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Gretchen Long
Missouri Valley, IA

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ABSTRACT

In this action research study of sixth grade mathematics, I investigated the use of meaningful homework and the implementation of presentations and its effect on students' comprehension of mathematical concepts. I collected data to determine whether the creating of meaningful homework and the implementation of homework presentations would have a positive impact on the students' understanding of the concepts being taught in class and the reasoning behind assigning homework. The homework was based on the lesson taught during class time. It was grade-level appropriate and contained problems similar to those students completed in class. A pre-research and post-research survey based on homework perceptions and my teaching practices was given, student interviews were conducted throughout the research period, weekly teacher journals were kept that pertained to my teaching practices and the involvement of the students that particular week, and homework assignments were collected to gauge the students' understanding of the mathematics lessons. Most students' perceptions on homework were positive and most understood the reasoning for homework assignments.

The topic for my research was creating meaningful homework and stressing the importance of completion. Homework was not something that was required in my school. In fact, many teachers in my building said that the work should be done in the classroom because one would never get the homework returned. This had really bothered me because I wanted my students to learn responsibility by bringing their homework back to the classroom as well as learn the classroom material. Knowing the unsupportive and tumultuous home life in which the students lived, this seemed a daunting task.

I had taught at my current school for nine years. It was my first job out of college. It made me aware of a different culture and opened my eyes to a whole new way of life. I taught at a K-12 school located on an Native American Reservation in Northeast Nebraska. There were approximately 45 certified staff and 20 classified staff members. Of those certified staff, there were six who taught in the middle school. Four of the teachers had a combined total of 105 years of teaching experience. I had taught for nine years and all of them had been at the same school. There was one other teacher, who taught the other section of sixth grade math, and he had been teaching for 25 years and 23 of them had been at this school. The amount of experience of the teachers overwhelmed me when I first started teaching since I lacked experience. The school environment was overwhelming for me, and I was glad my co-workers had as much experience as they did.

This past year, I taught sixth grade math, and throughout the year there had been between nine and 13 students on my attendance roll on any given day. The mobility rate for our students was 53% school-wide, meaning the same students who started the year were not necessarily the same students who ended the year. For example, at the beginning of the year, I started with 11 students in math, and I ended the year with nine students and only five of them were there since

the beginning of the year. There were approximately 300 students school-wide, and about 75 of those were in the middle grades. The student population consisted of 99% Native American population. We were a Title IX school where 93% of the students qualified for free or reduced lunch. The community had an unemployment rate of 83%. The math program that was implemented in my school was *Everyday Mathematics* (Bell, M., Bretzlauf, J., Dillard, A., Hatfield, R., Isaacs, A., McBride, J., Pitvorec, K., Saecker, P., 2001). It was established as the K-12 mathematics curriculum.

Our school has used the Comer School Improvement Plan. The mission of this process was that the school development program was committed to the total development of children and adolescents by helping parents, educators and policymakers create learning environments that support children's development along six critical pathways. The six developmental pathways were physical, cognitive, language, social, psychological, and ethical. There were 10 sub-committees for school development at my school: Parent Involvement, Total Wellness, Career/Technology Education, Curriculum, ILCD, Data/ Assessment, Cultural Integration, Attendance/Discipline, Data & Assessment, and Early Childhood. All school staff members, both certified and classified, were part of a sub-committee chaired by a member of the School Planning and Management Team. Each sub-committee had an area of focus and plans of action. Each sub-committee reported to the School Planning and Management Team. On the last Monday of the month, we had a 10 o'clock late-start so staff could attend the Comer Committee meetings.

I was a member of the curriculum sub-committee. My sub-committee had been creating a school curriculum since there was no curriculum in place. Teachers had been using the programs or textbooks that were implemented as our curriculum. We used the current programs of study,

Success for All (*SFA*) program for reading and *Everyday Math*, and aligned them with the state standards and created a curriculum for all teachers K-12. This year our sub-committee's focus had been on the math curriculum. We were following the state standards and creating guidelines for the teachers to follow in the classrooms. This helped the teachers become aware of what needed to be taught in the classroom in order for the students to meet the state standards.

PROBLEM STATEMENT

I chose the topic of meaningful homework because I saw my students struggling in the mathematics classroom. They had a hard time with the varying concepts in the math series we were using in my school. At some points, the class work from the textbook would have six different types of math problems: simplifying fractions; finding range; finding mean, median and mode; multiplying decimals; drawing; and measuring line segments. Some of the problems had not been introduced until that lesson, and when I had students who struggled with basic math computations trying to solve the different problems, it was a difficult transition.

I wanted the main focus of a lesson to be on one concept and review concepts we had studied previously. I also wanted a cohesive flow of the lessons, to follow a pattern where the students could build on their prior knowledge. *Everyday Math* did not provide the flow necessary for my students to build on their math ability. I saw the students use their fingers to subtract and add, and this was something I dealt with on a daily basis. Most of my students did not know their multiplication facts. They may have known some of them, but not one of my students knew all of their facts. When I asked what was 7 X 6, I waited over 15 seconds for the answer. The students would shout incorrect answers until one was correct. When I helped students one on one, they often had to use the multiplication chart. They relied too heavily on multiplication charts and

other devices that made it easier for them. I am not condemning these practices; I wanted the students to stop relying on these practices so heavily.

Everyday Mathematics was the program we had in place in the middle school. I had found there was very little individual work provided in this program. My students required individual work because they relied too heavily on others to do the work for them. The math journals for *Everyday Math* included lessons and math boxes to be worked in class. The text provided with *Everyday Math* was to be used as a reference, it was not one in which the students were introduced to the lesson. I encouraged group or partner work when both participants were benefitting, not when one student was doing all of the work and others used this to their advantage. I wanted the students to be able to help their classmates when one did not understand or was not able to complete the work on their own. However, I did not want them just to provide the answer because this did not teach the process.

The mathematic ability of my students was along all points of a spectrum. Although I would not say I had any high ability learners in my math class, there were a few students who had higher abilities than others in the class. One student in particular worked on her own pace if she understood the material. After the lesson was taught, I had four students who consistently needed to receive more instruction. They would sit at a table together so I could give more instruction. I would give them a problem to work, and then I walked around the classroom to monitor the progress of the other students.

There were math boxes in the math journal included with the *Everyday Math* designed for individualized work, but my students were unable to fulfill this task. I gave the students 5-10 minutes to complete the problems they were able to on their own. A student would volunteer to show his or her work for one of the problems he or she had completed. Once the demonstrations

were complete, we would go over the remaining problems as a class. I found I was presenting a majority of the problems because the students were unable to complete them on their own. The math boxes introduced some concepts we had not addressed in lessons thus far in the sixth grade class and the students may not had been introduced to in past years, but typically my students did not remember the procedure to complete these problems even if it was done in class the previous day. This was why I felt it was important for the students to do homework because I hoped as a result the students would have a better retention rate.

My frustration with using *Everyday Math* with my students stemmed from the lack of a general alignment with the standards and the difficulty my students had building on their knowledge from the previous lesson or making connections from one lesson to the next. It also did not focus enough instruction or math journal entries on new procedures for my students, and it did not provide sufficient review in the math journal entries for what my students needed. I wanted my students to be proficient in mathematics and be able to recognize what procedures they needed to follow to complete their math problems. I had found that at times some of my students struggled with basic computation, and if they could not do the basics, they would not be able to build until they had this foundation.

Meaningful homework made a connection to the daily lesson. It reinforced what was taught in class. By creating meaningful homework, I had the students review the work we did in class so that it was not forgotten the moment math class was done for the day. I wanted them to understand the procedures in order to build on their knowledge base for mathematics. The number of problems on the homework varied on a daily basis. The number of problems on the homework was based on the topic and the difficulty of the lesson. I stressed quality and not quantity. I did not want a large number of problems because I wanted them to complete it and

bring it back to class. The homework consisted of basic computation problems, review problems for the day's lesson, and at least one problem that required students to explain how they arrived at the outcome they did. In order to stress completion, I had students present their work and explain computations and the process needed in order to complete the problem.

For homework presentations, the students volunteered to present the solution of one problem and then I chose a name out of a bag for the other problem to be presented. There were two presentations for two different problems. Once the presentations were made, the students who did not present were given the opportunity to ask questions if they did not understand the solution to the problem.

