Peer Tutoring: Student Achievement, Confidence and the Teacher’s Role

Philip LaFleur
Council Bluffs, IA

Math in the Middle Institute Partnership
Action Research Project Report

in partial fulfillment of the MAT Degree
Department of Mathematics
University of Nebraska-Lincoln
July 2010
Peer Tutoring: Student Achievement, Confidence and the Teacher's Role

Abstract

In this action research study of my classroom of seventh grade mathematics, I investigated peer tutoring and its influence on student achievement and confidence in fractions and my role in the classroom. My data found mixed results on peer tutors and student achievement. Data collected for my role in the classroom, and peer tutoring and confidence was inconclusive. As a result of this research, I plan to use peer tutoring in all of my classes for further investigation.
During the past two years I have noticed a disturbing trend in my classroom where the students are too reliant on me. The students were unwilling to use their notes, examples, or previously corrected work to give them guidance. If the student did not know the answer right away, the first reaction was to raise their hand and ask me a question. It occurred to me that this could be due to their lack of confidence in mathematics, causing them to constantly search for my reassurance. As I moved around the classroom moving from raised hand to raised hand, I noticed that it was same five or six students who consistently raised their hands. This left little time for me to observe the progress of those students who did not feel comfortable raising their hands.

Throughout the first few months of school, I recognized that my few opportunities to wander, observe and question my students came while they were working with a partner. I was actually able to walk around the room and watch students complete a portion of their assigned work. When students were working with a partner, they had someone else to ask for help rather than asking me. The students also seemed more confident in the work that they were doing and completed it with ease.

After this observation, I decided to use the idea of my students working with partners for my action research in the form of a peer tutor. The purpose of my project is to investigate the use of peer tutors to see what happens to the levels of student achievement and confidence in fractions in math class. My students have a peer tutor to consult with when they are struggling with a concept, and in turn they will be able to lend assistance to other students who might be struggling themselves.
Problem Statement

In recent years, students in my district have had under a 70% proficiency rate on the seventh-grade fractions Criterion Referenced Test. Fractions are obviously a part of the NCTM Number and Operations Standards. While using reciprocal teaching I also incorporate two other standards: Communication and Reasoning and Proof. When students work together, they communicate their thoughts to their partner in a coherent fashion. They also analyze their partner's work to determine if it is done correctly. If it is not correct, then they must reason and prove this to their partner. Then they will need to again communicate the correct methods.

This research is important to me because I am constantly looking for ways to improve my instruction so that it will benefit the students. It is important for students within my building because we service a population of students who have a high mobility rate, a high percentage of special education students, and a large number of students who receive free or reduced lunch. Teachers within our building need tools and strategies so that we can help our students be successful. This should be important to all educators because it is our job to not only educate our students for the time that they are with us, but also prepare them to be lifelong learners.

Literature Review

After I determined my topic of peer tutoring and fractions, I began to search for common themes among research already done. I read many research articles and found that many of the themes that I was interested in had been explored on some level. I am examining the research themes of peer tutoring and student confidence in mathematics, peer tutoring and student achievement, and the teacher’s role as a facilitator after instruction has been given.
**Peer Tutoring & Confidence**

Parsons, Croft and Harrison (2009) discovered in research conducted at Harper Adams University College that college students confident in their ability in mathematics performed higher than those who were not confident. A student who is not confident will struggle to complete assigned work at a high level. Math teachers fight the stigma that follows mathematics on a daily basis. The phrase “Well, I was never very good at math” flows freely from the lips of parents and other teachers. Over time, this can affect the students in a negative way. This is why it is important for educators to search for different methods of instruction that will increase the confidence level in their students.

