

**Perceptions of Peer Tutoring in a Post Secondary Setting**

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### **Abstract**

Research shows that peer tutoring has been effective in helping students learn mathematics in elementary school and middle school levels. However, very little research has been done on the effectiveness of peer tutoring in a higher level setting. This purpose of this study was to learn about student perceptions on the effectiveness of peer tutoring on their own math classes and abilities. Students responded to a survey on their perceptions of the effectiveness of peer tutoring based on their personal experience in a specific peer tutoring program. The results of this study support that peer tutoring is very effective in post secondary math classes.

## Introduction

“Peer learning can be defined as ‘the use of teaching and learning strategies in which students learn with and from each other without the immediate intervention of a teacher’” (Hammond, Bithell, Jones, & Bidgood, 2010, p. 202). Peer learning, also called tutoring, can be implemented both within and outside the classroom setting. Several in-classroom peer tutoring programs may be categorized under the title of Peer Assisted Learning Strategies (PALs; Fuchs, Fuchs, & Kazdan, 1999; Hammond et al., 2010; Miller, Topping, & Thurston, 2010; Okilwa & Shelby, 2010; Robinson, Schofield, & Steers-Wentzell, 2005), which encompasses PALs itself as well as other forms of peer and cross-age tutoring. Some other strategies and procedures that root themselves in PALs are Classwide Peer Tutoring (Maheady & Gard, 2010), Peer Reading (Miller et al., 2010), Classwide Student Tutoring Teams (Maheady, Sacca, & Harper, 1987), and Reciprocal Peer Tutoring (Fantuzzo, King, & Heller, 1992). Much research has been done on these procedures and peer tutoring in general; most of these studies have shown that peer tutoring works to improve the performance of students at all levels and not only the lower achieving students on the lower achieving students.

“Early reviews and meta-analyses of peer and cross-age tutoring programs found a variety of positive academic, attitudinal, and socioemotional outcomes for tutors as well as tutees” (Robinson et al., 2005, p. 328). The research shows that peer tutoring has successfully enhanced comprehension, accuracy, and knowledge “in a variety of subjects, including Mathematics, Social studies, and Science, as well as reading” (Miller et al., 2010, p. 418). Most research on peer tutoring has been done in an “in class” elementary setting, and it typically focuses on reading and English (Fuchs et al., 1999; Miller et al., 2010). While some research has been done showing peer tutoring to be successful in the secondary setting and in the subjects of

mathematics, science, and social studies, more research should be done to support the use of peer tutoring in these subjects. A scarce amount of research has been done on the use of peer tutoring in secondary and higher education mathematics subject areas, which presents a need for continued research.

Many secondary schools and higher education facilities either have or are interested in having peer tutoring programs implemented for mathematics. Although there are many claims that peer tutoring is effective in these settings, there is little research in this area to support these claims. The goal of this study is to explore perceptions of the effectiveness of peer tutoring in a college setting. We are interested in examining perceptions of effectiveness through seeking student opinion. Factors to be analyzed are satisfaction about student tutoring sessions and confidence in the subject being tutored. Careful analysis of student perceptions will provide insight into the effectiveness of peer tutoring programs in the aforementioned subject area and levels.

## **Literature Review**

### **History of Peer tutoring**

“The practice of students teaching other students has a rich history dating back to the ancient Greeks” (Robinson et al., 2010, p. 328). The model of peer tutoring was originally thought to be a linear transition of knowledge from teacher to tutor to tutee. However, this definition was later changed when educators realized that the relationship in a peer tutoring setting is much different than the interaction between a teacher and a student (Topping, 1996). Over the last half century, many studies have explored the effects of peer tutoring over a range of topics since the interest in peer tutoring surfaced in the scientific community; many of these studies have demonstrated positive outcomes (Robinson et al., 2010). This research has been

mostly focused on tutoring in school classrooms, and much less can be found on teaching and learning in higher education (Topping, 1996). However, in recent years, the need for this research has grown considerably. The ever-growing population of students and the increasing scarcity of resources results in larger class sizes (Topping, 1996), which often only allows students to receive traditional lecture-style instruction and prevents deeper and more personal instruction. In higher education, classes can reach lecture sizes of over 200 students (University of Connecticut). This deficit of resources as well as the need to improve the quality of learning has sparked an interest in peer tutoring in higher education (Topping, 1996). Topping reviewed a small number of studies that researched tutoring programs in colleges and universities. One study that was reviewed surveyed 127 colleges and out of the 62 that replied, 47 had peer tutoring programs.

### **Benefits of Peer Tutoring**

Literature on the effects of peer tutoring at both the elementary and secondary levels, as well as the limited amounts on postsecondary levels, shows that it provides a variety of benefits for many students. Some of these benefits include improved academic achievement, desirable behaviors (e.g., increased time on task and improved classroom behavior), improved attitudes towards schools and the subjects being studied, increased self esteem and self confidence, and increased positive social and emotional skills (Miller et al., 2010; Okilwa & Shelby, 2010; Robinson et al., 2005; Topping, 1996).

**Academic benefits of tutoring.** The most noted improvements shown in the literature on peer tutoring are the academic improvements. Extensive research has shown that PALs and its other forms have successfully enhanced comprehension, accuracy, and knowledge in subjects

such as mathematics, social studies, science, and reading across all different groups of students (Miller et al., 2010). Although most of these discoveries have been found in the elementary setting, many studies have shown effectiveness in secondary classrooms. Cohen, Kulik, and Kulik's (1982) meta-analysis of peer tutoring studies showed that in almost 87% of achievement studies of both elementary and secondary schools, "the examination performance of students who were tutored was better than the examination performance of students in a conventional class" (p. 240). These findings are confirmed by other studies reviewed here. Research by Maheady et al. (1987) on 91 students in three 9<sup>th</sup> and three 10<sup>th</sup> grade mathematics classes showed that Classwide Peer Tutoring (CWPT) "resulted in immediate and systematic increases in the weekly math test performance" (p. 118). In Topping's (1996) review, 45 out of 65 studies showed better performance in students that had been tutored over those in a control group. Robinson et al. (2005) also discussed a study in which students who participated in peer tutoring in 10<sup>th</sup> grade mathematics classes received higher scores on the Texas Assessment of Academic Skills (TAAS) mathematics exam than did those who had no tutoring.