I felt my research plan addressed three of the National Council of Teachers of Mathematics (NCTM) process standards (Appendix A): communication, connections, and representation. By having meaningful homework, my students were able to more effectively communicate their thinking and their processes effectively, whether it be orally in their presentation or written on their homework. They were also able to make the connection that their learning of mathematics was a building process. They would continue to build on what they learned from day to day and unit to unit. By making these connections and using effective communication, I hoped the students would be able to create representations of their mathematical ideas.

My plan also stressed the NCTM principles of equity, teaching, and learning. The principle of equity proposed creating an environment of high expectations and support for all students. The students hopefully came away from my class knowing that they could do anything they set their mind to accomplish. Teaching the students what they needed to learn to become successful math students was incredibly important. Knowing the students relied on my ability

and capability with mathematics in the classroom was a priority. I wanted my students to know I felt comfortable in my ability to teach and help them learn the concepts. Learning through different methods and building on prior knowledge was one of the keys to understanding and becoming proficient in mathematics. The NCTM content standard I focused on was number and operations. If the students understood basic operations and computations, a solid foundation would be established so the students were able to build on it. In understanding how to use numbers and the processes, the students hopefully would become better math students.

The implementation and use of homework was important to me and other teachers because we did not want to fail our students in any way. We wanted our students to be successful in mathematics and all aspects of life. We never wanted to short-change the students. I felt that students should not be given assignments just for the sake of giving them something to do to occupy their time, thus creating "busy work." There should be a meaningful connection and legitimate reason for the assignment. When giving assignments that were designed to keep the students busy, they were not being given the opportunity to show they understood the process or reasoning behind the assignment. They may be able to answer all the questions correctly, but did they understand why they came to the answer they did? If the homework was meaningful and the number of problems was reasonable for the lesson, the students would be successful and feel positive and proud of their own achievements.

Of course, in an ideal classroom, the students would all complete their homework and would be able to present it when asked. This was not the case in many classrooms. It seemed the kids wondered what a teacher was going to give them if they completed their homework. It was the "What were you going to give me?" mentality. The students felt as though they were entitled to some sort of prize or reward for them doing what they were supposed to in the classroom. It

was not enough they were “getting” an education, but they did not think long term. The students wanted instant gratification. I did not know when or how this happened, but I would like to see a change in which the students were completing the assignments on their own accord, something I was sure many other teachers wanted too. After I read some of the other Math in the Middle participants’ journals, I knew I was not alone in the complacency of the students and we wanted so much to change it, but how? I hoped one of us in my school could discover this so it would spread to classrooms throughout the building. I understood there was no quick fix or a solution for all classrooms. I just wanted what was best for my students and wanted to see them succeed in the mathematics classroom, as well as outside of it, too.

I felt this idea followed along with all three levels: Knowledge-for-Practice, Knowledge-in-Practice, and Knowledge-of-Practice in the Cochran-Smith and Lytle chapter (1999). Knowledge-for-Practice was knowledge teachers used in their classroom. Knowledge-in-Practice was the knowledge that came through the experience of teaching. Knowledge-of-Practice generated knowledge in students by connecting their work in classrooms to larger issues. Creating meaningful homework would benefit the teacher in her own classroom because this would create an understanding of what was happening in the class. The immediate teachers in the community would benefit by using some of the same strategies implemented in a particular teacher’s classroom. It would also benefit the larger community of teachers because they would see the positive things happening in a classroom that they could use or implement in their own classrooms. I realized what I used in my classroom may not help every teacher because no classroom was exactly like another, since every teacher ran their classroom differently, but if they could take something positive away from the experience and use it in their classroom, that was all we could hope.

LITERATURE REVIEW

The issue of homework in the mathematics classroom was an ongoing debate. Were assignments reasonable in length and difficulty? What was the place of drill and computation in homework? Could we make assignments appealing and meaningful? How could homework assignments be made more meaningful to children? My area of research was dedicated to the issue of homework. The current curriculum set in place in my classroom did not entail work outside of the classroom, and I felt it was needed in order for the students to gain a better understanding of mathematics. By practicing mathematic concepts out of the classroom, the students were continuing the processes necessary in acquiring comprehension of mathematics.

In conjunction with giving meaningful homework, homework presentations were implemented to increase and strengthen the students' oral reasoning and communication in the mathematics classroom. After the creation of meaningful homework and presentations, I hoped the implementation of these procedures would ensure a better understanding of the material, instead what usually happened, that being just getting the answer and not understanding the reasoning or process behind a particular problem. I wanted my students to be confident in their work and be willing to share the processes and their understanding with their classmates.

The presentations demonstrated the oral reasoning and communication the student used to solve or attempt to solve the problem assigned. In order for this to take place, my teaching approach in the classroom needed to be more directed at student understanding than one focused on getting through the material. Focusing on more meaningful practices would in turn help the students become actively participating in the classroom. When the students actively participated in class, they would not withdraw from the activity or the discussion. Some students learned to

listen to their classmates and at times it helped them build on their understanding; instead of tuning the others out, they would benefit from what others had to contribute to class discussion.

Meaningful Homework

Farrow, Tymms, and Henderson (1999) studied a large sample of 492 primary schools with nearly 20,000 students in England. They focused on primary schools in contrast to most research on homework that focused on the effects of homework on secondary school students. There were very few studies using primary age school students. They investigated the relationships between amount of homework, ability of the student, home background, sex of the student, and the school. The amount of homework assigned had little relationship to the sex of the students and showed a large relationship with the support from home and the school the student attended. By assigning homework, the teachers hoped they would encourage parent involvement, improve study skills and students' responsibility, and reinforce the work covered in class. Teachers knew they were supposed to give homework and that in some cases they would be judged on that basis (Farrow, Tymms, & Henderson, 1999). This type of reasoning created the homework without meaning, doing it because the students had to do it because it was assigned. The ability of the student was a common issue in all classes. If students were not able to do the computation required to complete an assignment or a lesson, steps needed to be taken by the teacher so the students understood the necessary information and procedures to complete the task.

Having varying abilities in the classroom could affect the classroom environment. Teachers could accommodate diverse students by giving the students different assignments, and doing this created equity in the classroom because no student was exempt from the homework but all were given homework that met their individual needs. In my classroom, I was able to use

the same classroom work for all students. I had the students who understood the work practice on their own, while the struggling students sat at a table and received further instruction from me. The students sitting at the table also would benefit because one student could help explain a process to another student. By doing this, I was able to gauge the students' understanding for the lesson.

Corno (2000) used a qualitative case study and interviews of six families to gather her data on homework in a third-grade classroom. Her focus was on the reasons for giving homework, the students' and teacher's expectations, the types of assignments and feedback given, and parental involvement. She found that students saw homework as something that had to be done for adult or teacher approval. They did not understand the meaning of homework. Teachers could create and assign homework that would improve engagement in class. Adults and children had different interpretations of the purposes and requirements of homework (Corno, 2000). Corno's findings on parental involvement were similar to that of Farrow, Tymms, and Henderson's (1999): the more parental support the more likely the students would complete and understand their homework. Parental support was of the utmost importance to Farrow, Tymms, and Henderson's study. I wanted the students to be able to ask their parents for help when they did not understand a particular problem. Knowing there was a support system outside of the classroom was beneficial for both my students and the students in Farrow, Tymms, and Henderson's study.

Eilam used two different studies for his research. One in three seventh grade classrooms focused on students' difficulties while doing homework and the second was in a summer school program designed to teach students skills and strategies to help them in doing homework. As Eilam stated, "Homework is defined as tasks that were assigned to students by teachers and were

meant to be performed during nonschool hours" (Cooper, 1989a, p. 692). The work the students did in class was the only work the teachers could monitor. So it was our job, as teachers, to give the students the appropriate tools to be able to complete the tasks we assigned. In Eilam's study, he focused on the difficulties students encountered when they were performing the necessary tasks to complete their homework. He looked at the necessary skills the students needed in order to complete the tasks: recording, assessing, organizing, and making sense of the homework. The findings of this study found the students with a lower deficit in skills. Despite everything the teachers had to offer and the diverse assignments provided, the students felt lost and lacked the knowledge needed to complete the tasks. In his second study, he found a summer program implementing what he found to necessary skills from the first study, improved the students' ability to complete their homework. A major focus of my study was to give my students the necessary skills to be successful in the mathematics classroom. It was very important to me to make connections between the homework and the classroom instruction.

