johnson et al., 1984).

John Dewey's experiential beliefs of social interdependence followed Parker in the early 1900s in an era termed the Progressive Movement. This movement is characterized as "perhaps the longest and most intense period of educational reform and ferment in the history of the country, running from roughly the early teens into the 1940s" (Elmore, 1996, p. 3). Changing education from a teacher-centered, recitation-based pedagogy to a student-centered institution is at the core of the movement's agenda (Elmore).

Dewey believed the increasing industrialization of society caused a loss of communal sense and goals. He hoped that implementing a socialized classroom would bring people together by a reduction of friction and an increase of understanding (Spring, 1994). Dewey "encouraged children to move around the room, to ask questions, and to interact with each other as well as with the teacher" (Boyer, et al., 1995, p. 475). Embracing the values of democracy and cooperation through group activities and student-centered education became increasingly recommended (Boyer et al.; Kahne, 1994; Spring). Much of the change that occurred in schools shared a common theme "of breaking the lock of teacher-centered instruction and generating high

levels of student engagement through student-initiated inquiry and group activities" (Elmore, 1996, p. 3).

Theorists of the Progressive Movement examined how society functioned and attempted to organize classrooms in a similar manner. Colin Scott, a theorist who believed students benefited from group activity, formed the Social Education Association in 1906 (Spring, 1994). The Social Education Association was used as a vehicle to begin the transformation of classrooms into social groups in order to prepare students to work cooperatively in society (Spring). Scott utilized the Social Education Association to argue that children should be allowed to form "their own goals, organize groups, and their work" (p. 213).

The 20th century liberals viewed "students sitting at an individual desk and working alone as a symbol of economic individualism and competition and sought to replace that scenario with groups of students working together around a table" (Spring, 1994, p. 226). The result of this liberalism was a reduction to stress competition and an increase to teach students to work cooperatively.

Between 1920-1940 Larry Cuban conducted an analysis of the instructional methods used by teachers in New York. Cuban's findings indicated teachers employed a mix of student- and teacher-centered methods of instruction depending on conditions of the classroom and personal philosophies of the teacher (Spring, 1994). However, in 1934 the idea and

necessity of interpersonal competition began to seed itself in education when the Liberty League and the National Association of Manufacturers introduced the idea and necessity of interpersonal competition to educators (Johnson & Johnson, 1987). Interpersonal competition then became the promotive force moving teachers toward the implementation of teacher-centered instructional methods in the classroom.

In the 1940s, however, Morton Deutsch continued this promotion of cooperative education. He offered a theory that "emphasized different goal interdependencies as the distinguishing features of competitive and cooperative learning environments" (Sapon-Shevin & Schniedewind, 1992, p. 12). Goal structures then became part of the reform agenda of the 1960s (Sapon-Shevin & Schniedewind).

The civil rights movement demands of cultural pluralism, desegregation and an end to racism, particularly in curriculum, between 1950 and 1970, led to a greater need for cooperation among students in the classroom due to the increased levels of racial tension. In 1954 the court case *Brown v. Board of Education of Topeka* determined that children should not be in separate schools merely because of race and that desegregation should occur immediately (Boyer et al., 1995). Kenneth Clark, a social psychologist, helped aid the case by testifying that children who are treated with such inferiority might retaliate (Spring, 1994).

However, contrary to the Supreme Court's decision, immediate action did not occur, which led to the passing of other desegregation and equal rights acts. In 1964 the Civil Rights Act passed by President Lyndon Johnson outlawed "segregation in public accommodations, granting the federal government new powers to fight school segregation" (Boyer et al., 1995, p. 660). In addition to the President's support, Congress also participated in desegregation and equal rights. Congress passed the Higher Education Act of 1972, which upheld gender equality in educational institutions, ranging from preschool to graduate programs (Spring, 1994).