One method that educators have used to increase student confidence is using peer tutoring. This approach consists of two students paired together to play both roles as the tutor and tutee. Rosewal et al. (1995) compared the changes of self-concept and the student’s likelihood to drop out of school among students who participated in a peer tutoring program versus those students who did not participate in the program. The student participants came from one of two different classroom settings. Those settings were either a traditional class that used group learning activities or a traditional class setting that used individual learning activities. Rosewal et al. discovered that students who participated in a peer tutoring program had a significant increase in self-concept and general attitude toward school over those that participated in more traditional settings.

Care needs to be taken in not only pairing students, but also in creating tasks that would be conducive to peer tutoring. Fernandez-Santander (2008) observed that by beginning each class by presenting the main information to the entire class and then assigning tasks to be done in cooperative learning groups of two or three, students took a greater ownership of their learning.
Data were collected over a four-year span in the form of student surveys, grades and attendance. In the first two years the instructor used lecture only, and in the second two years, a combination of lecture and cooperative learning was used. Results showed that achievement and student satisfaction increased with the combination style. A great deal of time was taken to create tasks with objectives of “reasoning, reading comprehension and ability to summarize, and oral and written communication skills” (Fernandez-Santander, 2008, p. 35) in this Optics and Optometry course.

Although Parsons et al. (2009) did not focus on peer tutoring, they discovered that increased student confidence will yield higher achievement. Walker (2007) and Fernandez-Santander (2008) found that if the students worked with a peer tutor or some form of cooperative learning, all student participants will have a higher self concept and satisfaction. Thus, as students work with a peer tutor, their confidence will increase. When a student’s confidence increases, so will his or her achievement (Parsons et al., 2009).

**Peer Tutoring & Achievement**

Peer tutoring can take many forms in the classroom setting. Spencer (2006) looked at 38 studies from 1972 to 2002 where some form of tutoring was used for students with emotional or behavioral disorders. She discovered that in “the 38 research studies indicates that peer tutoring has been demonstrated to be an effective instructional strategy” (p. 211). The most effective form of the peer tutoring was a reciprocal method where the students reverse roles of tutor and tutee regularly. When students are required to explain their thought process in such a way that the other students will understand, they get a deeper understanding of the concept themselves.

It is not enough to pair students, give them a set of problems, and expect them to succeed at a higher level. Walker (2007) had the principal and teachers of Lowell High School choose six
high-achieving students to use as peer tutors in an after-school tutoring program. She chose to use the knowledge of these students to help compensate for the lack of understanding of how urban students understand mathematics and to help create and deepen knowledge and interest in mathematics. Her research shows that the tutors and tutees benefitted from working together on concepts taught in their class.

Through an action research plan, Mesler (2009) paired a third-grade student who had been retained with a classmate. The retained student became a tutor for the struggling peer. He and his tutee had both seen significant gain in their test scores by the end of the study. Mesler found that this increased the retained student's confidence and that with the extra math practice he showed improvement.

Walker (2007), Mesler (2009), and Spencer (2006) observed different types of children. Walker (2007) studied urban high-school students, Mesler (2009) studied a retained third-grade student, and Spencer (2006) looked at 38 studies of students with emotional and behavioral disorders. Although all three studied different types of children, they all discovered that pairing students in the form of peer tutors increased the achievement of both students.

Role of the Teacher

The role a teacher plays within the classroom is important. Davis and Weeden (2009) compare the role of a teacher to characters of stories. “However tempting the role of sage is, teachers should resist the temptation” (Davis & Weeden, 2009, p.76). Instead, teachers should embrace the role of a trickster. The trickster is a person who puts barriers in the way of the students in order to promote learning. “To do so is to accept and illuminate the dual responsibility of the teacher as both supporter and challenger” (Davis & Weeden, 2009, p.70). From the role of trickster, teachers facilitate the learning of their students.
Crow (2004) discusses the role of the teacher in college classrooms. “Facilitation in actual practice reduces teaching to a paper-shuffling event with little involvement of the teacher in the learning process” (Crow, 2004, p.67). Crow believes that student-centered learning is important and should be present in classrooms. However, it does not mean that the facilitation of the learning needs to exclude the participation of the teacher.