Despite a number of studies supporting positive academic effects of peer tutoring, some question remains as to whether it produces similar positive results when the content is more advanced. Allsopp (1997) studied the use of tutoring in subjects that require the use of higher order thinking skills (like algebra). He found no difference in achievement scores between the tutoring groups and the control group, which used traditional independent student practice instead of tutoring. In other words, the study showed that tutoring was similar in its effects to simple individual work in the algebra classes. Nevertheless, Allsopp claimed that the peer tutoring showed potential of being more effective than the traditional practice. This particular

study is important because most peer tutoring studies, especially in mathematics, are done on basic skills in a subject, like basic computation and problem solving (Allsopp, 1997).

Topping (1996) cited a meta-analysis by Kulik, Kulik, and Cohen that examined 75 studies of Keller's Personalized System of Instruction (PSI), a program that bases tutoring strategies on the needs of the individual student, in higher education institutions. In 48 out of 61 studies, research showed a more positive effect in students who used PSI. Eleven of these studies analyzed student feedback, and ten reported that PSI received more favorable ratings. Although there are some studies done on tutoring at post-secondary levels, the number is still small in comparison to the overall studies on peer tutoring. The scarcity of research in this particular field still leaves open the question of whether or not tutoring is effective.

Overall, research on peer tutoring and the use of peer tutoring supports the conclusion that it holds academic benefits for those students who are being tutored. Many of these studies varied on their subject, participant group/age level, setting, and procedure, but they all produced similar results that supported the use of peer tutoring.

Peer tutoring also holds some academic benefits for the tutoring students as well. Cohen et al.'s meta-analysis (1982) reported that, in 33 out of 38 of the studies that focused on academic achievement of tutors, "students who served as tutors performed better than did control students on examinations in the subject being taught" (p. 242). Out of those studies, 10 had results that were statistically significant. Robinson et al. (2005) also reported on more recent studies that showed academic benefits for tutors. In a study from 1998, students who served as tutors received a greater increase in score on their mathematics assessments "than did a control group of students with a similar initial achievement-level" (p. 334).



**Non-academic benefits of peer tutoring.** Peer tutoring also improves more than just academic achievement in both tutors and tutees. These additional improvements include behaviors like increased time on task, general classroom behavior, increased attendance and retention rates, and more positive attitudes about school (Robinson et al., 2010). Okilwa and Shelby's (2010) synthesis of literature revealed that a large number of the studies that they examined found increased on-task behavior in the students. Another meta-analysis of peer tutoring programs found 8 studies that demonstrated increased positive attitudes towards school and the subjects being learned following peer tutoring (Robinson et al., 2010). While these behaviors are not the central focus in the present study of peer tutoring, it is important to discuss them because of the relationship between these behaviors and student achievement.

Peer tutoring can also benefit students socially and emotionally. The effects of peer tutoring on students' social and emotional behaviors are second only to academic achievement as the focus of many studies on peer tutoring. One observed benefit is "improved social interactions or relationships such as making friends" (Okilwa & Shelby, 2010, p. 452). Some specific social and emotional outcomes that peer tutoring seems to target include a sense of belonging and social acceptance, self concept, and attitude towards subject matter (Robinson et al., 2010), as well as self esteem and self worth (Miller et. al, 2010).

In Cohen et al.'s (1982) meta-analysis of tutoring, 9 out of 65 studies examined effects on self-concept, and 8 reported on students' attitudes toward the subject matter. Seven out of the nine studies that focused on self-concept reported a positive increase in self-concept in classrooms that implemented peer tutoring practices. In the other two studies, self-concept was more positive in the classrooms in which tutoring was not implemented. Robinson et al. (2010) found studies indicating that "peer tutoring [boosted] academic self-concept, which is the degree

to which students feel positively toward themselves as students” and that these did not result from “pre-existing differences in academic competence” (p. 339). Miller et al. (2010) also cited a meta-analysis that reported several studies that found gains in students’ self concept with small to moderate effect sizes. Cohen et al. (1982) also reported data that 12 out of 16 studies showed a greater self concept in students who tutored. In the 13 studies pertaining to students’ attitudes toward the subject matter analyzed by Cohen et al., all 8 that studied tutees’ attitudes reported gains in positive attitudes, and 4 out of 5 reported positive gains in tutors’ attitudes. However, only two had an effect size large enough to be statistically reliable.

Peer tutoring has also shown gains in sense of belonging and social acceptance among peers in both tutors and tutees (Robinson et al., 2010). Students make connections with classmates that would never have been made outside the tutoring groups. Also, not understanding class material makes many students feel alienated. Tutoring helps with their understanding and reduces the feeling of alienation. A study analyzed by Cohen et al. (2010) found that feelings of social acceptance were greater in students that participated in Reciprocal Peer Tutoring than in students that were randomly assigned to classes without tutoring. Another study reviewed by Robinson et al. (2010) revealed that students who had received peer tutoring rated themselves as having a higher level of social skills than their peers. While the socio-emotional outcomes are not directly linked to the student achievement that results from peer tutoring, these outcomes are an important factor in students’ perceptions on the effectiveness of tutoring.

