The Advantages of Class Wide Peer Tutoring in an Urban Eighth Grade Inclusion Science Class

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Abstract

Class Wide Peer Tutoring (CWPT) is an instructional strategy which utilizes students who are academically strong in one area, in this case science. These students have favorable behavioral characteristics which allow them to successfully tutor their peers. One eighth grade inclusion science class of 23 students from an urban middle school were divided into five groups of four students and one group of three students. Each group was assigned a student peer tutor. This tutor would assist other students in the group with the designated science activity. Weekly observations of the effects of the CWPT; student, tutor and educator surveys on their opinions of CWPT in the classroom; and the comparison of student grades for two marking periods before and after CWPT implementation were used to gauge the level of program success. Fewer students earned failing grades for the marking period following CWPT than in previous marking periods where CWPT was absent. Positive classroom behavior and student engagement also increased during learning activities once CWPT had been implemented.
Chapter One: Introduction

In 1990, The Individuals with Disabilities Education Act (IDEA) mandated that students with disabilities be mainstreamed into all core general education classes. The implementation of IDEA became known as the inclusion movement in our national education system. It has forced educators to look at students and to evaluate their learning abilities. The results of these evaluations have identified more than half of the entire student population as learning disabled. About one third of the secondary science and math classes include students with learning disabilities (National Science Foundation, 1996). This astounding data has forced science and math educators to reflect on their instructional strategies to determine their effectiveness in student achievement.

In addition to IDEA, The National Science Standards require that all students reach the goal of mastery skill level. In order for science students to gain mastery skill level they must have a deep understanding of core scientific concepts. Inquiry science facilitates understanding of these concepts via hands-on activities and discovery-based labs. Students rather than science teachers are developing and asking the questions for topics (Schaaf, 2002). The goal of inquiry science is to transform the science student into the science educator with the latter being master of the curriculum.

Problem Statement

How can it be ensured that each student becomes a master of science,
addressing the wide variety of student needs and abilities that an inclusion class possesses without disrupting the flow of the classroom? The problem that arises in this inclusion classroom is that if all student needs are not met then negative behaviors tend to manifest, primarily the loss of the motivation. If an inclusion student’s academic needs are not being fulfilled then they will lose focus; give up and completely stop working on the lesson. This generally results in inappropriate classroom socializing. If the students are not focused and engaged in the science lesson then they become bored and turn their attention elsewhere. This causes major disruption in the learning of the science inclusion classroom because once the socializing begins it becomes very difficult; if not impossible to refocus and re-engage students. Improved academic performance and classroom behaviors are the guidelines by which a successful strategy may be assessed. Research supports Class Wide Peer Tutoring (CWPT) as one instructional strategy that successfully addresses this problem.

Significance of Problem

Incorporating students of all levels of academic abilities and behaviors affects the entire science classroom. It creates an environment which is not consistently supportive of all learners. If the students are misbehaving, then they are not engaged in their learning which often leads to an unproductive learning environment and decreased student achievement. I needed to implement an alternative instructional strategy to help students improve their academic and behavioral performance in science.
CWPT is a strategy which encourages students to teach and learn from one another. It was initially developed by Joseph Delquadri and Charles Greenwood at the University of Kansas in 1988. This strategy was a timely invention to help educators implement both the mandates of IDEA and the goals of the National Science Standards. CWPT is appropriate for use with students who are low achievers and/or have learning disabilities (Becker & Fiore, 1994). CWPT is also a teaching strategy science teachers can utilize to ensure mastery in this content area (Mastropieri & Scruggs, 1993). The tutors of the content become the mastery learners while teaching the tutees. The feedback provided by the tutors is utilized to clarify understanding and enhance learning of the science material by the tutees (Topping et al., 2004). Once clarification of the science curriculum is achieved by the tutees, inquiry learning can begin. This acquisition of knowledge is what led this action research project.

Purpose

The purpose of this six-week study was to measure the effectiveness of implementing CWPT in my eighth grade inclusion science class. It was hoped that the use of CWPT would create a more effective and efficient learning environment for all science students. I had previous opportunities to observe peer tutoring in a school-wide tutoring program for students who had several absences and needed to catch up in their classes. I made observations and concluded that the program was successful for both the tutors and tutees involved in the process. The benefits of the program were multifaceted. First, a support system was created for the tutee by which
fellow students were able to break down difficult concepts to their own level that teachers could not often duplicate. Secondly, the tutor enhanced their own understanding by way of explanation and review under the guidance of the teacher.

Rationale

If peer tutoring can be successful in the school-wide program then why not in my eighth grade inclusion science classroom? CWPT seems to be a perfect fit because it establishes a support system with the teacher and other classmates based on student needs, improving student learning by increasing academic and social skills, and reducing off-task behaviors (Arreaga-Mayer, 1998). CWPT gives the student tutor the opportunity to coach the tutee in recognizing important content area patterns which empowers the tutors to successfully educate their peers during a tutoring session (McDonnel, Mathot, & Thorson, 2001). These opportunities will hopefully improve the current classroom environment which is not supportive of the behavioral and academic science achievement of all students.

Definition of Terms

According to Arreaga-Mayer (1998), CWPT is a form of intra class peer-mediated instruction. “The tutor is used to increase the partner on-task behavior and to provide feedback and reinforcement during the acquisition and maintenance of the academic content being covered in the classroom” (Anderson & Yilmaz, 2002, p.1). CWPT is one instructional strategy that has many benefits which include easy implementation within any content area classroom.

An inclusion classroom defined by IDEA (1990), “ is a classroom of
students who have a wide variety of learning styles and problems” (p.1). These learning styles encourage the teacher to utilize visual models, hands-on activities, concept maps, guided notes and simplified instructions. Some identified characteristics of inclusion students are lack of social skills, low academic performance and increased negative behaviors in the classroom (Mastropieri & Scruggs, 1993).