Mathematics Reasoning

Draper and Siebert (2004) collaborated in an undergraduate, inquiry-based mathematics classroom at Brigham Young University with 25 students majoring in elementary or early childhood education. Their study focused on reading and writing in the mathematics classroom. In order for students to gain a meaningful experience, they needed to organize and interpret their experience. Mathematics education was about mathematical learning and thinking (Draper & Siebert, 2004). Siebert's math methods class was used in the study. Draper used the literacy approach in the study because researchers had found that teachers believed it was someone else's responsibility to teach reading and writing. These two collaborated because students needed to learn to articulate their ideas in mathematics by using reading and writing. In order for a student

to understand the problem they needed to understand the process. Draper and Siebert stated that understanding and sense making had become the battle cry of mathematics education researchers and studies had uncovered that little understanding was gained when the focus was primarily on procedures and facts (Boaler, 1998; Erlwanger, 1973; Sowder, 1988).

Civil's (2002) experience was in a fifth-grade classroom in a school with only one class per grade level to examine different types of mathematics and the attempts to bring a class together. The focus of her study was to bring everyday mathematics, mathematicians' mathematics and school mathematics into the classroom. When a class was actively participating, the students gained meanings through different approaches. Traditional school mathematics was often characterized by an over-reliance on paper and pencil computations with little meaning (Civil, 2002). Mathematics required time, persistence from the teacher and students, and flexibility. Encouragement by the teacher ensured students' persistence to achieve the task at hand. When students were outside of the classroom and faced with a mathematics problem, they were in control of the strategy they wanted to use to solve the problem, but in school they had very little control over the choice of problems and methods of solution. The teacher in this classroom used open-ended tasks to help the students analyze the information, explain their thinking, listen to one another, and consider different points of view. The students would actively participate in class. The students were able to articulate their ideas during their presentations. Active participation helped the students understand the concept in the class work, and this, in turn, helped them complete homework.

Pape, Bell, and Yetkin (2003) used the collaborative efforts of a seventh-grade teacher and university faculty member. They worked together to develop students' mathematical thinking and self-regulation in a middle school classroom. It was the goal to have the students

actively engaged in the classroom through explicit instruction. In this classroom, they used multiple representations and rich mathematical tasks to ensure mathematical thinking. The teacher used simpler questions to guide the students' thinking about more difficult questions. By doing this, the students would think about and articulate their strategies. When a student told me to add zero in the empty space when we were adding decimals, I asked him if we were actually adding a zero to the number. He said that there needed to be a zero in the space in order to line up the decimals. They understood the place value concept and that there needed to be a zero in order to line up the decimals. Using the correct vocabulary and terminology was important in the classroom.

Schoenfeld (2002) gathered data from public schools in Pittsburgh, Pennsylvania. He used this area because Pittsburgh Public Schools had made an effort to implement standards-based education in mathematics since the early 1990s. Schoenfeld felt there was national obligation to ensure that all students had access to high quality mathematics instruction. The reform in Pittsburgh stemmed from the NCTM standards. In order for this reform to work, there needed to be a systematic effort in which curriculum, assessment, and professional development were aligned (Schoenfeld, 2002). I created homework to align with the class work and *Everyday Math*. I used the objectives from the textbook to create lessons and homework.

Mathematics Communication

Forman and Ansell (2001) used a third grade classroom at Riverside Academy. They chose this classroom because they felt her teaching embodied many of the standards set by the NCTM. The particular standard focused on communication and the students' ability to explain their strategies for solving problems and their ability to listen to others. The teacher in this study encouraged the students to share their strategies, and then she repeated the strategy for

clarification and gave feedback. Students took an active role in discourse by initiating and evaluating as well as responding to teacher's actions and questions. The students shared their explanations. The students' explanations were validated by the teacher's feedback. The other students in class felt that they were teaching each other. This contradicted Civil's idea that, traditionally, students in mathematics class did not listen to each other's ideas. They switched off as if the conversation had nothing to do with them (Civil, 2004). The teacher reiterated their ideas and wrote their ideas on the board in order to reinforce the strategy. At times, clarification was needed for both the teacher and the students, and this reinforced, "Communication and negotiation of meanings were prominent features of a mathematical activity" (Civil, 2004). In order to communicate effectively, one needed to understand the process and strategy implemented in the solution or problem. The need for the emphasis on communication reinforced Schoenfeld's study on the reform of Pittsburgh schools. Communication in the classroom coincided with reasoning. If one could reason through the problem one was able to communicate the strategy. When the students in my classroom were able to articulate their thought processes they demonstrated an understanding of the concept. I encouraged my students to communicate their thoughts and questions effectively so the other students could benefit from this process if they were having the same concerns about the work.

Mathematics Understanding

Along with mathematics reasoning and communication came mathematical understanding. Mathematics was concerned with helping students gain a mathematical understanding, and in order to gain the necessary understanding, students needed to engage in authentic activities. These activities took place inside or outside of the classroom. It was difficult to produce authentic activities the students would encounter outside of the classroom because in

trying to create these activities, it came off as something that was contrived and did not have the authenticity that was required. Therefore, it was the job of the teacher to give the students the tools necessary for the students to solve problems they would encounter both in the classroom and out in the real world. Teachers who based their mathematics instruction on the deep understanding of students' thinking were more comfortable teaching the standard computational algorithms (Forman & Ansell, 2001). Mathematics education fit well with the problem-solving view of mathematics and its emphasis on understanding, meaning, sense making, and reasoning in authentic mathematical activity (Draper & Siebert, 2004).

In order for students to gain a deep mathematical understanding, they needed to examine their thinking and that of their classmates and be able to explain their mathematical reasoning (Pape, Bell, & Yetkin, 2003). Students' understanding was of the utmost importance. They needed to not only understand the problem and how to do it, but also why they were using that particular strategy to solve it. "The issue of being right and wrong was important no matter what we said to try to change the students' perceptions" (Civil, 2002, p. 55). Students needed encouragement in order to progress, but as Corno (2000) stated, a child could just complete the work for approval or rewards rather than the satisfaction of learning. By doing this, the students were completing the work for grades rather than for understanding of the subject material. I gave encouraging words when the students were able to complete the homework and presented their completed work. I wanted the students to feel good about what they accomplished.

Summation

Realizing the importance of students' understanding was critical in the study of meaningful homework. The students needed to be able to reason and communicate their ideas or strategies both in writing and orally. By achieving the ability to reason and communicate

mathematically, the students would hopefully achieve a deeper understanding of the material. Helping students achieve to their utmost potential was extremely important to me. While Eliam (2001) also studied homework, his study focused on seventh graders, and my focus was on sixth grade mathematics. Like Forman and Ansell (2001), I was interested in the students being able to communicate their ideas effectively. I also hoped my students would listen to their classmates and build off their ideas. I agreed with Civil (2002) in the fact that students tuned out when other students were talking. They could be learning from other students, and they were instead not listening. I found, after looking at my teaching practices, I enabled my students to not listen to others because I repeated myself. I understood I should be repeating myself when something was important, but I should not continue if I wanted the students to listen.

PURPOSE STATEMENT

This study focused on creating meaningful homework and whether and how the implementation influenced students' mathematical achievement. I collected data in my sixth grade math classroom, during the spring semester of 2009 during the months of February, March, and most of April. The purpose of my project was to try different strategies to increase the homework completion rate by creating and implementing meaningful homework and homework presentations. I examined the research themes of quality work and completion of homework as measured by homework, the quality of oral communication and oral reasoning observed in homework presentations, and the quality of understanding as measured by homework and seen in presentations, in seeking to answer the research questions:

- What would happen to the students' mathematical understanding and the completion rate once meaningful homework and presentations were implemented?

- What would happen to students' quality of oral communication and reasoning of mathematics when homework presentations were implemented?
- What would happen to my mathematics teaching as I implement meaningful homework and student presentations?

Along with the research questions, I also focused on research themes. These themes were the focus of my observations in the classroom. I focused on student achievement, the oral communication and reasoning done by the students, and students' understanding. Since the purpose of my action research was to improve quality and completion rate of student work through the creation and use of meaningful homework and by implementing homework presentations, I felt the following themes benefitted my research:

• The student achievement as measured by homework

• The quality of student oral communication and oral reasoning in homework presentation

• The student understanding as measured by homework.