In summary, the analysis of past studies on peer tutoring indicates the possibility that tutoring provides positive academic and social/emotional benefits for both students and their tutors. However, the evidence supporting tutoring in mathematics in secondary and

postsecondary classes is not extensive. Questions can still be asked about whether or not students perceive tutoring to be effective in these settings, which lead to the need for more research on the topic. The following study examines student perceptions of students on the usefulness of tutoring sessions in a post secondary setting.

### **Research Methods**

This chapter details the methods used in data collection and analysis during the course of the study.

The Quantitative Learning Center (Q Center) at the University of Connecticut provides free, drop-in tutoring for basic level “quantitative intensive” (Q) courses mainly in the subjects of mathematics, physics, chemistry, and statistics. The tutoring at the Q Center is provided by undergraduate tutors who have been hired based on their knowledge and proficiency in the subjects that they tutor. The program at the Q Center is entirely voluntary and is used as a resource for students who are struggling or seeking extra help in their basic quantitative courses.

### **Sample**

The target population for this study was the population of students who sought assistance in the quantitative math courses at the Q Center in the Fall 2011 semester. A convenience sample of participants was selected at random from those who sought help during particular periods of the Q Center’s hours during the last week of the semester. The time periods sampled included different times of day and days of the week in an effort to increase sample variability. The sample consisted of 45 students taken from a population of about 1176 individuals who attended the Q Center that semester. The population consists of both male and female student whose ages range from about 18-22 years. The sample as well as the population was made up of

students of many different races. These descriptions of the population are based on observation and were not based on collected data.

### **Instrument**

The data presented in this study were collected in a ten question survey (see Appendix) distributed to students from the sample during multiple visits to the Q Center. The survey, which was developed for this study by the student researcher, measured students' perceptions of peer tutoring in their college math classes. In this study perception is defined as the students' awareness and understanding of the effectiveness of peer tutoring as provided by the Q Center. Effectiveness is defined as the degree to which tutoring has increased the students' ability and confidence in math. Topics measured in the survey include students' perceptions of their ability to perform in math class without peer tutoring at the Q Center, the degree to which tutoring has increased their confidence in math, the degree to which tutoring has been helpful in learning math, what specifically about the Q Center makes it helpful in learning math, and what specific methods tutors use that do and do not contribute to the helpfulness of peer tutoring at the Q Center. The survey also collected data on students' current semester standing and math course they were currently taking as well as the frequency of their visits. A total of six questions measured the student's perceptions on the effectiveness of peer tutoring. Three questions were measured using a 5 point Likert scale, and the remaining three questions were presented as open ended.

### **Data Collection Procedures and Data Analysis**

Students were approached at random during their visits to the Q Center. Students were approached during all different times in their visit (i.e., when they first arrived, in the middle, or before they left) and asked to complete the survey and return it to the student researcher before

their departure. The student researcher is a tutor at the Q Center, but was not tutoring at the time of data collection. Some students may have known the student researcher and worked with her during previous visits. Data analysis included qualitative methods and some quantitative methods. Descriptive statistics were computed for the Likert scale items, and percentages of each response were also determined. The open ended responses were coded using common themes for calculating descriptive statistics as well as analyzed in a discussion of student responses.

### Results and Discussion

The students who completed the survey were enrolled in a range of 9 different courses at the University of Connecticut. The table below in Figure 1 shows the breakdown of the courses students sought help in. The average student who completed the survey was a sophomore in his or her third semester at UConn. About 63% of the sample had used the resources the Q Center in previous semesters. About 51% of the students visited the Q Center at least once a week and about 15% said they visited once every other week.

Course	Math 1060Q	Math 1131Q	Math 1132Q	Math 1070Q	Math 1125Q	Math 1126Q	Math 2110Q	Math 1071Q	Math 2410Q	No course
Number of students	2	2	11	9	4	2	5	2	1	7

*Figure 1.* Breakdown of students' courses.

The survey included six questions about different factors of the effectiveness of peer tutoring. Each question presented different results and themes on peer tutoring effectiveness, though all presented positive data in favor of peer tutoring.

### Perceptions of Student Ability and Performance in Math Class

The first question on the survey was, “If tutoring at the Q Center did not exist, you believe your ability and performance in your math class would be which of the following.” The responses were given in a five point Likert scale with 1 being “Much worse” and 5 being “Much better.” Student responses had a mean of 1.9, which means that the average student believed that their ability and performance would be worse without the help of tutors at the Q Center. A total of 85% of students stated that their ability and performance would be worse or much worse, and the remaining 15% believed that their performance would be the same. No student who completed the survey believed that their ability and performance would be better without the Q Center. Figure 1 shows a breakdown of the responses for this question.