Mastery learning is defined as “becoming an expert in the content area of study. A student who has become an expert, has the ability to solve problems and to recognize meaningful patterns of information” (National Research Council, 2000, p.3).

Summary

Peer tutoring is not a new concept in education, it has been an educational tool dating back to Aristotle (Enright & Axelrod, 1995). Class Wide Peer Tutoring is an alternative instructional strategy which involves student-centered teaching and learning. What effect will CWPT have on behavioral and academic success of eighth grade students once implemented in a science inclusion classroom?

My goal is to determine if CWPT is an effective strategy for improving academic and behavioral performance in the inclusion science classroom. Weekly observations of student, tutor and teacher relationships, as well as surveys will be used to evaluate CWPT’s effect on behavioral performance in the classroom. These surveys will be administered at the end of the six-week implementation period. The CWPT’s effect on academic performance will be measured through comparing
marking period grade reports; before and after CWPT implementation. Overall, this collection of data will provide insight as to the academic and behavioral effectiveness of CWPT in my eighth grade science inclusion classroom.
Chapter Two: Literature Review

Aristotle utilized peer tutors to assist him in educating many of his students. This practice carried over into Roman times when master teachers employed older students to drill the younger ones in basic reading and writing skills. During the Renaissance and Reformation periods, peer tutors were used widely to monitor other students' behaviors and scholarship under the guidance of the master teachers. Peer tutoring was found to be a very economical way to educate with limited school budgets. This ancient application of peer tutoring to improve academic and behavioral success is a model which can still be emulated in today's educational system (Enright and Axelrod, 1995). CWPT utilizes a student tutor much as Aristotle did in ancient Greece. It is still an economical method because it uses skilled students to help their peers in the classroom. It may only cost the school/classroom a weekly/monthly reward, not necessarily monetary, for the tutors as a token of appreciation for a job well done.

Studies Examining Implementation of CWPT in the Inclusion Classroom

Gilberts (2003) from the University of Texas at Pan American has some suggestions on how to implement CWPT into an inclusion classroom. The first step in incorporating this program is to carefully select and effectively train peer tutors. Peer tutors can be recruited through personal contacts and referrals from teachers, counselors and administrators. The training of the peer tutors should be extensive. It should cover the expectations of the tutors, characteristics of students
with disabilities, specific content knowledge, simple instructional strategies and tools as well as specific skills for working with teachers and students. Models, acronyms, mnemonics and graphic organizers should also be supplied to support tutoring sessions. These training sessions should occur throughout the entire implementation period. This process should imitate the professional development requirement for teachers.

The second step requires the reorganization of the classic classroom set up of vertical rows. One suggestion made by Gilberts (2003) is that students should be arranged into groups of at least four students. These groups need to be cooperative meaning that each student has an assigned responsibility. These responsibilities may include time keeper, researcher, transcriber, and peer tutor. A time keeper watches the clock to make certain the group is on schedule for completing the assigned activity. The researcher gathers the data or information needed to complete the activity. A transcriber records and writes the information that was gathered for the activity. Finally, the peer tutor assists other students in the cooperative group with the assigned activity. It is imperative that a peer tutor be assigned as part of this cooperative learning group of students in order to make CWPT successful in the classroom (Gilberts, 2003). For instance, three students should be assigned a classroom peer tutor totaling four students in each cooperative learning group.

Monitoring of the peer tutoring sessions is the third step for successful CWPT implementation. The classroom teacher must observe the tutor interacting
with the tutee to ensure that the training is being implemented accurately. These questions should be asked as the monitoring is occurring: How is the tutor treating the tutee? How is the tutee responding to the tutor? Is teaching and learning taking place or just socialization? Is clarification occurring? These monitoring sessions should occur frequently at the beginning of the CWPT program until the classroom teacher is confident in the peer tutoring process at which time monitoring can be reduced (Gilberts, 2003).

The final step involves making rewards an integral and important part of this program. Some rewards suggested by Gilberts (2003) are class credit, weekly rewards such as candy, fancy pens and gadgets, and monthly rewards that may include field trips, achievement certificates, dinner at a favorite restaurant or a trip to the movie theater. These extrinsic rewards are important because they thank the peer tutors for their effective tutoring skills and for their academic assistance to the classroom teacher. This can help to make the tutors feel appreciated and motivated which can improve the CWPT sessions.

Research has shown that extrinsic rewards are not successful tools when it comes to motivating students in the classroom, however, these extrinsic rewards are for the tutors only. Theses tutors have been chosen because they are already intrinsically motivated to learn and to achieve in the classroom. These tutors are voluntarily attending after school training sessions which emulate the professional development of salaried teachers. These extrinsic rewards can be utilized as a form of
Selection and Role of the Peer Tutor

The selection of the peer tutors as stated in the previous section must be done with careful consideration. The peer tutors must possess these needed qualifications: perseverance, higher-order thinking, leadership, organization, willingness to stand firm against odds, and compassion. These characteristics are not limited to students with high academic scores but also include those who demonstrate leadership skills in extracurricular activities such as student organizations. Motivated students with special needs should also be chosen as peer tutors because it may have a significant positive effect on their social skills and self-esteem. If these students are trained carefully and properly, they can help others who have the same needs.

One of the problems that we as teachers face when teaching students with special needs is the uncertainty of what truly helps them learn because of the lack of time and large teacher-to-student ratios. These motivated special needs tutors know when to ask for assistance in the classroom and can identify which learning strategies are successful. These educational tools can be taught to the special needs tutees and other students in the classroom. This knowledge can be utilized for teaching other students in the class with special needs (Dopps & Block, 2004).