In the context of peer tutoring, the role of the teacher is to facilitate, observe, question, and guide the learning of their students. However, it is still necessary to include some whole group instruction so the students have a base of knowledge. “Maintaining short periods of lecturing in every session was very helpful in the development of the pupil’s trust in the new learning methodology and in the success of it” (Fernandez-Santander, 2008, p.38) After the content has been given, then the teacher can roam the room to listen to discussions that students are having about the material. This will help them begin to understand the thought processes that their students are following and may intervene if they feel it is necessary.

Davis and Weeden (2009), Crow (2004), and Fernandez-Santander (2008) all believe that the role of teacher is extremely important to the learning of their students. Crow (2004) and Fernandez-Santander (2008) both feel that teachers should still play an active role in the learning by presenting the new information to the students. However, Davis and Weeden (2009) see a teacher’s role as a trickster that facilitates the learning.

Conclusion

Fernandez-Santander (2008), Walker (2007), Mesler (2009), and Spencer (2006) agree that having peer tutors will increase student achievement in elementary, high school and college. In the following action research, peer tutoring will be utilized as a method of instruction in a middle school setting. Rosewal et al. (1995) and Fernandez-Santander (2008) have shown that
having a peer tutor can also increase student confidence in the subject area, and Parsons et al. (2009) showed that if a student has confidence he or she will achieve more. This research looked at whether having a peer tutor increases the student achievement and confidence of the participating students.

Davis and Weeden (2009) believe that teachers should play the role of trickster and facilitate learning in a classroom. Crow (2004) and Fernandez-Santander (2008) believe that teachers should have an active role and lead some lecture for instruction. In this action research, I examine what happens to my own teaching as I attempt to shift into a facilitative role in my classroom.

**Purpose Statement**

The purpose of my project is to investigate the use of peer tutors to see what happens to the levels of student achievement and confidence in fractions in math class. I want to know whether having a peer tutor can increase the understanding and confidence of my students. I also want to know what my role is when my students are working with a peer tutor.

I am examining the research themes of student achievement, student confidence in mathematics, and my role as a facilitator after instruction has been given. From those themes, I have created three research questions. First, I investigated how students acting as peer tutors influence their achievement and the achievement of their peers while solving operations with fractions. Second, I investigated to what extent peer tutoring can alter a student’s confidence in mathematics. Finally, I looked at how my instruction was be modified as I shifted from instructor to facilitator.
Method

In order to answer my research questions, I chose to collect several forms of data from January 11 to February 18, 2010. My research began on January 11, 2010, in the form of a pretest (see Appendix A) over all operations with fractions and mixed numbers. All 14 students in the class were given the pre-test without any instruction and were asked to take the pre-test to the best of their abilities. Having foreseen a problem of students turning in blank tests, I told students that if they did not know an answer, then make a guess as to how they would solve the problem. The results of these pre-tests were used to pair the students with their peer tutor. I matched the higher scores with the lower scores and was conscious of possible behavior situations. The pre-test was also used to assess their prior knowledge of fractions.

On three separate occasions (January 13, January 28 and February 22), I gave my students a survey (see Appendix B). This survey was used to gauge their confidence and perceptions of their own abilities with fractions. Some students were absent on the days that these were given. It became difficult for me to remember to give the surveys to the students who were absent when they returned to class.

I chose to assess student learning with the use of 1-minute prompts (see Appendix C). These were given at the end of the six classes throughout the unit. I used the 1-minute prompts to get a quick picture of what the students understood about the lesson that day about fractions. From there, I determined what the class, or individuals, needed more help with.