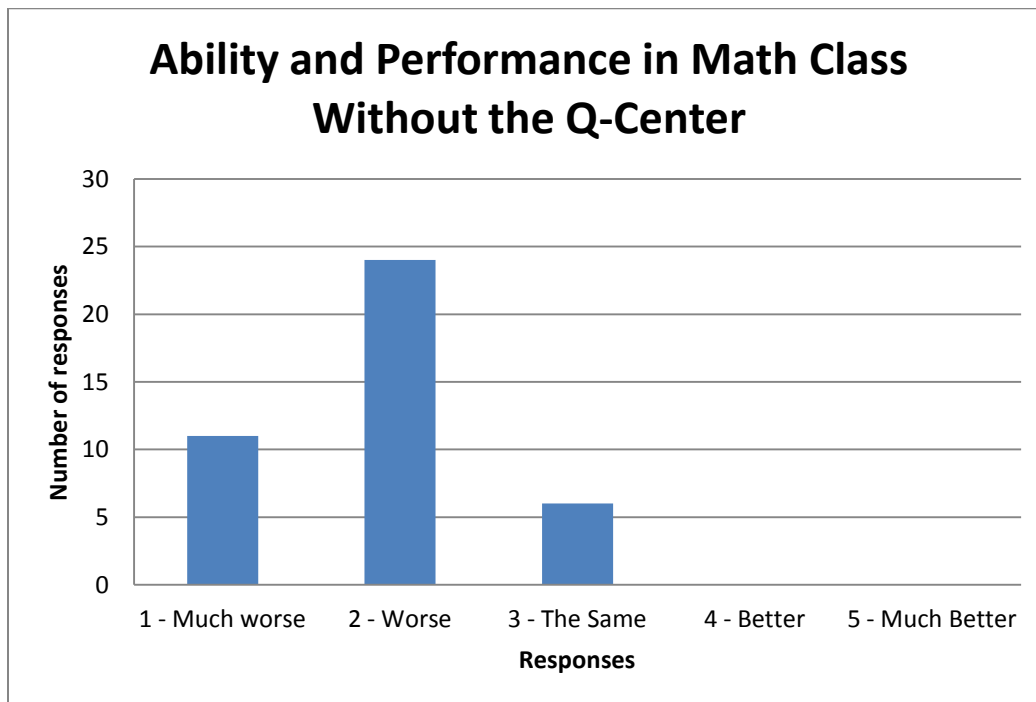


Figure 2. Students' perceptions of their potential performance if the Q Center had not been available.

These results strongly support the use of peer tutoring and its effectiveness in the post secondary setting at the Q Center. Many of these students believe that peer tutoring has had at least a minor impact on their academic success in mathematics. A few would even go as far as to say that it has had a major impact on their academic performance. Overall students perceived that the tutoring support and resources at the Q Center improved their ability and performance in their math class.

### **Students' Confidence in Math**

The second question that the students were asked to answer was “To what degree does tutoring at the Q Center increase your confidence in your math performance?” This question was also answered on a five point Likert Scale with 1 being “Not at all” and 5 being “A Great Deal.” The student responses to this question had a mean of 3.8, which means the average student said that the peer tutoring offered at the Q Center moderately increased their confidence in their own math performance. A surprising 100% of the students who completed the survey stated that their confidence in math increased as a result of the peer tutoring at the Q Center, even if only a little. Figure 2 summarizes the results for this question.

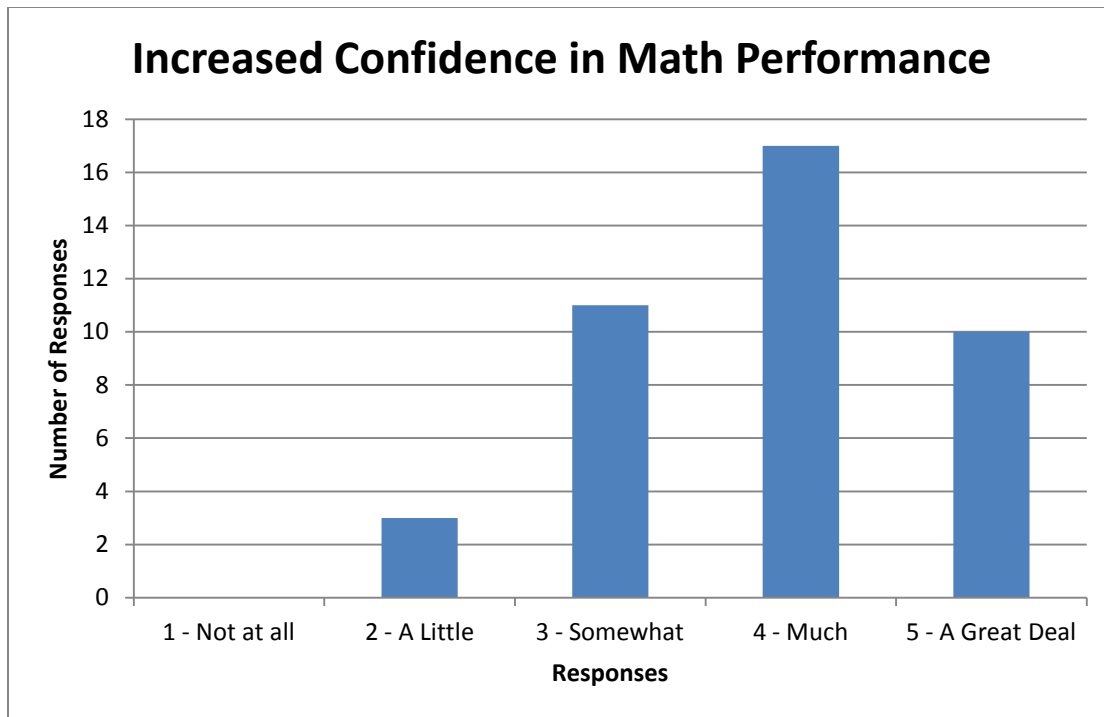


Figure 3. Students' confidence in their math performance as a result of the Q Center

These results also support peer tutoring and its effectiveness in a post secondary setting. The increase in confidence that students gain from peer tutoring may be a factor in the students' self concept, self esteem, self worth, or their attitude towards mathematics. If the students have more confidence in math, they will not be as afraid or unreceptive to learning the material. The peer tutoring allows them to be more open and responsive to learning mathematics. Overall the results from this question show that peer tutoring at the Q Center increased confidence in math in students who participated in the study.