The peer tutor must be able to fulfill certain responsibilities in order to ensure success of the Class Wide Peer Tutoring program in the inclusion classroom. The tutor must be able to provide effective feedback for both the tutees and
the classroom teacher (Arreaga-Mayer, 1998). This feedback between the teacher/tutor and the tutor/tutee is critical and necessary for the success of CWPT. Feedback needs to be meaningful, understood and correctly acted upon. Orsmond (2005) discusses six ways in which feedback can be utilized. It can be used to enhance learning, encourage reflection, improve motivation, clarify understanding, enrich the learning environment and improve engagement in the learning activities. Students generally learn from their mistakes if they are shown the correct way of doing something. Some students require a one-to-one approach with certain concepts which unfortunately most teachers do not have enough time to allocate (Ryan, Reid, & Epstein 2004). Successful CWPT can alleviate this time issue.

The second important responsibility is that the peer tutor must be able to monitor student understanding accurately and with compassion. Frequent tutee reiteration of content to the tutor is one simple way to measure this understanding. The teacher still has the primary role of providing basic concepts upon which the tutor can expand (Dopp & Block, 2004). If the tutor rushes or insults the tutee, the result can be detrimental to CWPT. The effects can include lack of motivation, decrease in confidence levels, and a lack of trust (Gilberts, 2003). It is the role of the teacher to monitor these sessions closely and to provide proper tutor training to ensure CWPT is promoting confidence in the tutees so that they are motivated to learn.
Effects of Class Wide Peer Tutoring (CWPT)

Delquadri & Greenwood (1995) utilized CWPT as a method to prevent school failure. Ninety inclusion students were exposed to the CWPT model in sixth grade. These students were tracked until eleventh grade. The data showed that this experimental group of students had eight individuals drop out of high school. The remaining eighty-two students were still enrolled in high school. The control group which consisted of ninety students that were not given CWPT had nine individuals drop out and eighty-one students that remained in school. The data can be utilized to support CWPT as an effective strategy in slightly reducing the drop-out rate in high school even if it is just by one student. It may not have been CWPT that kept that student in school but it can not be ruled out as an effect. Further research should be done and data collected to prove that CWPT was the cause for the decrease in the high school drop-out rate. Research has suggested that the longer we keep the students in high school the better our chances of increasing confidence in their learning. This in turn will increase our national college attendance numbers (National Research Council, 2000).

Dupaul & Henningson (1993) reported that CWPT is an effective method of instruction for students with ADHD in inclusion classrooms as well as all student populations. It allows for one-on-one academic intervention which is needed for students with ADHD. These students have a difficult time focusing and staying seated during instruction which contributes to their low academic achievement.
Seventy-five percent of students with disabilities display improper social skills that isolate them from the rest of the student population (Forness & Kavale, 1996).

"Students with disabilities often have difficulties in determining socially appropriate and academically correct behaviors; therefore, receiving appropriate feedback from their peers can provide essential information concerning behavioral expectations" (Gartin & Murdick, 1992, p.241). The tutors model the appropriate social behavior for the students with disabilities to follow in and out of the classroom. Peer tutors become a support unit for these students. They learn to trust the tutors and look to them for both academic and social support. The tutors assist the teachers in the classroom by keeping the ADHD students’ attention while the lesson is occurring. The amount of time it takes one peer tutor to refocus the ADHD student is much less than the amount of time it takes for the teachers to accomplish the same goal. The is due to the close relationship that has developed between the tutor and ADHD tutee (Voltz, Elliott & Harris, 1995).

Utley & Mortweet (1997) conducted a twelve-week study of CWPT involving nine different teachers of inclusion classrooms with ADHD students. A survey was given to the teachers which had them input observations on how their classrooms were affected by the CWPT implementation. The data from these surveys revealed that the students used socially appropriate skills, utilized self-control which reduced classroom aggression and cooperated with each other to solve problems. The surveys also conveyed that this peer tutoring instruction of students
with ADHD achieved higher amounts of engaged time, opportunities to respond, immediate error correction and increased motivation of the students as compared to the teacher-led instruction.

Maheady, Sacca, & Harper (1987) conducted research on the effects of CWPT in a middle school inclusion math class which showed an increase in scores of the students with learning disabilities on weekly math tests compared to students without learning disabilities. Another investigation performed by Fuchs, Fuchs, & Kazdan (1999) in a high school inclusion ELA classroom utilized PALS (Peer Assisted Learning Strategies). This is a reading program which was originally developed for elementary students, but when used in this high school setting proved to be successful. The results showed that PALS did not indicate an improvement in reading fluency among these learning disabled students. However, there were reading comprehension improvements on weekly quizzes. Students reported that they worked harder with a peer tutor through weekly interviews (Stephenson, 2001).

Cobb (1998) demonstrated CWPT success with low achieving sixth grade female students with ADHD. A short survey was given on CWPT after it was utilized in their inclusion classroom. Students made statements on how they felt more help was available in the classroom once CWPT was in place. They stated that they made some smart new friends. The tutors helped them with their reading skills. Students also stated that they felt more confident in their reading and comprehension and wanted to read aloud in class.
CWPT was done with some learning disabled students in a science classroom at Weatherford Middle School. Tilkin and Hyle (1997) conducted interviews with some of these students and asked them what they thought about peer tutoring. They talked positively about peer tutoring and supported its use in the classroom. One student with disabilities reported, “I think in any classroom someone understands it better than you. You ask a friend. You feel kind of embarrassed, but they help you. We have time in class for group work. That was pretty helpful” (Tilkin & Hyle, 1997, p.15). Another interview was done with a parent of a student with a learning disability. She was asked about her thoughts on peer tutoring in the classroom. The parent stated that, “Socially, it can be good and bad. You have to make sure it is a positive experience. Sometimes kids can communicate to kids better than adults” (Tilkin & Hyle, 1997, p.17). Prater and Serna (1999) discovered that students teaching is much more effective in most cases than teachers instructing students. Students have a way of showing each other their problem solving tricks which are, in many cases, much simpler than those of the teacher (Dopp & Block, 2004).