The tension evident in classrooms due to racial and cultural diversity was noticeable during this time. Again educators sought ways to improve the relations in such diverse classrooms. In the 1960s followers of Dewey advocated sociable behaviors and self-expression over regular curriculum materials seeking the well-rounded student (Boyer et al., 1995). Improving social behavior, among other factors, could be accomplished by instituting cooperative learning methods in the classroom (Slavin, 1991). "In the early 1970s, there began to appear instructional methods incorporating principles of cooperation among students" which were "designed specifically to meet the practical requirements of instruction in elementary and secondary classrooms" (Slavin, 1985, p. 177). The 1970s also brought a renewed emphasis on reducing racial tension. "...Establishing interpersonal relationships among diverse ethnic groups, largely as a function of

desegregation and integration efforts" remained important to educators (Sapon-Shevin & Schniedewind, 1992, p. 2).

It is apparent that cooperative learning has been used throughout history as an attempt to better meet the individual needs of the students in the classroom as well as for the enhancement of society. Research investigating the effects of cooperative learning has been conducted throughout the history of education. Many of these researchers have formed unions with universities at which they are able to conduct their research. Johnson and Johnson formed the Cooperative Learning Center in the mid-1960s at the University of Minnesota. At the learning center the researchers develop new procedures that will improve cooperative learning, plan and conduct research and write (Johnson et al., 1984). In addition to Johnson and Johnson, Slavin and DeVries continue to conduct research at Johns Hopkins University.

Integrative Review of the Literature

"The power and diversity of four or five minds is greater than one."

(Adams & Hamm, 1990, p.3)

In the following review of research I include some of the more popular types of cooperative learning, although I did not include all of the available methods. Many of the studies in the following review involved measuring the academic achievement of students in elementary school classrooms throughout a number of disciplines. These included mathematics, reading, social studies, language arts, and spelling. However, in addition to measuring academic achievement I include studies, which measured personal benefits such as self-esteem, relationships with peers, intrinsic motivation and perspective-taking ability. These studies fall into the following categories: general populations; control v. experimental groups; White and minority students; academically handicapped and nonhandicapped students; and ability levels.

The effects of cooperative learning have drawn the interest of many researchers. Studies on cooperative learning are numerous (Johnson & Johnson, 1993; Johnson, Johnson, Pierson, & Lyons, 1985; Madden & Slavin, 1981; Putnam, Markovchick, Johnson, & Johnson, 1996; Slavin, 1977; Slavin & Karweit, 1979; Slavin, Leavey, & Madden, 1982; Slavin, Leavey, & Madden, 1983; Solomon & Battistich, 1990) and have allocated any number of effects on student achievement. Proponents of cooperative learning

environments advanced the perspective that it is a means of increasing higher-order thinking skills; an alternative to ability grouping; and a way to prepare students for a cooperative workforce (Slavin, 1991; Sharan & Ackerman, 1990). In addition, studies have also attempted to show that cooperative learning promotes "team-building, a sense of inclusion, common identity, higher self-esteem, self-confidence, positive psychology adjustment, an understanding of another person's perspective, an increased ability to work effectively with others, better peer relationships, and better student-faculty relationships" (Davidson & Worsham, 1992).

A representative number of the reviewers of the literature note that students in cooperative learning environments work together in small groups to learn curriculum and gain significant achievement (Slavin, 1991; Stevens and Slavin, 1995). While a number of studies demonstrated positive effects of cooperative learning environments, Sapon-Shevin and Schniedewind (1992) posited that group work and cooperative learning might reinforce status hierarchies present among students in diverse classrooms.

General Populations

Several studies and reports (Johnson, Johnson, Pierson et al., 1985; Madden & Slavin, 1981; Sharan & Ackerman, 1980; Slavin & Karweit, 1979; Slavin, Leavey & Madden, 1982; Stevens, Madden, Slavin & Farnish, 1987) have shown that a typical cooperative learning scenario will produce increased academic achievement. Sharan and Ackerman's three-week study

comparing the pre- and post-test results on academic achievement of 108 students taught in small cooperative groups compared with that of 109 students instructed in the whole class approach in grades two through six found both small group and large group instruction benefited students. Data from grades three and five indicated a positive effect on the achievement of social studies curriculum of students in the cooperative group and that the second grade small-group classroom excelled on both low and high level questions. Although the findings here generally support the hypothesis that small group learning is beneficial for student academic achievement, on the second grade level students in the traditional classrooms achieved higher scores on both low and high level questions of Bloom's taxonomy. And again, in the fourth and sixth grades in traditionally taught classrooms, students performed better on lower level questions than did those in the cooperative group. The inconsistent findings presented in this study may be due to the short duration. The validity of the measurements found might have changed if the study were conducted for a longer period of time.