It was necessary for me to document my own thoughts, actions and observations. This was done in the form of 10 teacher journals. I wrote about the interactions I saw between the peer tutors, the level of improvement I was seeing in student abilities with fractions, my methods of instruction, and student attendance, effort and behavior.
At the end of the unit is when I gathered the most data. The students were given a post-test (see Appendix A) to assess the level of student achievement throughout the unit. At this point, I also interviewed four students about their views of peer tutoring and their feelings about fractions (see Appendix D). Finally, I asked the students to journal about two different prompts (see Appendix E) in order to give me insight about what they liked, disliked or learned about having a peer tutor.

As the data were being collected, I organized the data by the research question to which it pertained. For example, the pre- and post-test and 1-minute prompts were used for student achievement with fractions. This made it easy when I was analyzing the level of student achievement.

**Findings**

At the beginning of each class, my 14 students enter the classroom, get their math folders, and complete their bell work for that day. The bell work is usually four to eight review problems from previous lessons. While the students complete the work, I take attendance on my computer. Students are given four to five minutes to complete these problems, and then we correct and discuss them.

After bell work is put away, we discuss the previous day’s lesson. Sometimes I ask students questions about the previous lesson, and other times they ask me questions about the homework. Since we are on an A/B block schedule, it would have been two days since my students last had class. This tends to cause some problems for middle school students' organization and reinforcement of content. Having a block schedule such as this causes me to spend the first 20 minutes reviewing the previous lesson.
Assignments are collected after we have finished discussing the previous lesson. At this time, I like to reinforce that material by having the students pair up with their peer tutors to complete a brief in-class assignment. The students were first assigned their peer tutor based on their pretest scores. After several weeks, I reassessed the students based on my observations and reassigned the pairs. I used observations and student work to pair the students, and I again tried to match higher students with lower students. The review assignment usually takes between 10 and 15 minutes. When the students have completed the work, we then correct the assignment together. I encourage the students to ask questions and allow them to change the answer to those they ask a question about.

New material is covered next. Notes are given at this time if they are needed, and I present the new concepts to the students. During this presentation, I try to activate prior knowledge of what we have previously learned this year, in elementary school, or in their everyday lives. Some days this is easier than others. After I have presented and thoroughly discussed the new material, we do a few guided practice problems together.

When guided practice has been completed, I give the students another in-class assignment, game or task to complete with their peer tutor. The activity or assignment is always based on the new material that I just presented. As students complete this task, I take this opportunity to walk around the room to observe and question the students. I also write down notes for my journal as I walk around the room. When time allows, I also use this time to glance through the homework I collected earlier to see if there are any particular areas that they struggled with. This luxury is not always available to me when I have to deal with behavior issues or students who are refusing to work with their peer tutor that day. When the students have
finished the task, we review what was learned and I either collect the work or allow the students to keep it for their notes.

The final 10 to 15 minutes of class is when the students complete their 1-minute-prompts or surveys, and they begin their homework assignment. At this time I let the students decide whether they would like to begin their homework with their partner or on their own. Whether students choose to work with their partner depends on the day and the assignment.

Throughout this unit, I battled many outside factors that fought against the success of this project. There were only two days that all students were present and two of those days I had less than half of the class during the action research. This meant that the students rarely worked with their assigned partner. When a student was absent, I had to pair those students without partners together. Also, two students moved to a different school and one student moved to a different class due to a schedule change before the action research was complete. It was frustrating to have to deal with this inconsistency on a regular basis.

Peer Tutoring & Achievement

With the data that I have collected, I cannot say whether peer tutoring has had a positive influence on student achievement during a unit on fractions. Mixed results were found through the data analysis. All students increased their scores from the pre-test to the post-test, but only one of them scored a passing percentage on the post-test. This is a contradiction to all of my observations in class, observations on homework and the district’s criterion-referenced test. Even though I saw some increase in achievement, I cannot conclude whether this was directly attributed to having a peer tutor.

Prior to the post-test, I believed that the students were achieving at a high level. The students’ homework assignments were being completed on a regular basis and were done with
few mistakes. In the following samples, Sally\textsuperscript{1} and Jane were able to complete assignments on subtracting fractions from whole numbers and dividing mixed numbers at a high level.