Chavez and Arreaga-Mayer (1987) studied middle school science students who scored poorly on weekly vocabulary tests. They decided to implement CWPT into their science class and made weekly observations of its effects for eight weeks. They instructed the peer tutors to focus only on helping the tutees learn the science vocabulary. They observed that the tutors were utilizing mnemonics and foldables to help the tutees learn the science vocabulary terms. They
gathered and recorded the weekly vocabulary test grades and found that some vocabulary tests scores began to increase over the two month time period. CWPT proved to be effective in improving the science vocabulary test grades for these science students. Another empirical study done by Chavez and Arreaga-Mayer (1987) analyzed the effects of CWPT on fifteen Limited English Proficient (LEP) students. This is considered a learning disability because of the difficulty these students demonstrate with reading the English language. Scores from weekly science vocabulary pre and post-tests were collected for six weeks. The results showed an increase in the scores on these weekly science vocabulary tests. The number of failures on these tests went from an average of seven to three in this short time period. This data clearly shows that peer tutoring was successful for most of these LEP science students.

A controlled CWPT study of students aged seven to nine in a science classroom paired tutor-tutee to perform science activities each week for a period of eight weeks. Weekly videotaping of the peer tutoring was performed which demonstrated positive behaviors of both tutor and tutee. There were more discussions and challenging science questions being asked and answered. Informal observations of this class were done and the results showed tremendous gains in social interaction, conversational skills, questioning, experimenting and confidence levels of all students. Pre and post-tests of science vocabulary words were administered each week which demonstrated improvements in their scientific keyword understanding.
He concluded that peer tutoring in science has a number of potential and theoretical advantages for the tutor and tutee: improvements in student motivation, attitudes towards science and the level of confidence that he or she may become a scientist (Topping, 2004).

**Benefits for Tutors, Tutees and Teachers**

Stephenson (2001) found that the duality of student success is another powerful advantage of CWPT. The tutees gain the obvious benefits from this strategy, but there are also advantages for the tutor. CWPT allows the student tutors the opportunity to coach the tutees in how to recognize important patterns in the content which empowers them to educate their peers during a tutoring session (McDonnel, Mathot, & Thorson, 2001). This pattern recognition only reinforces the stimulus for the reinforcement of their own understanding of the knowledge which is being shared. Stephenson states, being able to convey concepts to their peers in a familiar way greatly increases the tutors’ confidence in their own learning abilities. This helps to deepen their own understanding of the topic bringing them closer to the national goal of mastery skill level in that subject.

Dopp and Block (2004) looked at high school students with disabilities and discovered that the peer tutors developed acronyms which assisted their tutees in the skill of getting ready to engage in the lesson. One example of an acronym that was developed was **STAR**: Sit up in your desk, Turn toward the speaker, Actively listen and Respect the speaker by not interrupting. The benefit for the tutors in this study
was in their ability to create an optimal environment for learning and teaching. The tutors are developing an understanding that they are in control of their learning environment. They are trying to teach this to their peers so that all individuals will benefit. They are increasing their problem solving skills and becoming true scientists by observing a problem and, creating and testing hypotheses to solve (Voltz, Elliot, & Harris, 1995). The teachers observed that peer tutors showed tremendous progress and growth in their own development of self-esteem, self-worth and problem solving. Peer tutors became positive role models for all the students in the classroom (Dopp & Block, 2004). These are identified as tutor benefits, but they can also be advantageous for the classroom teachers.

Lastly, the tutors benefit from the extrinsic non-monetary rewards they earn for their excellent classroom tutoring services. Gilberts (2003) states that these rewards are helpful in thanking them for being an effective tutor and for providing the classroom teacher with assistance and valuable knowledge in creating a successful learning environment.

The benefits for the tutee are multifaceted. First, the tutees have a strong support system established in the classroom. The tutees have several student tutors and classroom teachers to consult with if they have problems or questions with lessons or activities. The positive relationships that are created from CWPT encourage the tutees to ask more questions because they feel safe and comfortable which increases their understanding and academic achievement (Cobb, 1998).
Secondly, the fellow student tutors show the tutees some simple tricks to breakdown difficult concepts in order to gain understanding so that they can increase academic achievement in the classroom (Dopp & Block, 2004). The tutors also show them how to recognize important patterns which will make it easier for them to solve problems (McDonnel, Mathot & Thorson, 2001).

Finally, the tutees are given positive feedback on their classroom behavior and academic achievements which improves their self-confidence and self-esteem. This is a great intrinsic motivator that keeps students working hard (Tilkin and Hyle, 1997). All of these benefits become learning strategies which the tutees can utilize throughout their educational career. Hopefully these benefits will increase students' chances of staying in high school and continuing on to college (National Research Council, 2000).

CWPT promotes the idea of creating independent student learners. This type of classroom strategy forces educators to give the students ownership of their learning. The more ownership they have, the better they perform. Students want to be in charge of their destiny (Dopp & Block, 2004). It is a great assessment tool as well because it gives teachers a better understanding of where the students are in their learning. It has some implications for classroom management in that it eliminates a lot of the challenges. If the students are engaged and busy, management is no longer a problem. The reduction of the negative classroom behaviors such as socialization during a lesson, and not following simple classroom
Summary

It has been stated in research that once a student learns something through his own methodology, it is never forgotten and easily applied (National Research Council, 2000). CWPT empowers the students to utilize their own methodologies to improve their learning which will tremendously increase their academic and behavioral achievement in the classroom. This increase will change the role of the classic teacher to facilitator of student learning. It makes more time available for the teacher to create student-centered, inquiry-based activities in order to improve mastery learning.

The effects of CWPT demonstrated in the inclusion classrooms were all positive (Palincsar et al., 2001). Anderson & Yilmaz (2004) concluded that CWPT in an inclusive science classroom improved academic performance for all students and improved mental and social skills. It established a good classroom rapport amongst the tutors, tutees, and teachers. Off-task behaviors decreased which led to improved academic achievement (Mcrel, 2003).