Slavin and Karweit (1979) evaluated Student Teams Achievement Division (STAD), Teams-Games-Tournaments (TGT), and Jigsaw II to determine their effectiveness on improving student achievement, attitudes, and self-esteem in language arts, mathematics, and social studies subjects over the length of a semester. The participants were 388 fourth and fifth grade students, who were pre- and post-tested to the intended variables.

Contrary to the inconsistent findings in Sharan and Ackerman's study, the researchers found experimental groups scored significantly higher than the control groups, ranging from .2 to 1 whole grade equivalent.

Another study, conducted by Stevens et al. (1987) found results (based on pre- and posttests) that showed an increased academic ability in reading, language arts and writing activities in students who learned in a Cooperative Integrated Reading and Composition (CIRC) environment. They conducted two studies allocating over 2 hours each day to the CIRC environment. The first study included 461 third- and fourth-grade students separated into 11 experimental and 10 control classes over a 12 week period; the second study was composed of 450 third- and fourth-grade students separated into 9 experimental and 13 control classes over 24 weeks. The results of the two studies suggested a positive difference favoring the experimental groups in reading comprehension, vocabulary, language expression, language mechanics and spelling. The authors noted that interpretation of such effects was difficult because the CIRC environment was complex. Although it was a cooperative environment it still consented to teacher-directed instruction and independent reading activities daily.

Johnson, Johnson, Pierson, et al. (1985) performed another study supporting the benefits of cooperative learning. The authors designed the structured controversy study to evaluate the effects of controversy and concurrence seeking in single- and multi-age cooperative groups measuring

achievement, motivation, interaction and perspective-taking ability. The participants were 36 fourth grade, 43 fifth grade, and 33 sixth grade students randomly chosen for heterogeneous placement in one of four conditions: multi-age controversy; multi-age concurrence seeking; single-age controversy and single-age concurrence seeking. Instruction included three weeks of 40-minute sessions. The results suggested that students at all three achievement levels performed better in the controversy condition than those students in the concurrence-seeking condition. Students in the controversy condition were also better able to take two perspectives than their concurrence-seeking counterparts. Low- and medium-achieving students in the controversy group said they had a higher sense of personal efficacy in comparison with those in the concurrence-seeking group, although it was the opposite for high-achievers.

Stevens and Slavin (1995) also investigated the effect of CIRC and Team-Assisted Individualization/Team Accelerated Instruction (TAI) on academic achievement in reading, language and mathematics. The two-year long study involved two treatment and three control schools consisting of 1,012 students in second through sixth grades. By comparing the pre- and post-tests after the first year, they determined that significant differences occurred in the treatment group on reading vocabulary. The results after the second year favored the treatment group in reading vocabulary and comprehension, in addition to language expression and math computation.

The positive effects on achievement found in this study maintained the effectiveness of cooperative learning and reduced the possibility of the Hawthorne effect (Stevens & Slavin).

The results of these studies support the claim that cooperative learning can be used as the primary means of instruction in classrooms. Many of these studies generally supported the hypothesis that academic achievement is increased under cooperative learning environments. Although at different levels of success, the general findings showed increased performance in subject areas. However, other research studies (Slavin et al., 1982; Wheeler & Ryan 1973) comparing three learning environments (cooperative, competitive and control) suggested increased academic achievement occurs above the control group, but no significant difference exists between the two experimental groups.

Control v. Experimental Groups

Slavin et al.'s (1982) studies illustrated this issue. They conducted two studies measuring the effects of programmed instruction and cooperative learning in mathematics on academic achievement. The authors used a combination of individualized instruction and cooperative teams. They randomly assigned 504 third, fourth, and fifth grade students (who had been pre-tested on mathematics achievement) to one of three conditions to be implemented for the duration of the eight-week study: Cooperative-Individualized (Team Assisted Individualization), Materials Only (MO), or

Control group. The students remained in teams for four weeks, and then new teams were assigned for the last four weeks of the study. The second study conducted by Slavin et al. (1982) consisted of 375 fourth, fifth, and sixth grade students, which sought to measure the effects of TAI over a 10-week period. In their analysis of the results, the researchers found the TAI group gained significantly more in achievement than the control group. However, the materials only group also gained marginally more than the control-group. The authors failed to find significant differences between the two experimental conditions--TAI and MO, which could be contributed to the length of the studies which were a brief two and two and a half months, respectively. The results might have looked differently had the material been truly constructivist, in other words meaningful and authentic to the students in the TAI and MO groups.