I measured the students' understanding by their ability to explain the math homework problem in their presentation or when I asked them how they arrived at the solution. If the student understood the problem, they could effectively communicate the process involved to find the solution. The ability to reason through the problem was made apparent in the homework and the presentations if they could articulate the processes involved in obtaining the solution.

METHODS

My action research took place during the spring semester of 2009, from early February through the middle of April. I collected data in several ways that I thought would best show the

completion rate of homework and the attitudes and perceptions of the students. Before my research, I followed the *Everyday Math* teacher's manual and used the math journals in my daily lessons. I felt this needed to change. One thing I started in my classroom during my research and continued after it was to use the daily objective from *Everyday Math* to focus on one concept instead of multiple concepts, which would thus create multiple mini-lessons from *Everyday Math* in one class period. Using the daily objective created a focused lesson for the students. Doing this created direct instruction on one concept. By focusing on one concept, a lesson consisted of review from the previous day's work and a tie-in to the current lesson, the introduction, class practice, and then individual practice.

The first data I collected was the pre-research survey (Appendix B). This survey asked questions related to the students' perceptions and attitudes about math class, math problems, and their mathematics understanding. At the end of the research, I gave the students a post-research survey (Appendix C) with similar questions to see if any of their perceptions and attitudes had changed throughout my research.

The largest part of my data collection was the homework that was collected. I created an assignment that coincided with the daily lesson. Ideally, I wanted homework collections at least 3 to 4 times a week, but sometimes the lesson took longer than expected because the students were having difficulty with the content of the lesson or the instruction took longer than planned. Life happens became my mantra, and I had to keep telling myself there were things out of my control and I could not fix everything. Some of the homework looked like the previous days because the students were learning a new concept and may not had understood it as well as I hoped. So we would do as many days working similar problems as was needed for a majority of the students to understand a particular concept.

I implemented homework presentations, but these did not go as well as planned. I initially intended for the presentations to take place on Tuesdays and Fridays. In order for the students to present, a student had to volunteer to present a homework problem for the class, and I would also assign someone to present by selecting his or her name. In order for it to be fair, I had to take out the student's name who had volunteered. Some of the students became very comfortable doing the presentations, others did not as they would not complete the homework so they would not be able to present their homework. However, I would have them get in front of the class to present a problem the class had worked. It was ironic that the students never made the connection between them not doing or presenting their homework and my picking them to present class work. There would always be someone else willing to come to their rescue, which was nice but not what I had intended when I implemented the presentations. If a student struggled with the problem to be presented, another student would help them with the process or how to articulate a procedure or answer. One student, in particular, struggled with the difference between prime and composite numbers. He would confuse the two. During his presentation, he stated that 6 was a prime number. One of his classmates corrected him and told him the definition of a composite number.

I also interviewed a student from the class weekly, asking him or her questions (Appendix D) about his or her definition of homework, how he or she felt about my teaching practices, and I had him or her solve a problem and tell me what steps he or she was following to solve the given problem. I would conduct the interviews when the students returned from the library or during class while other students worked quietly. It was difficult not to help the students with their problem or guide them in the right direction, as a teacher during the interviews. I tried hard to maintain my role as the researcher when it came to the student

interviews. I had a hard time taking off my teacher hat because it was my job first and foremost to help the students. In one interview, the student was asked to find the common factors of 8 and 24. Since it is imperative she understood all the vocabulary in the problem, I asked her the definition of "common" in this particular problem. She answered that the factors would be the same. This showed that she understood the definition of common factors.

I set aside time on Thursday afternoons so I could keep a teacher journal (Appendix E) to keep track of my observations on the students' attitudes toward homework and my expectations when it came to the homework assigned. I needed to keep in mind that I was serving a dual role, as both a teacher and researcher. In the journal, I noted what was working in class and procedures I needed to change in order for students to better understand the concept being taught. I also noted the challenges in my experiences of being both a teacher and a researcher.

Table 1 was a calendar of dates during research collection. It showed the dates of assignments, reasons for days missed, lessons taught, interviews, and journal entries.

Date	Day of the Week	Lesson	Interview and Journal dates
2/2/2009	Monday	IRB Approval	
2/3/2009	Tuesday	Pre-Research Survey	
2/4/2009	Wednesday	Early Dismissal – Water main break	
2/5/2009	Thursday	Perimeter/Area	
2/6/2009	Friday	Perimeter	
2/9/2009	Monday	Area	
2/10/2009	Tuesday	Adding & subtracting decimals	
2/11/2009	Wednesday	No class – Library	Student Interview #1
2/12/2009	Thursday	Sweethearts – Mean, Median, Mode, & Range	Teacher Journal
2/13/2009	Friday	Math Activity in class – no homework	
2/16/2009	Monday	No school – President's Day	
2/17/2009	Tuesday	Divisibility – Early dismissal – water main	
2/18/2009	Wednesday	No School – Water main	

2/19/2009	Thursday	State Writing Workshop	
2/20/2009	Friday	Mean, Median, Mode, & Range	Student Interview #2 & Teacher Journal
2/23/2009	Monday	Mean, Median, Mode, & Range	
2/24/2009	Tuesday	Prime & Composite Numbers	
2/25/2009	Wednesday	No class – Library	Student Interview #3
2/26/2009	Thursday	Prime & Composite Numbers	Teacher Journal
2/27/2009	Friday	Prime Factorization	
3/2/2009	Monday	Assembly – No class	
3/3/2009	Tuesday	Prime Factorization	
¾/2009	Wednesday	No class – Library	Student Interview #4
3/5/2009	Thursday	Prime Factorization	Teacher Journal
3/6/2009	Friday	Common Factors	
3/9/2009	Monday	Common Factors	
3/10/2009	Tuesday	No School – ICE	
3/11/2009	Wednesday	Greatest Common Factor	Student Interview #5 & Teacher Journal
3/12/2009	Thursday	No School – Boys' State Basketball	
3/13/2009	Friday	No School – Boys' State Basketball	
3/16/2009	Monday	Greatest Common Factor	
3/17/2009	Tuesday	Emergency eye appointment	
3/18/2009	Wednesday	State Writing Rater	Teacher Journal
3/19/2009	Thursday	State Writing Rater	
3/20/2009	Friday	State Writing Rater – No School – Funeral	
3/23/2009	Monday	Greatest Common Factor	
3/24/2009	Tuesday	Early Dismissal – Water main break	
3/25/2009	Wednesday	No class – Library	Student Interview #6
3/26/2009	Thursday	Least Common Multiple	Teacher Journal
3/27/2009	Friday	Least Common Multiple	Student Interview #7
3/30/2009	Monday	Understanding Fractions	
3/31/2009	Tuesday	Absent	
4/1/2009	Wednesday	No class – Library	Student Interview #8
4/2/2009	Thursday	Stanford 10 Testing	Teacher Journal
4/3/2009	Friday	Understanding Fractions	
4/6/2009	Monday	Equivalent Fractions	
4/7/2009	Tuesday	Stanford 10 Testing	

4/8/2009	Wednesday	Stanford 10 Testing	
4/9/2009	Thursday	Teacher was gone so I was subbing	Teacher Journal
4/10/2009	Friday	No School – Spring Break	
4/13/2009	Monday	No School – Spring Break	
4/14/2009	Tuesday	Absent	
4/15/2009	Wednesday	Stanford 10 Testing	
4/16/2009	Thursday	Stanford 10 Testing	Teacher Journal
4/17/2009	Friday	Equivalent Fractions	Student Interview #9
4/20/2009	Monday	Fractions in Simplest Form	
4/21/2009	Tuesday	Fractions in Simplest Form	

Table 1: Summary of Data Collection

FINDINGS

I, unfortunately, did not have a typical or average teaching day. It seems there was always something interrupting my teaching, whether it was my own students being disruptive, students from another class coming in and interrupting my instruction, or some unforeseen interruption. I counted the days of mathematics instruction I had during my research and I came up with 31 days, which does not bode well when I was trying to collect data. During the month of February, there were 11 days out of 18 that I was able to have math. We had two early dismissals due to water problems, one full day off due to water problems, two library days, one day when I was at a state writing workshop, and one scheduled day off for President's Day. In March there were only 15 days of math instruction. We had two days off for Boys' State basketball, one day off due to an ice storm, I was gone for three days for the state writing assessment and sick one day. During April, our school was scheduled to take the Stanford tests during my scheduled math class, thus enabling only seven days of instruction during the period of data collection for this project. This hurt my homework collection tremendously because the students functioned better when they had consistency, as did I. When the students knew what to expect and there was not much change or variation from the regular schedule, there was a tendency to perform positively.