There is not enough research performed in the science inclusion classrooms as discussed by the authors of these CWPT empirical studies. The authors suggest that more documented research needs to be done in order to substantiate the implementation of this instructional strategy as a solution to increasing student academic achievement. They also suggest that research implementation periods need to be longer than six weeks. A time period of at least six months would be a more substantial measurement of the effectiveness of CWPT in the classroom.
Chapter Three: Applications and Evaluation

Introduction

The target group for this research study was a class of urban eighth grade inclusion science students who were not successfully achieving academically or behaviorally. The students were exhibiting negative classroom behaviors such as not following simple classroom procedures and being very disruptive during lessons. These negative behaviors may have been a factor in why the majority of the students were not earning a final marking period grade above sixty-five percent.

This drove my research of using an instructional strategy, Class Wide Peer Tutoring (CWPT), which I anticipated would improve both efficiency and efficacy of the classroom learning environment.

Participants

The participants were twenty-three multi-racial students enrolled in an urban middle school eighth grade inclusion science class. Twenty of the students are African American and three are Hispanic. There are fifteen males and eight females in this science class. Ten of the male students are identified as having Attention Deficit Hyperactive Disorder (ADHD). This disability contributes to students’ inability to stay focused on lessons and is one reason why these ten students have Individualized Educational Plans (IEPs). These plans contain goals and procedures utilized by the content and inclusion teachers. The IEPs also assist and guide the students in achieving academic success. Extended test time is one
example of an IEP procedure utilized to assist these students. The other thirteen students are general education students who have not been diagnosed with a learning disability and therefore do not have an IEP. Eight of these students are female, five are male.

The inclusion teacher in the classroom is assigned to the ten students with the IEPs. She is a secondary inclusion teacher with her permanent certification in special education. She has been teaching urban middle school inclusion students for eight years but has no prior experience with CWPT.

I am a science teacher with my provisional certificate in secondary biology and chemistry. I have been teaching eighth grade science in this urban middle school for five years.

Procedures of Study

I decided to utilize CWPT in my inclusion science class because of my previous experiences with school tutoring programs. These programs utilized student tutors to help other students who were falling behind in their classes. I observed the success of this tutoring program and decided to utilize student tutors inside my inclusion science class to help my students achieve behavioral and academic success. I selected my six student tutors and implemented CWPT into the classroom. I was responsible for the training of the student tutors with the science curriculum. Both the inclusion teacher and I interacted and facilitated daily with the tutors and tutoring groups on the assignments to make it a smooth and
Six student tutors were selected out of the twenty-three students because of their high academic achievement, positive behavior and leadership skills. Three males and three females possessed these skills which qualified them as class tutors. The unit in which the tutors were trained to assist was genetics. The topics included in this unit were: meiosis, DNA, genes, chromosomes, dominant and recessive traits, Punnett squares, probability, pedigree charts and mutations. This training required student tutors to attend a seven day, after school learning session. Five of these days were used for content training, while the remaining two days were for job responsibility and confidentiality training as suggested by Gilberts (2003). Once I felt the tutors had mastered the material, I gave them the list of responsibilities. This list included expectations and rights and wrongs of tutoring, as well as informing students of their right to withdraw from the CWPT program at any time without negative consequences.

Once the training was over, a new seating chart was designed which placed the students in six groups of four; the tutors were assigned to their tutoring groups. Student tutors would sit with this group for the remainder of the year.

The genetic lessons were taught each day for the six-week research period. The first half of each science class consisted of teacher input and ascertaining whether or not the students understood the material. The second half of the lesson included a student-centered activity or science laboratory work. This is where the
student tutors began to function as Class-Wide Peer Tutors (CWPT).

Each tutor would assist their group with the assigned student-centered activity. At that time, we, the teachers would walk around the room and observe student tutors with their groups. We would listen to the conversations between the tutor and tutee to make certain that appropriate and effective feedback was being utilized by the tutor. During the six week period, my inclusion science class was transformed from teacher-centered into a student-centered classroom.

I recorded weekly journal observations of student, tutor and teacher relationships, improvements in the learning environment and on-task behavioral progress that developed during this six-week CWPT implementation period. Once the six weeks of observations of CWPT were over, tutors, tutees and classroom teachers were administered a survey. These surveys consisted of a series of questions that pertained to the CWPT process asking if they thought it was helpful. If not, students were asked to provide suggestions on how to improve the program. Six weeks worth of marking period grades were also charted and compared to the previous marking period before the implementation of CWPT.

Instruments for Study

Journal entries of CWPT observations for the six-week research time period was utilized as one instrument for study. Journals examined the advantages of CWPT in this urban middle school eighth grade inclusion science class. The entries contained annotations and commentary on the after school tutor training sessions, tutor-tutee
relationships, improved learning environment and the on-task behavioral progress made after CWPT implementation.

Surveys were another important instrument for study. They were administered to tutees, tutors and classroom teachers after the six-week research period had ended. These surveys gave valuable feedback on the effectiveness of CWPT and also provided me with some suggestions on improvements of this program in my science class for the following school year (see Appendices A, B and C.) The final instrument used in obtaining results was end of the marking period grades. Comparisons were made between grades earned during the marking period prior to CWPT implementation and marking period grades after CWPT. These grades were used to demonstrate any academic effects of CWPT.
Chapter Four: Results

I started this action research in my eighth grade inclusion science classroom because I observed that the students were not achieving academic or behavioral success. I decided to implement CWPT to observe any academic or behavioral effect on my students.

Academic Data Analysis

I collected marking period grades prior to CWPT implementation and after CWPT to observe if it had any academic effect on the students in this urban eighth grade inclusion science class. Figure 1 shows the marking period grade reports prior to CWPT implementation.