### Helpfulness in Learning College Math

The third question that was measured on a Likert scale asked the students, "To what degree do you agree with the following statement: The Q Center has been very helpful in my learning math in college." The five point scale rated their level of disagreement with 1 being "Strongly Disagree" and 5 being "Strongly Agree." The students' responses had a mean of 4.3,



meaning that the average student that took the survey agreed that the tutoring at the Q Center was helpful in their learning of college math. About 85% of the students who took the survey either agreed or strongly agreed with the statement that the Q Center has played a role in their learning of college math. The remaining 15% said that they were undecided. Not a single student disagreed with the statement. Figure 3 summarizes the survey results for this question.

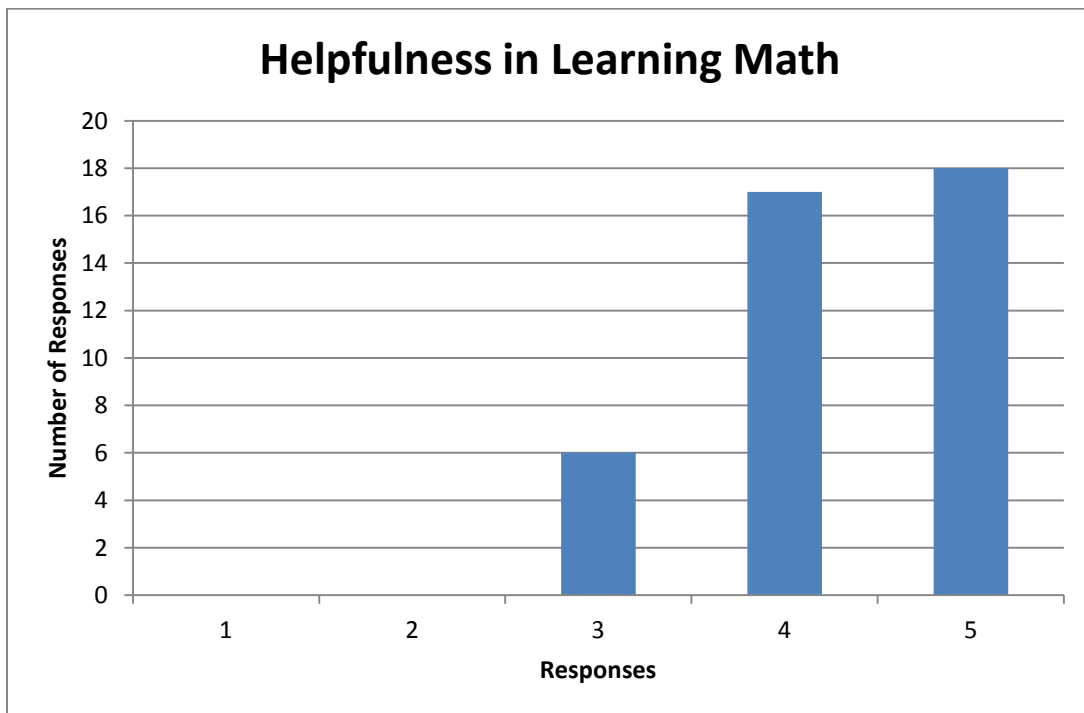


Figure 4. Students' perceptions of the Q Center's helpfulness in learning math

These results also support peer tutoring and present evidence for its effectiveness. The students believed that the peer tutoring at the Q Center helped them in their process of learning math. By saying that the tutoring offered at the Q Center was a factor in learning the math taught in their classes, the students support the effectiveness of peer tutoring at institutions like the Q Center.

### Open-Ended Questions

The following three questions from the survey are open-ended questions for which students were able to write their own thoughts and comments about the Q Center.

**Specifics that make tutoring helpful.** The first open-ended question that students were asked to respond to based on their perceptions of peer tutoring at the Q Center was “What specifically about the Q Center do you believe is helpful to your learning of math?” Three students elected not to answer this question, so the results are based on a sample of 42 students. There were four overarching themes that I found in student responses to this question: homework/study help, one on one attention, tutoring by a peer, and question answering/explanation of the material.

The most prevalent theme at the Q Center that students felt was helpful to their learning of math was the tutor’s ability to explain the material and answer questions on the material. This theme was found in 45% of student responses. Several students who mentioned this theme in their responses said that the peer tutors at the Q Center could explain topics and information better than they were explained in lecture. This shows that students perceive that they respond better to the peer tutoring resources provided at the Q Center than they do to standard learning in their math classes. One student wrote, “The tutor explains concepts on a way that is more understanding than a professor, more from a student’s perspective.” This “student’s perspective” was also mentioned by a few other students. This shows that the students found a connection with their tutors and felt that they were on their level of understanding. This more personal connection that the students find in their tutors is one of the major reasons why peer tutoring is effective.

Another student who commented on the tutors' explanations stated, "They teach you the methods so you can apply them to other problems." The students claim that professors will present concepts and work through examples, but don't always generalize topics. With the tutors at the Q Center, students are able to get that generalization so that they can apply to other problems and continue to expand their knowledge of the concepts.

A subset of this overarching theme is the amount of time that tutors are able to spend with the students and the amount of questions that are answered. On this theme, one student said that "the fact that the tutors spend a good amount of time to help" is helpful to their learning of math. In classes, professors aren't able to spend a great deal of time on explanation or answer a lot of questions from each and every student because they have a specific length of time for their scheduled classes. At the Q Center with the peer tutors, students are able to get the long explanation that can't receive in class and they can ask as many questions as they want. This is one of the major features that make peer tutoring appealing.

The second most recurring theme found in the responses to this question was the fact that the tutors were their peers. This theme was mentioned in about 32% of student responses and is very closely related to the previous theme. Most students who appreciated the fact that the tutors were their peers mentioned that they were better teachers because they could explain from a "student's perspective." One student responded to the question with, "The tutors over at the Q center overall have a great understanding in whatever subject they tutor and because they're students like me, I feel like the way they teach helps for me to understand in my level." So they believe that because the tutor is a student like themselves, they were more helpful in teaching and explaining the concepts. Another student said that what was helpful was "having another

student teach.” Overall, students generally appreciated that the students at the Q Center were their peers.