In an attempt to measure the academic achievement effects of cooperative and competitive classrooms, Wheeler and Ryan (1973) randomly assigned 88 fifth and sixth grade students to one of three treatments for an 18-day period: cooperative, competitive or control groups. Although both groups outperformed the control group, the results indicated that there was no significant difference found between the two experimental groups. The validity of these results is subject to the small size of the population, the length of the study, and a lack of a pre-test. The small sample size was not representative of the general population; therefore, the generalizability of the

results is limited to the sample population of students. The short duration of the study did not allow for proper instruction of the characteristics of cooperation and what it might look like in a classroom. Finally, the researchers failed to control for the intended variables due to a lack of pre-testing. Therefore, the validity of the measurements of academic achievement was questionable, as there was nothing to compare the final results to.

White and Minority Students

Increasingly American classrooms are becoming more and more diverse in make up (Slavin et al., 1982). Evidence suggests that a gap in achievement exists between Black and White students and it is theorized that a reduction in that gap may occur by allowing students to work cooperatively (Slavin, 1977). In his study, Slavin used STAD to compare the effects on White and Black students' achievement. The subjects were 65 seventh grade students randomly assigned to either the experimental or control group by a coin flip. Both classes were taught by the same Black female teacher and were given pre-tests to determine initial differences. The STAD treatment was used 40 minutes per day for a total of nine weeks in the spring. The results strongly supported the author's initial belief that student-team learning techniques would increase achievement for Blacks more than Whites. In the STAD class, Blacks showed consistently greater academic achievement gains than Blacks in the control group. Minimal effects were found for White students in the experimental group.

Another study supports Slavin's findings. Lucker, Rosenfield, Sikes and Aronson (1976) performed a study that demonstrated similar effects of cooperative learning on reading skills. The Jigsaw study investigated 303 fifth- and sixth-grade students in 11 classrooms; the two types of classrooms were interdependent and traditional. The study lasted for a two-week unit on colonial America, each period lasting for 40- to 45-minutes daily. A pre-test before the introduction of the materials and a post-test after its completion were administered to the subjects. An analysis of these results indicated that student performance was superior in experimental classes; however, the improvement occurred in the performance of minority students, not Anglos.

Again, why would the cooperative environment influence the academic achievement of minorities only? One possible reason might be that the Anglo students may have shown a greater achievement level over a longer period of time. Another possibility may be that the lower class and minority students were more peer and group oriented which would contribute to their ability to perform better in learning groups rather than individually (Slavin, 1977).

Academically Handicapped and Nonhandicapped Students

In addition to heterogeneity of race in classrooms, ability became diverse as well with the mainstreaming of academically handicapped students under PL94-142 (Slavin et al., 1982). While attempting to research the increasingly large gap in ability, Madden and Slavin (1981) evaluated acceptance and mathematics achievement of mainstreamed academically

handicapped and nonhandicapped students. The subjects were 183 third, fourth, and sixth grade students; 40 were labeled as having significant academic handicaps. The conditions were in effect for seven weeks, implementing the conditions for one hour a day. A mathematics curriculum test was given pre- and post-treatment to assess achievement. The results demonstrated that achievement increased in the cooperative condition for the full sample of handicapped and nonhandicapped students.

Contrary to Madden and Slavin's findings, Johnson, Johnson, Scott and Ramolae (1985) found problems that may be indicative of cooperative learning methods. In order to measure the impact of single-sex and mixed-sex cooperative learning experiences on male and female science achievement and attitudes they selected 154 students (76 fifth and 78 sixth) who were randomly assigned to groups with heterogeneity in regard to ability, sex, grade level and handicap. The instructional sessions lasted for 45 minutes per day for 21 days over a nine-week period. The results of the study claimed that males achieved higher than females. The researchers were able to find increased academic achievement; however, the achievement increased only for non-handicapped students. A gap in the significance of these findings is that the duration of the study did not allow much time to witness the long-term effects on handicapped students.