Figure 1. The students' marking period grades before CWPT was implemented.
The results from Figure 1 show that the number of Ds and Fs are significantly high for such a small class of students. Figure 1 shows that there are no As for this marking period. These results show that the number of failures are high and the number As or high achievement is zero for this marking period. This is a key reason why I decided to implement CWPT into this class. I wanted to improve this academic roller coaster curve.

Figure 2 shows the marking period grade reports after the six week study on CWPT was completed.

![Graph showing student grades](image)

Figure 2. The students' marking period grades after CWPT was implemented.
The results show a significant decrease in the number of Ds and Fs. There is also a significant increase in the number of As. The academic roller coaster shaped curve changed to a bell shaped curve. The results from Figure 2 clearly provides supportive evidence that there was some academic improvement in concurrence with the implementation of CWPT.

Figure 3 shows the tabulated results of both Figures 1 and 2 in a proportion comparison graph.

![Graph showing proportion comparison of students' marking period grades before and after CWPT implementation.]

Figure 3. Proportion comparison of the students' marking period grades before and after CWPT implementation.
The results show that the number of students achieving As increased and the number of students achieving Ds and Fs decreased after the implementation of CWPT in this urban eighth grade inclusion science class. The line graph representing the data taken before CWPT increased as it went from As to Fs. The line representing the data taken after CWPT was implemented decreased as it went from As to Fs. This is more evidence to support the idea that there was academic improvement while CWPT was occurring in this classroom. However, I can not state that CWPT was the only reason for academic improvement. This was not a perfectly controlled action research project. There are several other factors that may have contributed to the academic improvements like good attendance, student interest, and enjoyment of this genetics unit. The results were positive and CWPT was implemented so I want to continue to utilize it in my classroom.

Behavioral Data Analysis

Journal entries about the effectiveness of CWPT in my urban eighth grade inclusion science class were taken for six weeks as the instrument for study for this behavioral data analysis. I wrote these on my computer at the end of each day. I recorded observations of the classroom environment that existed before and after CWPT, the types of relationships that developed between the tutors and tutees, on task and positive class behavior, and teacher relationships with students and tutors.

The results from these journal entries showed that before CWPT, my eighth grade inclusion science class was chaotic and not conducive to learning. The
students were engaging in negative classroom behaviors such as socializing during class instruction, throwing things, not doing their assignments, and not following simple classroom rules and procedures. Once CWPT was implemented, I began to observe some positive changes. The tutors were helping the students at their tables and the students were asking them questions. I also observed the students asking to become tutors. Positive and supportive relationships were forming. I also noticed more assignments were being completed and were becoming more accurate as well. The class started to become more engaged and excited about doing better on their science assignments. I was able to observe and facilitate the learning process more and more as the weeks went by. Positive relationships between the teachers and the students were increasing because the negative student behaviors were decreasing. This class became so engaged in their learning and a joy to teach that I utilized this class for my Permanent Certification Video. This class became a role model for all of my classes. The grades as discussed in the previous section began to increase which I believe is partly because of this positive class behavior that evolved once CWPT was implemented.

In addition, I administered surveys to the tutors, students and inclusion teacher about the effectiveness of the CWPT process. Specific survey responses best reflect the attempt to answer whether or not this is an effective instructional strategy from student, tutor and inclusion teacher point of view. The survey questions were the same for all three subjects; the tutor, student and inclusion teacher. These survey
questions can be found in Appendices C, D and E.

Examination of the tutor survey responses provided evidence that the tutors enjoyed being peer tutors because they liked helping in the class and they observed less classroom behavior problems. The tutors also thought CWPT was beneficial to the students in science because it helped improve most of their grades. The tutors observed that their peers seemed to like science more than they did the last marking period. The tutors informed me that I should increase the number of peer tutors in the classroom.

The student survey responses revealed that the students liked CWPT because the tutors were their friends, they achieved higher grades in science, and the class was quieter. Some things they disliked about CWPT were bossy tutors, sometimes getting teased by their tutor, and not always getting enough help with their assignments. They also thought that their science grades increased because of the extra help in the classroom and the nagging from the tutors to finish their work.

The examination of the data from the inclusion teacher survey provided evidence that she liked CWPT because of the increased student engagement in their learning and the improvement of the classroom student behavior. She also observed an increase in the students’ grades. She did suggest that the tutor training process be longer and have more specific goals and guidelines for the tutors. She found nothing that she disliked about the CWPT process.
Summary

Figures 1-3 provide evidence that during CWPT implementation, academic achievement in this urban eighth grade inclusion science class was improved. I believe this to be an advantage of CWPT, an effective instructional strategy. These figures clearly show that the number of students obtaining Ds and Fs decreased. The number of students achieving As increased from 0 to 6 after CWPT implementation. This decline in Ds and Fs and the increase in As suggest that more students are increasing their understanding of the science concepts. This understanding is improving their scores on tests, labs, and class assignments which could be a reason for the increase in students achieving passing grades in this urban eighth grade inclusion science classroom. I believe this to be due to the classroom tutoring and additional support provided by the student tutors. These tutors increased the teacher to student ratio in this eighth grade inclusion science classroom from 2:23 to 8:23 which provides more academic support which is yet another possible cause for the increase in the student academic success.

The responses to the surveys that were given to the teachers, tutors, and students (tutees) as shown in Appendices C-E provide evidence that CWPT was liked by all the participants in this study. They wanted this process to continue because it helped to create positive peer relationships which in turn improved the learning environment in the classroom. The surveys also revealed that the students noticed they had more assistance in the classroom with getting their questions answered.
This may have been one contributing factor which helped students improve their scientific conceptual understanding and their marking period science grades.

The surveys in Appendices C through E also provided helpful suggestions for improving the CWPT process. One suggestion was to make the tutor training more extensive and longer to better prepare the tutors. Another suggestion was to make the tutor guidelines and goals more specific so that the tutors would clearly understand their tutor responsibilities and expectations.