The third most prominent theme in student responses for this question is the access to one-on-one help. This is probably one of the biggest advantages to a peer tutoring center like the Q Center even though it is not one-on-one 100% of the time. This theme was found in about 29% of student responses to the question. Many of them simply stated that what makes the Q Center helpful to learning is the “one on one help.” This shows that the students prefer the one-on-one learning environment provided by the Q Center. One student wrote, “The one on one time with the tutors is very helpful. You are able to ask them direct questions and work through the problems together in order to understand the material, which is not possible during class.” Other students described the one-on-one help as “extremely useful,” “easier to follow,” or “tremendously helpful.” These students believe that it is the one-on-one help that makes the peer tutoring at the Q Center helpful.

The fourth and final theme that was found in student responses was homework/study help. The main service that tutors at the Q Center perform is helping the students understand their homework and/or preparing for tests. About 26% of students mentioned this theme in their responses. One student said that the reason that tutoring at the Q Center was helpful was because “they teach me methods for solving [homework] problems that were not comprehended during lecture.” The Q Center provides students the resource to seek help in these areas.

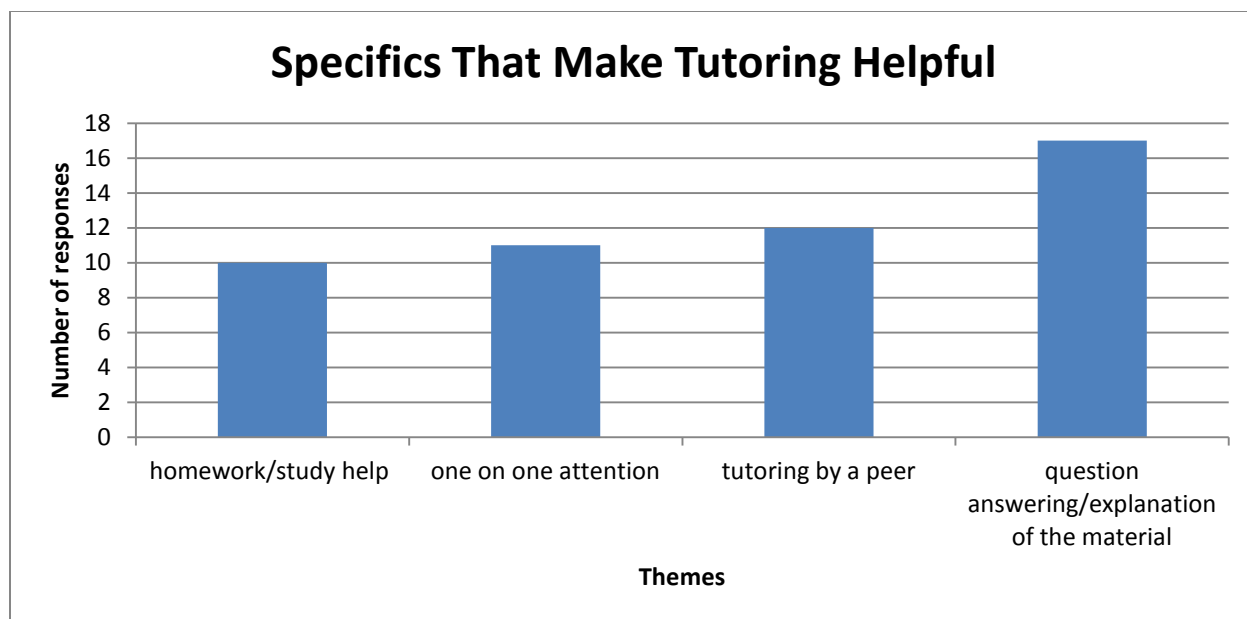


Figure 5. Specific methods that the students perceive make peer tutoring helpful.

In summary, it is a combination of the four themes that students perceive make the peer tutoring effective in their learning of math. The peer tutors at the Q Center provide students with one-on-one attention. They are able to explain topics from a “students’ perspective” and answer the questions that students have about the subject. Finally, they are able to help the students with their homework and studying for tests and quizzes. The students find all of these themes to be helpful in their learning of math. Figure 4 summarizes the responses to this question.

**Methods that are most helpful.** The second open-ended question that students were asked to respond to based on their perceptions on the effectiveness of peer tutoring was “What methods do the tutors use that you find are more helpful?” Six students elected not to answer this question, so the results are based on a sample of 39 students. This question only had three overarching themes: working through examples, providing a step by step process for topics, and providing explanations for why things work. While these themes seem closely related, they each provide a specific level of helpfulness to students learning math.

The method that the peer tutors used at the Q Center that most students found to be helpful was simply their explanations. About 66% of students mentioned this in their responses to the second question. Since the tutors are the students' peers, many of them have recently taken the classes that the students are currently taking and understand the need for detailed explanations for some of the topics. One student said that the tutors' explanation methods "use comparisons to make difficult terms or concepts easier to understand, break problems into smaller parts, and emphasize conceptual thinking not memorization." Many other students' responses resembled this answer. The students perceived these types of explanations that the tutors were able to provide to be one of the more helpful methods.

The next most prominent method that was mentioned in the student responses was providing a step by step process for understanding and completing examples for certain topics. About 34% of students mentioned this method in their response to the question. This method is helpful to students because it provides them a break down into smaller pieces that are easier to comprehend. One student said that a helpful method that tutors use is that "they actually walk [you] through the problems step by step as opposed to telling [you] what to do." Students don't learn when you simply tell them what to do. They need more of an explanation and a process like the tutors provide to be able to comprehend certain topics.