Changes in schedule created chaos. I responded better to a set schedule, and when something disrupted it, I struggled.

When I was fortunate enough to have a full class period, I started the class with a Mad Minute. The Mad Minute is given to reinforce basic mathematical procedures. I tried to wean my students off the multiplication charts and their use of their fingers to count when they were adding or subtracting. I used the Mad Minute to help the student remember the basic math facts. They wanted to complete as many facts correctly in a minute, thus helping them to memorize their facts and become able to answer the computation in a very short amount of time. Following the Mad Minute, if there was a homework presentation, this was the time the students made their presentations. Whether there was a presentation, this was when the lesson introduction took place. Since February 23, I had been following a unit from another textbook. The unit consisted of prime and composite numbers, GCF, LCM, and fractions.

Everyday Math had touched on these topics but had not gone in-depth. I felt these concepts were more important and wanted to more than brush the surface. This was when I asked review questions that were pertinent to the lesson and made sure I used appropriate mathematic vocabulary that was necessary for the lesson. I then did some introductory problems on the board, while the students wrote the problems on their scratch paper so they could use this as a guide when they were doing their independent practice. Once I went over the initial problems, I had the students do a few practice problems while I walked around observing the students work and answered any questions the students had. This was the time when I knew if I needed to take a different approach to the lesson. When the students completed the practice problems, I asked for volunteers to come to the board to share their work. It was necessary for the students to explain what they were doing while they were at the board. Students also needed to use the

appropriate vocabulary while they were at the board, in order to avoid confusion for those who were following the work they were presenting. Then I gave the students the problems for independent practice. This led to students working with partners or working independently to complete the class work.

In order for the students to be prepared to do homework at home, I created a care package for the math homework. The package consisted of a packet of references, which included a place value chart, measurement conversions, rules for rounding, a list of prime numbers, and anything else they might need to complete the homework, including pencils, rulers and erasers. I created these in hopes the students would put their homework in it, take it to their next class, and take it home at the end of the day. The reasoning behind the care package was to create responsibility and to get the students to practice bringing it back the next day and not have lack of supplies be the reason they did not complete the homework. I unfortunately found these care packages in desks, other teachers' classrooms, and in the office. There were four students out of the 12 who consistently used the care packages throughout the research period and still use it. The other students had lost theirs or blamed their younger siblings for playing with the care package and subsequently losing it.

The ability of the students varied greatly in the classroom. The higher-ability students in my classroom were not what you would typically classify as higher-ability students. These were the students who could work on their own after the instruction of the lesson and needed little to no guidance once they were doing their independent class work. They were high-ability for the class. I had one particular student who could think mathematically, but she was no longer part of the classroom. This left three stronger students, four average students, two low students, and one student who I was unsure of his ability since his attendance was abysmal. The stronger students

and average students required some guidance from me when they were working independently. The low-ability students were the ones who sat at the table after the lesson and received more instruction and guidance from me. The student I was unsure about was dropped from the roll three different times because he missed 10 days in a row. When he was in school his attendance was sporadic, once every few days. Not once all year was he present for a full week of school.

I was glad to see the students were willing to work with one another throughout the math class because I sometimes struggled with this group to get them to do cooperative work in reading. There were some students I would not pair with each other because they did not work productively because they would much rather talk or draw. They would be working on something, but it was not on math. A few of the students would rather work by themselves so they did not get distracted. The students worked very well together in a game called Target Card. Each student was given five cards (numbered 0-20). There was a target card, and the students used addition, subtraction, multiplication, or division to get the target number. The one who used the most of their cards won the round. It was interesting to watch the students interact and discover different methods to get to the target card. Some would find a different way to solve for the target number using someone else's cards. They thought this was a free day when in all actuality they were enriching their math skills without being aware of it.

Before I implemented the homework after the daily lessons, I wanted to be aware of the students' perceptions and attitudes toward mathematics, homework, cooperative learning, and presenting homework or class work problems. To do this, I had them fill in an interest survey. There were nine students who participated in the pre-research survey. I had the students read the content of the survey to see if they understood what each question meant or if they had any questions. I stressed the importance that this survey was an individual task. They were not to use

their neighbor's answers, and if they had any questions they were to direct them to me. Only nine of the 12 students were in attendance on February 3 when I gave the survey. I intended for the implementation of meaningful homework to start on Wednesday, February 4, but we were dismissed early because of water problems, which would be the first of many interruptions in the research process for the students and me. There were many unforeseen delays in progress for research and for the students' learning. I became very frustrated to learn we would be taking unscheduled days off, not only because of my research plans, but also for the simple fact that the students had very few five-day weeks. The water-main problem the town suffered in December seemed to loom above our heads at all times.

Completion of Homework

My first research question focused on the students' performance on their homework. I wanted to know if the completion rate of the homework would increase after I implemented meaningful homework. While creating the meaningful homework, I faced the challenge of how many concepts to put into each homework assignment since we had missed so much school second quarter; I felt I needed to cover more of the basics when we came back to school. It was as though we were starting a whole new school year and everything needed to be re-taught. This was when I decided to introduce the students to Mad Minutes, which I felt would enrich their basic skills and basic facts. The students enjoyed the competition and math seemed fun, temporarily. The students started with the addition Mad Minutes, and over the course of the research they moved on to subtraction and ended the year with multiplication. As I saw improvement with the Mad Minutes, the students would move to the next set. I also had the challenge of the math series we were using. I did not feel the lessons were in-depth enough for the concept to be learned. It seemed the lessons just brushed the surface of the concept. The

students needed to have continuity in the lessons so they could see that math skills were like building blocks, one could not have a large structure if done did not have a strong base. The students became complacent when the lesson or homework was too difficult because it was a new concept or the work was more challenging than the concepts we had encountered previously. When I started with prime and composite numbers, I felt the students would progress since I planned to build on this lesson by progressively moving from finding the greatest common factor to understanding fractions. As I noted in my journal multiple times, the students would not complete the homework when the work was challenging to them.

One student stated in an interview that the purpose for homework was to practice the math work at home. This response pleased me because that was the reasoning I had for implementing meaningful homework. I wanted the students to view the homework as an extension of the lesson. I wanted the students to be able to ask their parents for help when they did not understand a particular problem. When asked who the student asked for help when it came to homework, one replied, “I ask my mom. She helps me.” Of the nine student interviews, six of the students stated that they asked their parents for help with their homework. One student replied, “I ask my sister because she is good in math.” In my research, my students understood the purpose or reason for the homework was to practice the class work. They knew the work was for their benefit, not just something to keep them busy. I made it very clear that homework was an extension of the class work. My students did not complete the homework to seek my approval, although I was very pleased when they returned their homework.

The journal entry for the week of March 5 stated that this week was a little more difficult for the students. The math program was introducing greatest common factor, and I felt we needed to talk about the divisibility rules (Appendix F) to enhance the lesson. The students relied

way too much on their multiplication charts, and I wanted them to be able to find other ways to locate factors. I wrote, “This week’s homework was more difficult for the students because they were struggling with the lesson in class. The students were not as cooperative for this lesson.” The week of March 11, I noted in my journal that the students seemed eager to do the class work, but were not producing when it came to homework. I commented, “The students want the homework to be fun, and I have to keep the homework relevant.” Following the *Everyday Math* lesson, a homework assignment was given that dealt with perimeter and area (Appendix G) because we had been talking about formulas. I decided to use perimeter for the homework since it was just adding the sides, and it was something they had done prior to this lesson. The concept of area and some of the formulas that went with it was something that was new. I only had two students turn in the assignment. I felt this was due to the area portion of the assignment by looking at the completion rate for the perimeter homework was 100% and the area homework was 0%. This was definitely not the start I had anticipated or welcomed. Since the return rate was terrible at best, I made two different homework assignments: one for perimeter and one for area. For the perimeter assignment there were eight students in attendance and eight students returned the assignment, thus giving it a 100% return rate. In fact, some of the students were so eager to do the assignment, it was done before the end of the day and in some of the desks waiting for the presentations the next day. Students did not do as well with the area assignment, it had a 0% completion rate and the same students were in attendance. I felt the perimeter assignment was easier for the students due to the fact it involved addition, whereas the area assignment contained multiplication problems.