Sally:

When teaching fractions over the past six years, I have come to expect that homework completion will drastically decrease. This year was an exception to that tendency and I did not observe the decrease in homework completion. With this class there was an increase in homework completion by many students. Several students who typically do not turn in

\textsuperscript{1} All names are pseudonyms.
assignments on a regular basis consistently completed fraction worksheets during the action research time period. Of the 14 students who began this unit, only four students would have received a failing grade for homework completion. However, two of those students moved to a new school before the end of the unit. Despite this observation, I was unable to find any data to indicate why there was an increase in homework completion.

Just as I had observed good work from my students’ homework, I observed good interactions between the peer tutors. The conversations that they were having were at a high level of conceptual thought. For instance, I heard Bob say, “We don't need to make equal fractions because they have the same denominator already” (Personal Journal, January 28, 2010). I also observed on January 26, that “Sally has shown that she has a talent for teaching others” (Personal Journal). There was an increase in her partners’ effort, work completion and participation since starting the unit. This leads me to a conclusion that good things have come from the peer tutors.

I had not planned to use our district’s criterion-referenced tests as a source of data for this action research. However, with the students scoring so poorly on the post-test, I believe that it is important to show that most students met the standard of the district. Eight of the 11 students who participated in the entire action research scored proficient or advanced on this assessment. Two of the three students who scored progressing attended class less than half of the time throughout the action research. All but one student who attended class on a regular basis and actively participated in peer tutoring achieved our district standard.

It is my opinion that the reason students did not score as high on their post-test as other forms of data was due to the orientation of the problems. Looking at the problems in the pre- and post-test (see Appendix A), I saw that all of the problems are written horizontally. All sample problems and assignments were written vertically for addition and subtraction problems. I
believe that this had a negative influence on their post-test scores. I also made a mistake on question number 2. This problem will give a negative answer, and my students had not been exposed to negative fractions. Due to these many contradictions in data, and a lack of data indicating that the achievement was directly related to peer tutoring, I am unable to make any conclusions.

*Peer Tutoring & Confidence*

When looking over the data collected about peer tutoring and confidence, I again do not have enough data to make any conclusions. An increase in confidence is seen in the student surveys. In the graph below, there was an increase of students who “strongly agreed” and “agreed” that they are good at solving fractions.

On January 13, four students agreed that they were good at fractions. This increased to six students on January 28 and to eight students on February 22. That means that there was a 50% increase in students who felt that they were good at fractions over the six-week unit.

In another survey question, an increase is seen in students who “disagree” or “strongly disagree” that no matter how hard they try, they still are not good at fractions.
On January 13, there were only five students who felt that they were good at fractions. This increased to seven students on January 28 and to eight students on February 22. The ending result of this survey question supports the findings of the previous survey question.

Some of the same students who typically do not complete their homework began completing their homework and increased their participation. These students not only participated with their peer tutor, but also in whole class discussions. I noted in my teacher journal on January 26, that I have seen improvement in the “effort, work completion and participation” from one particular student.

On February 3, I had reassigned the peer tutoring pairs. As I did this, I made a point to speak with Sally about her new peer tutor.

I had to explain to Sally that the reason she was working with him was because she has done such a wonderful job. You could tell that this made her happy, and I did not hear her complain again. (Personal Journal, February 3, 2010)

After this conversation with Sally, I could see a new confidence that I had not seen before.

Despite the fact that students are more confident in their work, it is still unclear whether this is directly attributed to peer tutors. During student interviews, I asked students how peer
tutoring affected their confidence in solving fractions. One student refused to answer the question, and the other three students’ responses did not fully address the issue, considering the question asked. For instance, Jane said, “It helped me. I would rather have a peer tutor so you don’t have to bug the teacher, cause they might know” (Student Interview, May 17, 2010). Even though this gave me insight toward why students enjoyed having a peer tutor, it did not say how peer tutoring affected her confidence.