Appendices C through E indicate that this urban eighth grade inclusion science classroom became more student-centered with an increase in on-task learning. The teachers' roles switched from the deliverers of knowledge to the facilitators of the students obtaining knowledge. This science class became an enjoyable experience for the teachers, tutors, and students because of the increased classroom enthusiasm to learn. A support system was established between the students and tutors as well as between the students and teachers. The tutors appeared happy and willing to help their peers. The tutees showed little reluctance to ask for assistance from the classroom tutors. This clearly demonstrates an increase in positive urban eighth grade inclusion science classroom behaviors which creates a cooperative, effective learning environment for all the participants in this class.

These results from the research of this urban eighth grade inclusion science class have shown some of the advantages of CWPT for all types of learners. The learners are both students with and without learning disabilities. Students spent more
time on task when they were working with their tutors. The tutors helped to keep the
groups motivated and focused on learning and accurately completing their
assignments. This kept the students quite busy so they did not have time to engage in
disruptive or off-task behavior. This lack of disruption and negative classroom
behavior may be an explanation as to why Figures 1-3 show an increase in the
number of As in this science class and a decline in the number of Fs after CWPT was
implemented. I have interpreted this to mean much more student-centered learning
and conceptualization occurred because of the close monitoring of the subjects by the
tutors and the classroom teachers.
Chapter Five: Conclusions and Recommendations

Discussion

The empirical studies in the literature review of this paper states that CWPT is an effective instructional strategy which improves the classroom learning environment by increasing student understanding and academic success of all types of learners (Arreaga-Mayer, 1998). CWPT is advantageous in many ways to three very important classroom team players: teachers, students being tutored and peer tutors.

In this urban eighth grade inclusion science class, CWPT was advantageous to the instructors in that it changed their traditional roles from the deliverers of the knowledge to the facilitators of the students obtaining the knowledge. The teachers facilitated ways that the students could use in finding their own knowledge. The facilitators had the opportunity to observe the learning in progress during the lesson instead of relying only on the traditional tools of learning assessment such as tests and quizzes which come at the end of a lesson. The teachers had a chance to correct any students' misconceptions or errors in their learning process before the lessons ended.

Another advantage for the teachers in this study; If the students are engaged then majority of the behavioral issues tend to disappear (Dopp and Block, 2004). The data from the journal entries and surveys provided evidence that the classroom environment became much more cooperative and supportive of learning with CWPT
in place. Positive and trusting relationships developed in the classroom which helped the class to stay focused on their learning because of the peer tutors. The peer tutors helped to increase the teacher to student ratio in this class from 2:23 to 8:23. This increased ratio helped to increase the student engagement in learning and reduced the negative student behaviors. It also allowed the teachers to focus less on classroom management and more on creating inquiry-based lessons which continued to encourage student engagement and focus, and improved student academic achievement.

The academic results from this study have provided evidence that CWPT demonstrated its effectiveness with students who received the tutoring services. These students increased their number of passing grades significantly which is linked to their improvement of understanding and self-confidence in science. The students had more classroom assistance because of the peer tutors. The peer tutors provided encouragement to the students to remain focused on their assignments and to do well. This seemed to motivate them to ask more questions for clarification which led them to complete the lessons with accuracy thus improving their grades in science.

The peer tutors benefitted from CWPT in this study by the reinforcement of their own understanding of the knowledge which began to make them mastery learners which helped them to achieve As in this class. They became the experts on this knowledge. They increased the teacher to student ratio in the classroom from 2:23 to 8:23 because of their mastery skill level of this genetics unit. This expertise
boosted their self-confidence levels which motivated them to look for another academic challenge to conquer. This is a goal of the education system; to make mastery learners out of all students and to increase their motivation to learn and achieve more.

**Recommendations for Future Research**

Future research should look at the effect an increased amount of data collection time would have on students once CWPT is implemented in the classroom. The data in this project was only collected for six weeks as with most of the empirical studies found in the literature review. The time period should be increased to an entire school year to really observe the true patterns and effectiveness of this instructional strategy. Six to twelve weeks is definitely not enough time to get a clear picture of the advantages of CWPT. From my experiences as a teacher, I have noticed that our educational system never allows time for programs to settle in and to observe their true effects. We give the program or strategy six weeks to maybe a year to produce results and then we move on to something new. If we keep moving on to something new then we will never find what really works to help the students achieve academic success.

Another suggestion is to increase the amount of classrooms which have peer tutoring. The studies from this paper state that most of the classes that implemented CWPT were inclusion classrooms. This project was also done in an inclusion science classroom. I recommend that CWPT be implemented into all types of
classrooms; general education, self-contained, and inclusion. CWPT can benefit all types of learners (Arreaga-Mayer, 1998). Any classroom that has more than one person who is knowledgeable on the subject to assist others will show improvements in student understanding. The peer tutors become additional teachers in the class which increases the teacher to student ratio. Increasing the amount of student understanding will then increase student academic achievement no matter what type of classroom. All types of classrooms have students who may not understand or have questions. There are always students who tend to understand topics better than others so it only makes sense to take advantage of these additional resources which will likely improve student achievement.

Action Plan

In light of this research, the action plan is to continue CWPT with this inclusion science class for the remainder of the year and continue to gather data. However, I plan to expand the implementation of CWPT into my two non-inclusion science classes and record the data as well. This data will then be shared with administrators and district science directors. I will encourage them to lead a professional development workshop on the implementation of CWPT in the classroom. Once other teachers have utilized CWPT and have observed the academic and behavioral advantages, perhaps it can become an instructional strategy which will empower all students with or without learning disabilities. It is hoped that these students will become mastery learners of science content; satisfying the
educational goals of IDEA and the National Science Education Standards.