Students’ completion rate of homework was affected by the day assigned and whether there was time off from school. Homework assigned on Fridays had the average completion rate

of 64%, and homework assigned on Mondays had an average completion rate of 53%. The day the homework was assigned directly correlated with the return rate. Table 2 showed the date the lesson was taught, the number students in attendance, the number of homework assignments turned in, and the completion rate of the particular assignment. There were some gaps in assignments and this might have been due to scheduled and unscheduled days off, Stanford testing, my absence, or the start of a new lesson. On February 23, I implemented a new teaching approach in the classroom. This was when I deviated from the math program and the lessons focused on one concept.

Date homework assigned	Lesson	# of students in attendance	# of homework assignments returned	Completion rate
2/5/2009 Thursday	Perimeter/Area	8	2	25%
2/6/2009 Friday	Perimeter	8	8	100%
2/9/2009 Monday	Area	8	0	0%
2/10/2009 Tuesday	Adding & subtracting decimals	11	6	55%
2/12/2009 Thursday	Sweethearts: Mean, Median, Mode, & Range	11	11	100%
2/17/2009 Tuesday	Divisibility	7	4	57%
2/20/2009 Friday	Mean, Median, Mode, & Range	10	5	50%
2/23/2009 Monday	Mean, Median, Mode, & Range	11	5	45%
2/24/2009 Tuesday	Prime & Composite Numbers	9	8	89%
2/26/2009 Thursday	Prime & Composite Numbers	8	8	100%

2/27/2009 Friday	Prime Factorization	11	5	45%
3/3/2009 Tuesday	Prime Factorization	9	6	67%
3/5/2009 Thursday	Prime Factorization	8	5	63%
3/6/2009 Friday	Common Factors	10	7	70%
3/9/2009 Monday	Common Factors	10	6	60%
3/11/2009 Wednesday	Greatest Common Factor	10	5	50%
3/16/2009 Monday	Greatest Common Factor	12	7	58%
3/23/2009 Monday	Greatest Common Factor	9	6	67%
3/26/2009 Thursday	Least Common Multiple	11	7	64%
3/27/2009 Friday	Least Common Multiple	10	7	70%
3/30/2009 Monday	Understanding fractions	8	5	63%
4/3/2009 Friday	Understanding fractions	9	6	67%
4/6/2009 Monday	Equivalent Fractions	6	4	67%
4/17/2009 Friday	Equivalent Fractions	8	7	88%
4/20/2009 Monday	Fractions in Simplest Form	7	5	71%
4/21/2009 Tuesday	Fractions in Simplest Form	8	6	75%

Table 2. Summary of Homework Assigned

Out of 25 assignments, there were six that had 50% or less for the completion rate. I believed this was due to the days they were assigned. Friday homework, turned in on Mondays, had a low return rate. When I was gone or school was cancelled was another contributing factor. Only one homework assignment had 0% completed. The divisibility assignment (Appendix F) was a

lesson we worked on throughout the quarter prior to the research. The students struggled to get through the rules. We continued to talk about divisibility rules throughout the research as it tied into the fraction lessons and homework.

Table 3 is a calendar for the days of school during my research. April was a tough month for data collection due to the Stanford 10 testing that took place during the math class period. Wednesdays were library days so the students did a math activity or game when they returned from the library.

Date	Day of the Week	Lesson	Completion Rate
2/2/2009	Monday	IRB Approval	
2/3/2009	Tuesday	Pre-Research Survey	100%
2/4/2009	Wednesday	Early Dismissal - Water main break	
2/5/2009	Thursday	Perimeter/Area	25%
2/6/2009	Friday	Perimeter	100%
2/9/2009	Monday	Area	0%
2/10/2009	Tuesday	Adding & subtracting decimals	55%
2/11/2009	Wednesday	No class - Library	
2/12/2009	Thursday	Sweethearts - Mean, Median, Mode, & Range	100%
2/13/2009	Friday	Math Activity in class - no homework	
2/16/2009	Monday	No school - President's Day	
2/17/2009	Tuesday	Divisibility - Early dismissal - water main	57%
2/18/2009	Wednesday	No School - Water main	
2/19/2009	Thursday	State Writing Workshop	
2/20/2009	Friday	Mean, Median, Mode, & Range	50%
2/23/2009	Monday	Mean, Median, Mode, & Range	45%
2/24/2009	Tuesday	Prime & Composite Numbers	89%
2/25/2009	Wednesday	No class - Library	
2/26/2009	Thursday	Prime & Composite Numbers	100%
2/27/2009	Friday	Prime Factorization	45%
3/2/2009	Monday	Assembly - No class	
3/3/2009	Tuesday	Prime Factorization	67%
3/4/2009	Wednesday	No class - Library	
3/5/2009	Thursday	Prime Factorization	63%
3/6/2009	Friday	Common Factors	70%
3/9/2009	Monday	Common Factors	60%

3/10/2009	Tuesday	No School – ICE	
3/11/2009	Wednesday	Greatest Common Factor	50%
3/12/2009	Thursday	No School - Boys' State Basketball	
3/13/2009	Friday	No School - Boys' State Basketball	
3/16/2009	Monday	Greatest Common Factor	58%
3/17/2009	Tuesday	Emergency eye appointment	
3/18/2009	Wednesday	State Writing Rater	
3/19/2009	Thursday	State Writing Rater	
3/20/2009	Friday	State Writing Rater - No School - Funeral	
3/23/2009	Monday	Greatest Common Factor	67%
3/24/2009	Tuesday	Early Dismissal - Water main break	
3/25/2009	Wednesday	No class - Library	
3/26/2009	Thursday	Least Common Multiple	64%
3/27/2009	Friday	Least Common Multiple	70%
3/30/2009	Monday	Understanding Fractions	63%
3/31/2009	Tuesday	Absent	
4/1/2009	Wednesday	No class - Library	
4/2/2009	Thursday	Stanford 10 Testing	
4/3/2009	Friday	Understanding Fractions	67%
4/6/2009	Monday	Equivalent Fractions	67%
4/7/2009	Tuesday	Stanford 10 Testing	
4/8/2009	Wednesday	Stanford 10 Testing	
4/9/2009	Thursday	Teacher was gone so I was subbing	
4/10/2009	Friday	No School - Spring Break	
4/13/2009	Monday	No School - Spring Break	
4/14/2009	Tuesday	Absent	
4/15/2009	Wednesday	Stanford 10 Testing	
4/16/2009	Thursday	Stanford 10 Testing	
4/17/2009	Friday	Equivalent Fractions	88%
4/20/2009	Monday	Fractions in Simplest Form	71%
4/21/2009	Tuesday	Fractions in Simplest Form	75%

Table 3 Summary of the Weeks of Data Collection

Communication and Reasoning

My second research question dealt with the quality of oral communication and reasoning of mathematics when homework presentations were implemented. The students struggled with the correct word usage, and I felt it was important to use oral communication through presentations as a component in my research. I also needed to be aware of the vocabulary

choices I made while teaching a lesson. It seemed that when I used something incorrectly, the students had a tendency to remember it no matter how many times I tried to correct it myself.

I became very aware of proper word usage when we were working with place value. Using 10^3, the students said that one needed to add three zeros to the one. I asked the students if we were actually doing the process of addition to make sure it was understood that we were not adding zeros to the one since that would give us the answer of one, instead of the correct answer of 1,000. Quality oral communication was not only important in presentations but in all educational and social arenas. Students needed to be able to articulate what they did not understand, what they needed to do, and what they were doing.

An interview question I asked the students was what they thought was the purpose for homework. There was hesitation after I asked this question with every student interview. I interpreted the hesitation as the students did not know or understand the word "purpose." I then rephrased the question to ask why they felt students should do homework. The word "purpose" was not in their immediate vocabulary, which surprised me. An ironic follow-up question asked whether it was important for students to understand the vocabulary words in problems or questions, and two students answered no, it was not important to understand all of the words. The other students answered that it was important to understand all the words in a problem so that the problem could be solved using the correct process.