The final method that many students found helpful was when a tutor works through example problems. About 23% of students mentioned this method in response to this question. Working through problems and examples in math is important to the learning process because learning the concepts is almost useless if it cannot be applied to a problem. This method goes almost hand in hand with the step by step process discussed earlier. The students voiced that professors often speed through examples when and even if they do them in class. The students

will sometimes miss the examples in class and rely on the tutors at the Q Center to help work through them. On using this method, one student said it is helpful “when [the tutor has] me try to do the problem by myself first and then go back and work through it with me in order to find where my errors were.” This is definitely an important aspect of doing out examples. The students mentioned that in class, when a professor does out examples, they just do them out for you. If students are always making mistakes, it helps when a tutor will walk through a problem with them to help discover mistakes in their logic.

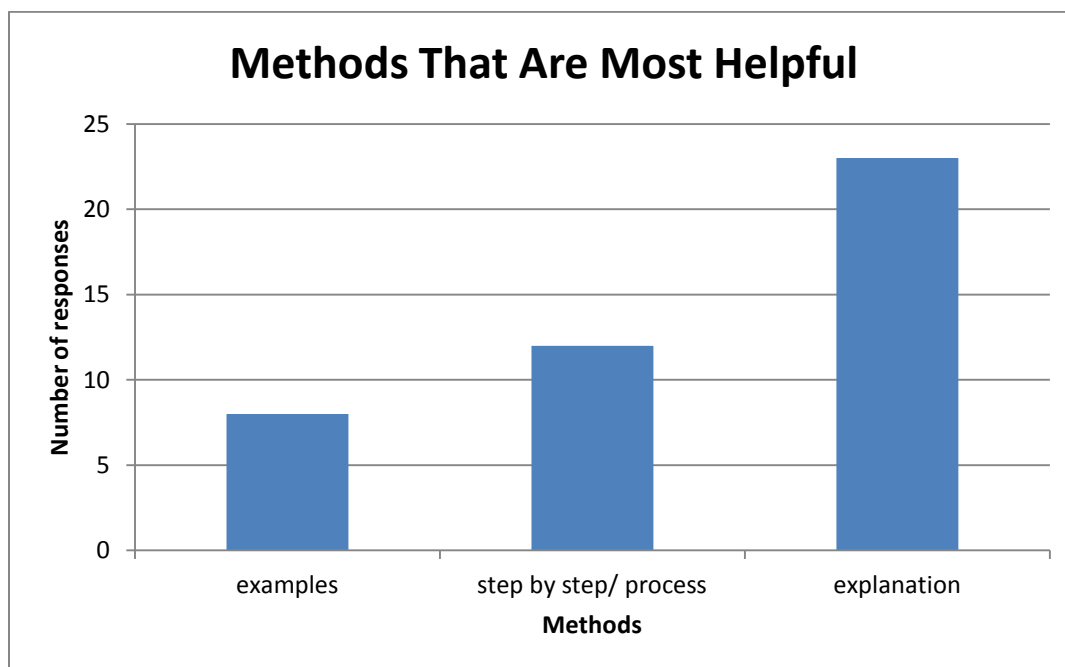


Figure 6. Methods that the students perceive are most helpful.

In summary, all three of these main methods that the tutors use are helpful to the students and their learning of math. Most often the tutors combine two or all of the methods to assist the students. They walk through examples with the students, sometimes giving them a direct step by step process to use and always explaining the concepts as they go through them. Figure 5 summarizes the responses to this question.

**Methods that are not helpful.** The third and final open-ended question that the students were asked to respond to on the survey based on their own perceptions on the effectiveness of peer tutoring was “What methods do the tutors use that you find are not helpful?” Ten students chose not to give a response to this question, so the results in this section are based on a sample of 35 students. About 32% of students that completed the survey said that there weren’t any methods that the tutors use that they find to be unhelpful in their learning. Out of the remaining students that responded, there were only two major themes that students found were not helpful to learning math: not answering the questions/bad explanation and over crowdedness.

The more prominent of the two themes mentioned in the response to this question was tutors not answering questions or giving bad explanations. One tutor pointed out, “sometimes they don’t know the answer which doesn’t help.” This is probably one of the biggest issues with peer tutoring; the tutors are not experts in the fields they are tutoring and so they are sometimes unable to properly explain a problem or concept. Another student said, “there are times in which tutors don’t explain their way of thinking well, which makes things even more confusing.” If the tutor is learning or relearning the concept alongside the student, he or she may have trouble expressing interpretations in a manner that is coherent for the student.

The second theme mentioned in student responses to this question is one that the tutors do not actually have control over. Several students mentioned that tutoring at the Q Center is not helpful when the volume of students seeking help is overwhelming. When there are a large number of students in attendance at the Q Center, the tutors are overwhelmed; there is no longer the pleasant one-on-one atmosphere that students find to be advantageous. One student responded that “if it is very busy, [the tutor] will go through the problem very quickly and not explain all the steps of how to get the solution.” This can make it very frustrating for the



students, but when the volume of students is high, the tutors may get a bit overwhelmed and will rush their explanation so they do not ignore their other students.