In an attempt to monitor high ability students' achievement only, Johnson and Johnson (1993) conducted a study measuring achievement, self-

esteem, higher level thinking and social acceptance of high-ability students in cooperative and individualistic learning environments. The participants were 34 high-ability students (defined as being in the top 25% in reading) from four fifth-grade classrooms, who were randomly assigned to conditions. The procedures consisted of six 55-minute instructional sessions, taught by two different teachers. Pre-tests were given to ensure validity. The results indicated that high-ability students in the cooperative condition performed better than their counterparts in the control group on recall questions, higher level questions and the total test. The generalization of the findings included in this study is limited due to the short duration of the study--six 55-minute sessions. This lack of significant time allocated to the cooperative structure fails to control for outside variables such as familiarization with the group structure, personal problems that might arise within the group, and the time of day the structure was implemented.

Ability Levels

While these and other studies show cooperative learning's influence on students of all abilities, it is interesting to note that the following research study exemplifies a different finding on academic achievement. Swing and Peterson (1982) conducted a four-week study that investigated students' mathematics achievement during small-group activities. After taking a pre-test, forty-three fifth-grade students were assigned randomly to either an experimental or control group. The results indicated that low and high ability

students in the cooperative group demonstrated improved academic achievement, although the group exercises did not promote the achievement of medium ability students.

Fuchs et al. (1997) conducted a study that supports the findings from Swing and Peterson's (1982) study. Exploring students' mathematical ability during group learning activities, Fuchs et al. examined 40 teachers in grades 2, 3, and 4 who implemented cooperative groups for 18 weeks. Four students (one of high, two of medium and one of low ability) from each of the 40 classes were pre- and post-tested for mathematics ability. The analysis indicated that students of all abilities who participated in small group interaction--whether tutoring, receiving elaborated help or giving explanations--surpassed the achievement of those in the control group. However, follow-up tests suggested that the method could have been more beneficial for low- and high-ability students than for the average-achieving students.

Peterson and Janicki (1979) added a twist to the findings of other researchers. They conducted a study of 100 fourth-, fifth- and sixth-grade students who were randomly assigned to two groups: large and small instruction groups. Each of the two teachers taught mathematics material to two classes for 40 minutes per day for the nine-day duration of the study. Students were given a test at the end of the study and again two weeks later to test for retention. The researchers concluded that high-ability students retained more information in the small-group approach and the low-ability

students retained more in the large-group approach. The authors claimed that the high-ability students gained more from explaining the material within the small group, whereas the low-ability students needed more direction and explanation from the teacher, thus benefiting from instruction in the large group. However, these results are very limited due to the extremely short length of time of this study. The duration is subject to the validity of measurement of similar effects over a longer period of time.

Finally, Nattiv's (1994) STAD study found similar effects of cooperative learning on academic achievement. Using videotaped sessions for 30 minutes over a 3-week period, Nattiv sought the answer to the influence helping behaviors have on the math achievement gain of students in a cooperative learning environment. The subjects were 101 students in third through fifth grades who were taught math concepts in cooperative groups of five to six students. The researcher administered pre- and post-tests to guarantee validity of the study. The results illustrated that giving explanations did indeed increase academic achievement; however, giving and receiving answers only did not affect achievement positively or negatively in the sample. Similar to the previous study's weakness, the short duration of the implementation of treatment subjects this study to the lack of validity of the effects over a longer period of time.

Summary

This review of the research highlighted significant findings of the affects of cooperative learning strategies on academic achievement, social behaviors and personal interaction. The results of the various studies suggested that cooperative learning environments were at least as effective as traditional classroom practices in many cases. However, in a limited number of cases researchers found traditional methods of instruction was more beneficial to the student population. Although the review did provide more insight into cooperative learning environments, strengths and weaknesses were evident and should be considered for future research purposes.

Conclusions

"It is nature that built cooperation into us and we must realign our cultural practices so as to restore this basic component of our design."