During presentations, the students were required to use appropriate mathematical language, and this was a struggle for some. It was difficult to articulate exactly what was being processed to solve the problem. Other students would come to the rescue, which was great to see. In one particular presentation, a student was adding decimals and needed to align the decimals and put the zero in as a place holder. The student said that he needed to add a zero, but another

student corrected him and said that a zero needed to be put in as a place holder. Precise language was necessary when we were working with mean, median, mode, and range. There was often confusion on the differences of the four. The homework to find mean, median, mode, and range (Appendix H) had the definitions for each to lessen the confusion. If nothing else, the presentations helped the students be more sympathetic to classmates.

One behavior of the Native American tribe was teasing or joking, and I did not witness this behavior during presentations. I had set a standard in the classroom that if someone was willing to go to the board to present their work, they deserved respect. Being disrespectful was not tolerated in my classroom. I reiterated to all the students, "No one is perfect."

My third research question was concerned with students' mathematical understanding once meaningful homework and presentations were implemented. As I noted in my journal for the week of March 26,

> "The students are using different methods to solve the problems. Also the cooperative work is increasing. They were helping each other. I enjoy seeing the students work with each other and help each other out. There is a competition between two of my students, and this is a motivator for them."

By keeping the journal, I was able to monitor my teaching practices and document the students' progress. The journal was a useful tool for documentation of the weekly happenings, whether they were good or bad. I was able to use the journal as a reference for days missed or what had happened on any given day

I knew some of the students were learning how to find the greatest common factor when one was able to help another student go through the same process. It was also very gratifying to watch a student who usually struggled complete the same assignment with little to no help from me or from other students. This was a student I watched struggle daily with the basic skills, and

he was able to complete the class work assignment once he got in a groove. He may not have returned a completed homework assignment, but I felt completing class work was a step in the right direction, since he did not turn in class work on a regular basis. In the same March 26 journal entry, I commented on the fact that the students were at least attempting their work. I wrote, “The same students are returning their completed homework, but I am thankful some of them are taking it home and at least trying it.” I also had a student use appropriate language during an interview on March 11, 2009, when she was asked to find the common factors of 9 and 27. She stated that one needed to use the factors of 1 and 9 first because 1*9=9. Next she stated that you need to find the factors in between the numbers 1 and 9. She realized that 2 is not a factor of 9 since it is an odd number. She found that 3 is the only other factor of nine. She completed the factors of nine and was able to articulate her reasoning why there were only three factors for the number nine. She said, “One, three, and nine are the factors for nine. There are no other numbers between 1 and 9 that you can multiply to get nine.” She followed the same process to find the factors of 27. She stated, “The common factors of 9 and 27 were 1,3, and 9”. She showed mathematical understanding by applying her knowledge and was able to communicate effectively how she solved the problem. It brought a smile to my face.

Table 4 showed the results from the pre-research survey. There were nine students in attendance on February 3 when the survey was issued. It showed the attitudes of the students toward homework and presentations they would be introduced to in the coming months. The students seemed to be rather indifferent when it came to going to class. This was not a surprise to me because they let me know on a daily basis about their feelings toward school. One student, in particular, complained about hating math on a daily basis. He complained about not understanding the lesson but would not pay attention during instruction. I would then give him

individual instruction. Then when it was time to line up for lunch, he would be the one at his desk completing his work. He stated in his interview that he learned more with homework because there were different problems for practice.

It was rather disconcerting that one student did not feel comfortable asking for help, but at the same time I was pleased to see that seven of the nine students felt it was important to do well in math class. The students were to mark the box that applies: A – Always; S – Sometimes; N – Never. The table below showed how the students responded before the research began.

	A	S	N
I look forward to going to math class.	1	7	1
I feel comfortable doing math work on my own.	1	7	1
I feel comfortable asking for help when I don't understand something.	5	3	1
It is important for me to do well in math class.	7	2	
I like to work on math problems.	2	4	3
I like hearing how my classmates worked the math problem.		7	2
I understand math when we do more practice problems.	4	4	1
I am comfortable sharing my ideas with the class.	1	5	3
I finish all the math work assigned in class.	2	7	
I think some kids were better at math and some just don't understand it – and doing more work won't help.		5	4
I don't think I am very good at math.		5	4
I prefer to work by myself.	2	5	2

Table 4. Student Responses to Survey Prior to Research

The students were to mark the box that applies: A – Always; S – Sometimes; N – Never

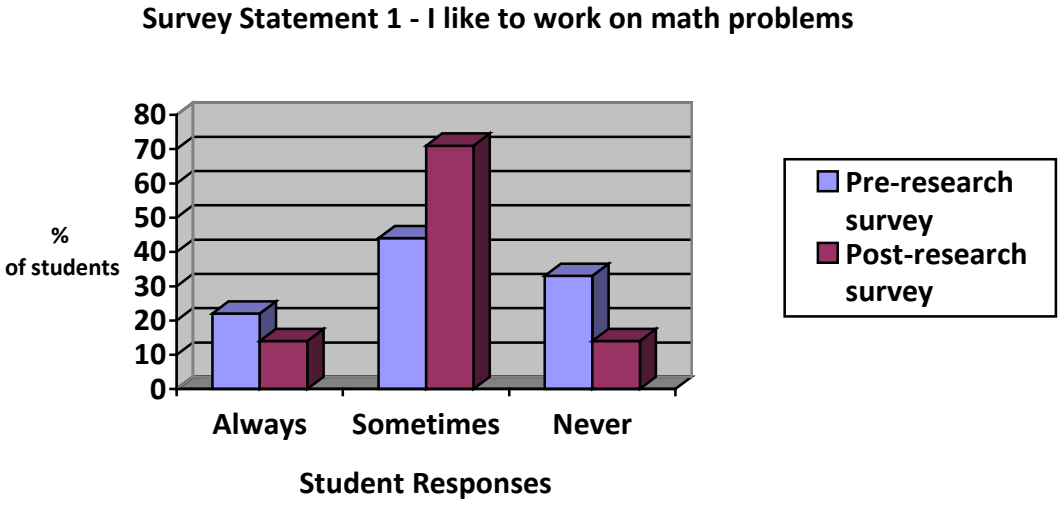
	A	S	N
I look forward to going to math class.	1	5	1
I feel comfortable doing math work on my own.	1	5	1
I feel comfortable asking for help when I don't understand something.	4	3	
It is important for me to do well in math class.	5	2	
I like to work on math problems.	1	5	1
I like hearing how my classmates worked the math problem.	1	4	2
I understand math when we do more practice problems.	3	4	
I am comfortable sharing my ideas with the class.		2	5
I finish all the math work assigned in class.		7	
I think some kids were better at math and some just don't understand it –	2	5	

and doing more work won't help.			
I don't think I am very good at math.	1	5	1
I like presenting my homework solutions to the class.		5	2
Helping my teacher and classmates is important.	2	5	
I prefer to work by myself.		7	
I understand the math topics better when another student explains it to me in addition to my teacher's explanation.	1	5	1

Table 5. Student Response to Survey at End of Research

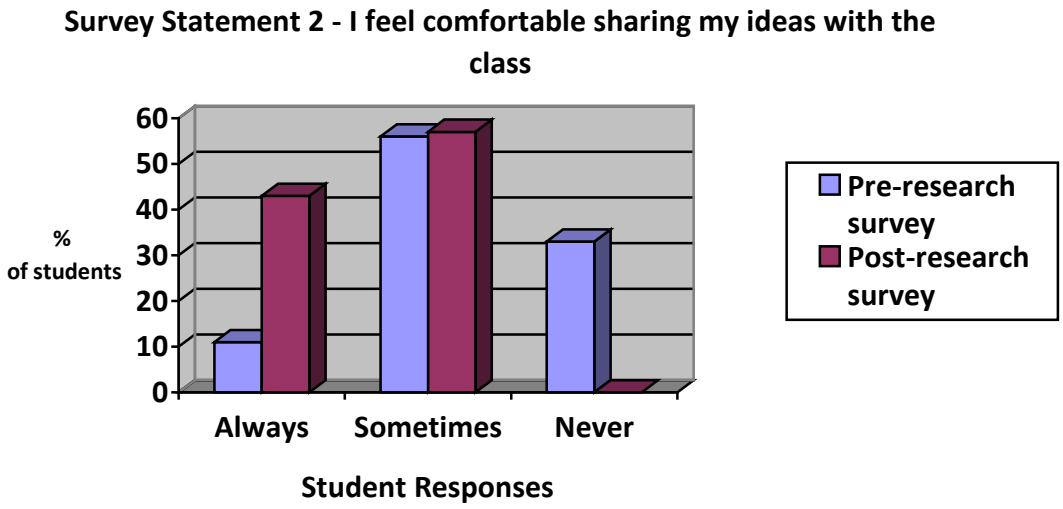
Table 5 was the post-research survey. The survey was given on April 23, and seven students were in attendance. The students' responses showed they sometimes looked forward to coming to class, and they sometimes felt comfortable doing math work on their own.