Role of the Teacher

The final piece to my action research was to determine to what extent my instruction would be modified as I shifted from instructor to facilitator. As I planned the data collection, I intended to use teacher journals, student journals and student interviews. Things did not work out as planned throughout the unit, and I ended up having the students do one journal on two prompts at the end of unit. All responses in the student journals and interviews were focused on who their peer tutor was, even when the question had nothing specifically to do with peer tutors. This leads me to believe that I did not create questions that were focused enough to provide the desired data. In the end, I had to only use my personal journal to find evidence of changes in my teaching.

Through my teacher journals, I observed minimal change in my role in the classroom. On January 26, I observed the following:

I have noticed that I am answering fewer and fewer questions each time. The students are feeling more and more comfortable asking each other, rather than running to me every time.

While the students were working with one another productively, I had the opportunity to do other things. I was then able to walk around the room, observe the interactions between peer tutors, talk to the students about what they were doing, and correct the homework assignments
that were due that day. The latter was observed by Jane in her journal response to question 2 (see Appendix E). She said:

I would say peer tutoring is when you get paired up with someone so if you need help you can ask them instead of the teacher so he can do his work. And that is just like having another teacher just the same age as you and does not have a degree yet. (April 2, 2010)

Jane was able to see that part of the point of having a peer tutor was to have someone their own age explain the content in a way that the teacher might not be able to.

In another teacher journal, I recognized a necessary change in classroom management.

On February 3, I observed that:

I have had to adjust my discipline. When partners are talking more than working, I take points off their assignments. Normally I would have made them go back to their own seats.

Since the focus of this action research is working with peer tutors, I did not feel like I should send the students back to their seats to work by themselves. I changed my initial discipline for behavior concerns, and constantly reminded students about appropriate work habits when working with a peer tutor.

I made one further observation in my teacher journal about my role in the classroom on February 5:

I find myself mediating in the tutoring pairs. When pairs have different answers, they begin to argue. They don't try to convince the other person, they just say that they are wrong. I then have to go through the problem with them to show where the mistakes were made.

This was something I would have expected early when students were first working with peer tutors. However, I was disappointed that I still had to do this four weeks into the research. I wonder whether the personalities of the pairs had anything to do with the arguments. In the student journal question where I asked for advice about next year, many students responded they wanted to choose their own peer tutors. Steve said, “I would say they can pick their own friends
to learn with, so you don’t work with some person you don’t know” (April 2, 2010). Other students went further and said that they did not like the person they were working with and thought it was awkward to ask their peer tutor for help.

Throughout the action research, I noticed minimal changes in my instruction. I still spent the majority of the class mediating arguments and doing discipline. My journal observations did not show yield enough data to make a conclusion how my instruction shifted from instructor to facilitator.

Conclusion

My findings illustrate that there is potential in peer tutoring. Sally showed that she has good leadership and characteristics of a good teacher. Like Walker (2007), I have shown that it is possible to use the excellence from your own students to guide others in need toward higher achievement. While that higher achieving student is explaining, rewording and then re-explaining, they too are benefitting from the peer tutoring. Not only are they practicing the problems, but they are gaining a deeper understanding of what they already know and are gaining confidence in mathematics (Walker, 2007).

While Rosewal (1995) found that peer tutoring increased students’ self concept, my study did not share this finding. My data was limited due to insufficient supportive student interviews and journal entries. This may be because my data instruments were not properly created to produce data that would clearly define whether peer tutoring had an impact on student confidence.

Implications

Next year I will take the advice of my students and allow them to choose their own peer tutors. Students openly complained about their being partnered with someone they did not like.
This was a major barrier in the path toward success for peer tutoring. This is one of those battles that I do not wish to fight in the future, and I can see a student’s point that they feel more comfortable sharing with someone they are close to. However, I will assign them partners until they get comfortable with the process.