(Davidson & Worsham, 1992, p. 30)

As can be seen in the historical review, cooperation has been around since the first century (as recommended by Quintilian). So, why is competition so popular in classrooms today? It is evident that the use of competition and cooperation fluctuated throughout history. Competition was popular during the colonial period as demonstrated by the development of the petty class reading-and-writing and the more elite grammar schools.

Cooperation became more popular with the rise of twentieth century liberals such as Colonel Francis Parker, John Dewey and Colin Scott. Each of these promoters of educational change influenced the use of cooperative groups in the classroom. Dewey, in particular, stressed industrial society's loss of common goals and hoped to implement a socialized classroom. He sought to develop a program that would embrace the values of democratic society and improve social skills of young students. Many of Dewey's followers continue to research the effects of cooperative learning environments, hoping to maximize the benefits.

Although it is clear from the research reviewed in the previous pages that cooperative learning's effect on academic achievement is at least as effective as traditional classroom instruction, several important findings have

emerged, ranging from cooperative learning's ineffectiveness to the improvement of one whole grade equivalent on academic achievement. First, for the most part cooperative learning environments demonstrated positive effects on student academic achievement in various subjects. In some studies authors did fail to produce significant effects between two experimental groups, although in both studies the experimental groups outperformed the control groups (Wheeler & Ryan, 1973). One possible contributing factor to this outcome is that all students were given the post-test under competitive conditions. "Thus, regardless of the treatment from which he came, a subject's frame of reference at the time of testing was probably influenced by a situation that resembled previous school examinations" (p. 406). The authors of this study proceeded to suggest that if analyses of the effects of cooperative and competitive classroom environments are to be done, non-competitive post-tests measures should be developed.

The present findings suggest that cooperative learning environments are more beneficial to low and high ability students and that they have little effect on average achieving students, although results indicate that average ability students were not any less involved (Peterson & Janicki, 1979; Swing & Peterson, 1982). The researchers attributed the results to a number of task-related behaviors that were included in the study. They explained that cooperative learning increased the achievement of high ability students

because these students comprehended the material and were capable of explaining the difficult information to less able students.

The research evidence also suggested that cooperative learning improved the academic achievement of minority students and did not demonstrate a significant effect on the achievement of Anglo students. One researcher attributed these findings to a lack of school-related skills and motivation while working independently (Lucker et al., 1976). However, the authors also offered another explanation: students may have spent more time on homework to prepare for school in order to impress their classmates.

Researchers also investigated the effects of cooperative learning on the academic achievement of mainstreamed academically handicapped students. The research studies reviewed here indicated that cooperative learning was not effective in increasing the academic achievement of handicapped students. However, caution is advised as to the reliability of these results as the length of the study does not seem an ample amount of time to measure improvement.

Although the results of the measurement of academic achievement were mixed, it is apparent that it is beneficial for improving social relations, self-esteem, perspective-taking ability, and increasing academic achievement of high- and low-ability students. Nevertheless, I suggest that future research be conducted to more thoroughly investigate how cooperative learning can

increase the academic achievement of (a) Anglo students; (b) medium-achieving students; and (c) handicapped students as well.

I recommend caution to the interpreter of these studies. The results of some of the studies are inadequate and should not be generalized to the general population. In some studies the population was too small to obtain a true portrait of cooperative learning's effects on achievement or the duration of the study was too short to provide reliable results. I do agree, however, that when cooperative learning is implemented in a careful manner, including each of the necessary components, it is capable of improving the academic achievement of all students. However, after further research I recommend that teachers implement cooperative learning methodologies in a constructivist manner. Students should learn to work cooperatively on tasks that they show interest in learning about. The task should be authentic, holistic, meaningful, and student-centered.

I conducted this research to educate myself on the effects of implementing cooperative learning strategies in the classroom. I also hoped to educate the reader as to the effects of cooperation. I expected that my evaluation of the research would demonstrate the academic benefits of cooperative strategies. After conducting this research I recommend that cooperative learning be used in the classroom as part of a combination of competitive and individualistic learning situations. There continues to be a place for all three environments and students would benefit from being

exposed to each of them. The concept of cooperative learning was developed around the idea of preparing students to participate in democratic society, to work together, to develop social skills and to reduce tension among diverse groups of people. In order for students to understand and function as part of this society they must be able to work cooperatively and individually, as well as competitively.

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