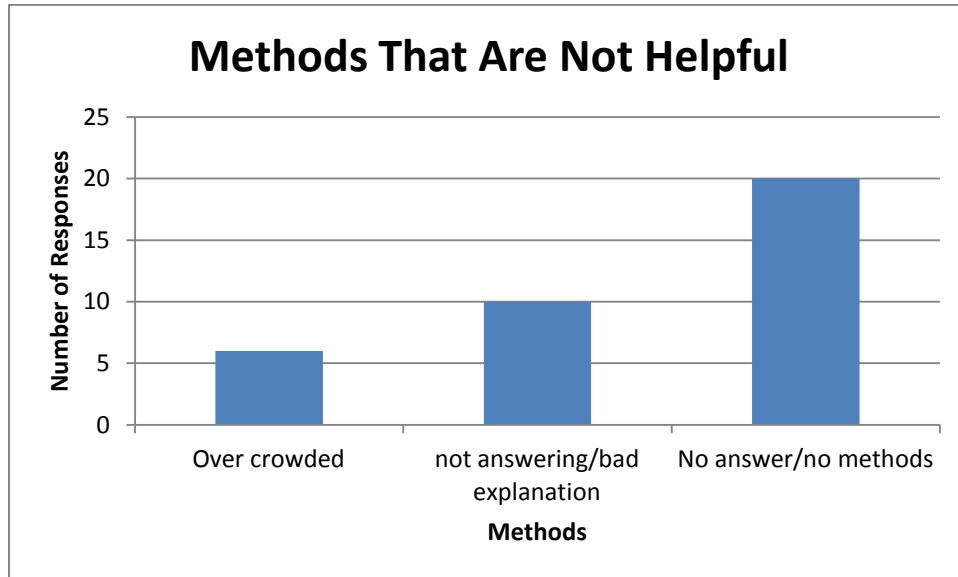


Figure 7. Methods that the students perceive are most helpful.

Overall the number of complaints about the peer tutoring at the Q Center was minimal. Almost half of the students who took the survey either left the question blank or answered that there wasn't anything that they found was not helpful at the Q Center. Also, one of the two major issues was one that the tutors themselves could not even control. Figure 6 summarizes the responses to this question.

## Conclusions and Implications

It can be seen throughout the student responses that they perceive peer tutoring at the Q Center at the University of Connecticut to be effective. Several factors were noted that guide this perception. First, the students believe that because the tutors at the Q Center are their peers, they better understand their way of thinking and can better explain the concepts they are struggling with. They could think about it from a "student's perspective" as the participants

called it and were therefore more equipped to provide explanations. A second factor was the one-on-one help that the tutor could provide. The students believe that receiving that one-on-one help from a peer tutor very effectively helps them learn math.

Another big factor that goes along with the fact that the tutors are their peers is the time and effort the tutors give to the students. The tutors are able to take a much longer time to explain concepts than professors can in class. They can work through it as slowly as the students need them to until they understand it. They can provide a more detailed explanation in the extended time that they have, giving students that specific step by step process for solving problems. The tutors also make the effort to generalize the different concepts and give students methods that they can apply to all their problems instead of a single one.

The only negative factor was that sometimes their explanations weren't so helpful. Even though for the most part, the students found peer tutoring to be extremely helpful and effective, the tutors can't be perfect. However, there are other factors that hinder the tutors' ability to provide an adequate explanation sometimes. One of these factors is the number of students at the Q Center at the given time. If a tutor is dealing with 10 students at once, he or she does not have the time to devote the same detail and effort to explanations that he or she otherwise would. Another factor is the fact that the tutors are not experts in their field. As much as the tutors being peers is an advantage, it can also be a small disadvantage in this sense. Since the tutors are not experts, they may hit road blocks when trying to explain a concept which a student would perceive as very unhelpful.

However, overall, the students perceive peer tutoring as very effective, as shown by their survey responses and by how often students come back. About 66% of students who responded

visit the Q Center at least every other week. This demonstrates their perception that the peer tutoring is helpful and effective. The students gave a great deal of positive feedback on the peer tutoring methods and effectiveness. In conclusion, the data collected in the survey support the use and effectiveness of peer tutoring institutions like the Q Center.

### **Limitations**

There are some limitations to the present study. One is that all of the subjects surveyed were from a single peer tutoring facility. Another limitation is that the survey participants were limited to students who came to the Q Center during the last few weeks of a single fall semester. One more limitation is that the sample size was rather small for the population of 1176 students. As a result of these limitations, the results found are not generalizable to all peer tutoring centers. Nevertheless, the students surveyed were able to give detailed descriptions on their perceptions on the effectiveness of peer tutoring, which provided a direct answer to the research question and may suggest some directions for further study.

### **Implications**

The implications of this study are important to colleges and universities facing decreased funding, larger class sizes, and limited support for their students. Future research can look into perceptions of students using peer tutoring in other institutions. It would be interesting to see if students in other facilities perceive the same level of effectiveness as the students who participated in this study. Additional research could look into the effect that peer tutoring has on its tutors. This type of research could present a more rounded view of the effectiveness of peer tutoring. More research could provide the support that colleges and universities need to support the implementation and use of peer tutoring centers.

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**Appendix**  
**Survey**

Please complete the following survey about tutoring at the Q Center.

What math course are you currently seeking tutoring for at the Q Center?

What is your semester standing?	1 or 2	3 or 4	5 or 6	7 or 8	9 or 10
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Is this your first <b>semester</b> visiting the Q Center?	Yes	No
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How often do you visit the Q Center on average? (ie. Once a week, daily, once every other week etc.)

If tutoring at the Q Center did not exist, you believe your ability and performance in your math class would be which of the following:	1	2	3	4	5
	Much worse	Worse	The Same	Better	Much Better

To what degree does tutoring at the Q Center increase your confidence in your math performance?	1	2	3	4	5
	Not at all	A Little	Somewhat	Much	A Great Deal

To what degree do you agree with the following statement: The Q Center has been very helpful in my learning math in college.	1	2	3	4	5
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

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What specifically about the Q Center do you believe is helpful to your learning of math?

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What methods do the tutors use that you find are more helpful?

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What methods do the tutors use that you find are not helpful?

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