Conclusion

In this research an urban eighth grade inclusion science class was selected to implement CWPT to improve classroom behavior and student grades. Peer tutors were selected by their academic grades in science and their leadership skills. These tutors were then trained on the unit that was to be covered within the next six weeks. They were also trained on their role as a classroom tutor. The class was divided into six tables of four students in which one student was a tutor. The tutor would assist the other students at the table with their lessons and activities.

The data collection included weekly observations made of the peer tutoring sessions and of the overall classroom atmosphere. Surveys were given to the peer tutors, the students being tutored and the teachers at the end of this six week project. A comparison was made of the student marking period grade reports before and after CWPT implementation. The observations of the classroom showed that there was a supportive and positive learning environment. There were trusting relationships that were developed in the classroom which helped to boost self-confidence of the students when doing science. Grade reports showed that the students improved academically after CWPT had been implemented. The surveys stated that the tutors, tutees and teachers enjoyed CWPT and wanted it to continue in the classroom. They stated that CWPT improved the science classroom behavior and increased student grades. The overall results from this research have shown that CWPT was
advantageous and effective in improving academic and behavioral success in this urban eighth grade inclusion science classroom.
References


[http://www.materialsworldmodules.org/teaching/design3.html](http://www.materialsworldmodules.org/teaching/design3.html)


Appendix A: Statement of Informed Consent (Inclusion Teacher)

Statement of Informed Consent

Dear Inclusion Teacher:

For the next 4-6 weeks I will be conducting research in our classroom for completion of my Master's Degree at SUNY College at Brockport Department of Education and Human Development. The goal of my research is to observe the effects of peer-tutoring (students tutoring each other) in our science class. I want to see whether or not this teaching strategy increases our student's grades and achievement in science.

If you choose to participate, you will be asked to fill out a survey that will address the effects peer-tutoring in our science class.

Please understand that:

1. Your participation is voluntary and you have the right to refuse to answer the questions on the survey – there will be no effect on your position in this class at all if you choose not to participate.
2. Your name will not be used in the results of this research. Your confidentiality will be guaranteed.
3. There will be no personal risks or benefits because of this participation.
4. Your participation involves completing a survey which will ask questions about the peer-tutoring in the class.
5. The results of this survey will be utilized in a research paper for the completion of my Master’s Degree at SUNY Brockport College Depart of Education and Human Development. Again, your name or the school’s will not be included in my research paper.
6. When this paper is completed, all consent forms will be destroyed.

Please sign below if you have read and understand the above statements and that you agree to participate in this research survey. You may change your mind and withdraw from this at any time with no consequences to you or your position in this class. I certify that I am at least 18 years of age. If you have any questions please call me at x2540. I am the researcher and science teacher for this class.

Please print your name: ____________________________

Signature: ____________________________ Date: ____________
Appendix B: Informed Consent Form (Parent)

Statement of Informed Consent

Dear Parent or Guardian:

For the next 4-6 weeks I will be conducting research in our classroom for completion of my Master’s Degree at SUNY College at Brockport Department of Education and Human Development. The goal of my research is to observe the effects of peer-tutoring (students tutoring each other) in my science class. I want to see whether or not this teaching strategy increases your child’s grades and performance in science.

If you choose to allow your child to participate, he/she will be asked to fill out a survey that will talk about how peer-tutoring affected his/her class.

Please understand that:
1. Your child’s participation is voluntary and he/she have the right to refuse to answer questions on the survey – there will be no effect on his/her grade in this class at all if he/she chooses not to participate.
2. Your child’s name will not be used in the results of this research. His/her confidentiality will be guaranteed.
3. There will be no personal risks or benefits because of this participation.
4. Your participation involves completing a survey which will ask questions about the peer-tutoring in the class.
5. The results of this survey will be utilized in a research paper for the completion of my Master’s Degree at SUNY Brockport College Depart of Education and Human Development. Again, your name or the school’s will not be included in my research paper.
6. When this paper is completed, all consent forms will be destroyed.

Please sign below if you have read and understand the above statements and that you agree to participate in this research survey. You may change your mind and withdraw from this at any time with no consequences to you or your science grade. If you have any questions please call me – Mrs. Arieno at or stop by my room (254). I am the researcher and science teacher at Frederick Douglass Preparatory School. I certify that I am at least 18 years of age.

Child’s Name: _______________________________________

Please print your name: ______________________________________

Signature: ______________________________________ Date: __________
Appendix C: Inclusion Teacher Survey

Inclusion Teacher Survey

1. Did you like the classroom peer-tutoring? ____ (yes or no)

2. What are two things you liked about the classroom peer-tutoring?

3. What are two things you disliked about peer-tutoring?

4. What are some ideas or suggestions that could make peer-tutoring more successful in the classroom?

5. Do you think classroom peer-tutoring should continue next year? Why or why not?

6. Do you think classroom peer-tutoring helped our students in science class? ____ (yes or no). If yes, then how?
Appendix D: Tutor Survey

Tutor Survey

1. Did you enjoy being a classroom peer-tutor? _____ (yes or no)

2. What are two things you enjoyed about tutoring?

3. What are some ideas or suggestions you have to make classroom tutoring more successful?

4. What are some ideas or suggestions you have for me as your teacher?

5. Would you like to be a classroom tutor for next year?

6. Do you think peer-tutoring helped the class? _____ (yes or no). If yes, how did it help the class?
Appendix E: Student Survey

Student Survey

1. Did you like the classroom peer-tutoring? _____ (yes or no)

2. What are two things you liked about the classroom peer-tutoring?

3. What are two things you disliked about peer-tutoring?

4. What are some ideas or suggestions that could make peer-tutoring more successful in the classroom?

5. Would you like to become a classroom peer-tutor next year? Why or why not?

6. Do you think classroom peer-tutoring helped our students in science class? _____ (yes or no). If yes, then how?