I feel that there is a lot of potential with peer tutoring. I will definitely use peer tutors next year with all of my classes, and will encourage my fellow math teachers to do so as well. My next step will be to create lessons that are more conducive to having a partner.
References


### Fraction Pre-Test / Post-Test

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>(\frac{2}{5} + \frac{3}{4} = )</td>
<td>9.</td>
</tr>
<tr>
<td>2.</td>
<td>(\frac{4}{7} - \frac{2}{3} = )</td>
<td>10.</td>
</tr>
<tr>
<td>3.</td>
<td>(\frac{2}{5} \cdot \frac{3}{8} = )</td>
<td>11.</td>
</tr>
<tr>
<td>4.</td>
<td>(\frac{1}{2} \div \frac{5}{8} = )</td>
<td>12.</td>
</tr>
<tr>
<td>5.</td>
<td>(3 + \frac{2}{3} = )</td>
<td>13.</td>
</tr>
<tr>
<td>6.</td>
<td>(5 - \frac{1}{7} = )</td>
<td>14.</td>
</tr>
<tr>
<td>7.</td>
<td>(2 \cdot \frac{2}{5} = )</td>
<td>15.</td>
</tr>
<tr>
<td>8.</td>
<td>(2 \div \frac{3}{4} = )</td>
<td>16.</td>
</tr>
</tbody>
</table>
Appendix B

Survey of students' confidence level with fractions

Directions: Circle whether you strongly agree (SA), agree (A), disagree (D) or strongly disagree (SD) or do not know (DK) for each of the statements listed below.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learning how to solve operations with fractions involves mostly memorization.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>2</td>
<td>I really want to do well with fractions.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>3</td>
<td>My parents think I am good at mathematics.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>4</td>
<td>I am very good at solving problems with fractions.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>5</td>
<td>I like to help others with fraction problems.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>6</td>
<td>I understand key vocabulary when working with fractions.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>7</td>
<td>Fractions are easier for me than for most people.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>8</td>
<td>No matter how hard I try, I still do not do well with fractions.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>9</td>
<td>I can solve any adding fraction problem.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>10</td>
<td>I can solve any subtracting fraction problem.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>11</td>
<td>I can solve any multiplying fraction problem.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
<tr>
<td>12</td>
<td>I can solve any dividing fraction problem.</td>
<td>SA</td>
<td>A</td>
<td>D</td>
<td>SD DK</td>
</tr>
</tbody>
</table>
## Appendix C

### One-Minute Prompts

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Solution</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What about today's lesson is still confusing?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. What is one thing that you learned today?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Summarize in a few words what today's lesson was about.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 4. \[
\frac{1}{2} \cdot \frac{2}{3} = \frac{1}{3}
\]                  | \[2 \frac{1}{3}\]  | Explain why this solution is incorrect.          |
| 5. \[
\frac{2}{5} + \frac{3}{4} = \frac{5}{9}
\]                      |                   | Explain why this solution is incorrect.          |
| 6. \[
\frac{2}{3} \div \frac{1}{3} = \frac{2}{9}
\]                    |                   | Explain why this solution is incorrect.          |
## Appendix D

### Student Interview Questions

1. If I told you that you were "doing well" with fractions, what do you think that would mean? Please give me a definition of "doing well."

2. What skills allow you to help others with solving different types of fractions?

3. How has peer tutoring affected your ability to "do well" with fractions?

4. What advice would you give me about doing peer tutoring with my classes next year?

5. I noticed that many of your classmates have turned in more homework during this unit. Why do you think this is?

6. How has peer tutoring affected your confidence in solving fraction problems?
Appendix E

<table>
<thead>
<tr>
<th>Final Student Journal Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am thinking about using peer tutors for my students next year. What advice would you give me?</td>
</tr>
<tr>
<td>2. If I had you come to my class at the beginning of next year to explain how peer tutoring works to my new 7th graders, what would you tell them?</td>
</tr>
</tbody>
</table>