The pre-research survey was given on February 3, and the post-research survey was given on April 23. The following bar graphs are comparisons in responses to the pre-research and post-research surveys. I chose the survey statement I like to work on math problems because I wanted to get a sense of their attitude toward math as research progressed. The students' attitude toward working math problems slightly improved. There were fewer never responses on the post-research survey than there were on the pre-research survey.

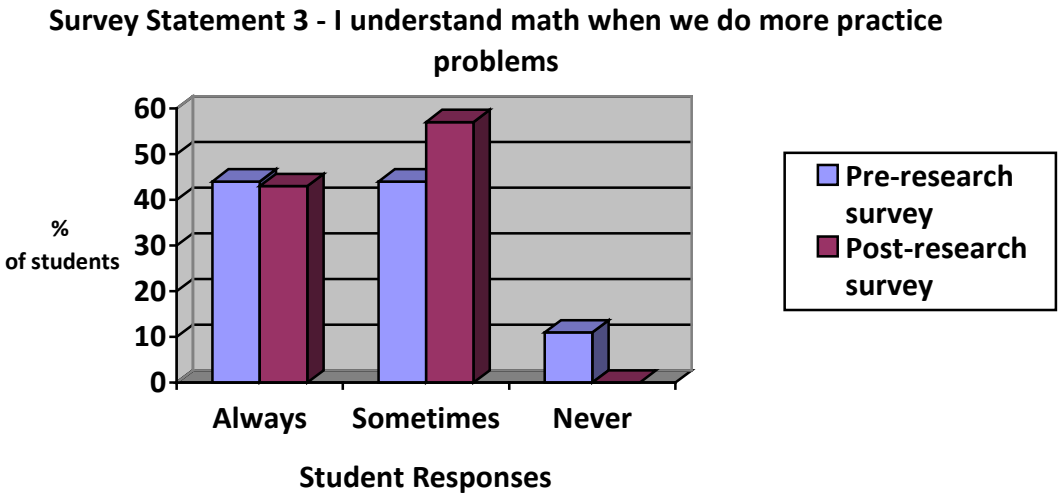


The second survey statement I chose was the comfort level of the student when they were sharing their ideas. Since presentations were implemented I wanted to see how the students felt

being in front of the class. The students were more comfortable sharing their ideas with the class at the end of the research period.



One of the purposes for my research was the effect meaningful homework would have on students' comprehension and understanding of math concepts. Survey statement 3 asked the students whether they understood math when they did more practice problems. The students felt they understood more when they practiced more. Meaningful homework provided them with this practice.



The replies on post-research data for the students indicated that students did not feel comfortable sharing ideas contradicts their classroom behavior. In class, the students were willing to come up and share their class work on the board. The only students who were not willing to share their work were the two new students who enrolled at the end of March. The students were more apt to share their work when they understood it. As stated in my journal dated February 20, the ones who volunteered were the ones who understand the work. There was one student in particular who would be very willing to share his work if he understood it, but if he felt the work was too difficult, he would not get up and share with the class, if he did the work at all. When we worked on prime factorization, he did not want to share his work for the homework (Appendix I). He said, “I don’t want to go up to the board because this work is too hard.” I felt this was a common happening for most people. If I did not understand a concept, I would not have felt comfortable to present the material for fear of failure. Failure was not something any of the students wanted to do. The students’ belief they were good at math improved during the time of the research.

CONCLUSIONS

I felt that as a teacher I was more understanding of the students' needs. After doing the research, I had become more aware of the students' needs by seeing how many homework assignments were returned. The amount of homework returned directly correlated with the difficulty of the assignment. If the students struggled with the daily lesson, they would not turn in the homework. I also noticed if the homework was assigned on a Friday, the completion rate was low. This also happened because of the amount of days school was called off or if I was absent, the students did not return their work.

Although the students did not complete the homework, they were still held accountable for their presentations, since I had them present class work. This ensured the students would get the practice to communicate the processes they used to arrive at the answer and all the reasoning behind the steps they took to complete the problem. Presentations also enriched the students' practicing active listening.

As Draper and Seibert (2004) stated, in order for students to gain a meaningful experience, they needed to organize and interpret their experience. One student answered the question in one of my student interviews about the purpose for homework with the response: "We take homework home so we can practice and understand what we were learning." Draper and Seibert (2004) also stated that students needed to learn to articulate their ideas in mathematics. By having presentations, the students were able to articulate their processes and ideas. This reinforced what they were learning and gave them the understanding required to build on their mathematics knowledge. If the students could reason through a problem and effectively communicate their ideas, the student had gained mathematical understanding.

Forman and Ansell (2001) used a third grade classroom for their study. A main focus of this study was the students' ability to communicate their strategies and their ability to listen to others. Listening to others in the classroom was part of active listening I tried to use in the classroom. I knew at times I enabled the students not to listen by repeating myself because they were not listening.

Corno (2000) interviewed families in her study. I would be interested to interview families in the town where I teach. I would like to hear their responses to the student interview questions I used. Family and community support was one of the sub-committees in our Comer School Improvement Plan. We were always looking for ways to get parents and the community involved.

IMPLICATIONS

I will continue working with the students and focusing on one concept per lesson. This seemed to be an ideal practice for the struggling students and enriched the lesson for those who had a firm grasp of the concept. By focusing on one concept this would also lessen the amount of confusion when lessons switch concepts in each class work problem. The students who had a grasp could therefore help the students who were struggling. This supports the students who responded in the post-research survey that they sometimes understood the math topics better when another student explained, in addition to the teacher's explanation.

I also will continue to encourage the cooperative learning that has stemmed from the approach I had been using in my class. Students worked together in groups when material was too difficult to do on their own or when the material was a new concept. This benefited the students who needed more instruction or guidance. Learning to work in groups helped in math class and benefitted the students in other classes.

Although I will not be sending homework every single day, I will continue to send homework to reinforce the current lesson. I had found on the second day of the lesson there was more understanding of the concept so this would be the ideal day to assign the homework. I am also hoping we would switch math programs, but if it did not happen I would continue using the objectives and finding class work and create homework that would coincide with the lesson.

Presentations also seemed to be a beneficial part of the classroom and students learning, even when the students thought they were going to get out of doing it. I will definitely continue to have the students present their class work. This seemed to be a positive way for the students to practice their oral communication and oral reasoning.

Responsibility is something I will be trying to instilling in my students. I want them to learn that along with homework comes responsibility. Maybe if they hear enough that homework is their responsibility they will continue to bring the completed homework back without even consciously thinking about it. Hopefully bringing completed homework to class will become something they learn to accept as the norm.

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Appendix A

NCTM Principles and Standards

NCTM Principles for School Mathematics

- ***Equity.*** Excellence in mathematics education requires equity—high expectations and strong support for all students.
- ***Curriculum.*** A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.
- ***Teaching.*** Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.
- ***Learning.*** Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.
- ***Assessment.*** Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.
- ***Technology.*** Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.

NCTM Standards for School Mathematics

- Numbers and Operations
- Algebra
- Geometry
- Measurement
- Data and Analysis and Probability
- Problem Solving
- Reasoning and Proof
- Communication
- Connections
- Representation

Appendix B

Pre-research Survey
Attitude survey

Mark the box that applies:
A – Always
S – Sometimes
N - Never

	A	S	N
I look forward to going to math class.			
I feel comfortable doing math work on my own.			
I feel comfortable asking for help when I don't understand something.			
It is important for me to do well in math class.			
I like to work on math problems.			
I like hearing how my classmates worked the math problem.			
I understand math when we do more practice problems.			
I am comfortable sharing my ideas with the class.			
I finish all the math work assigned in class.			
I think some kids were better at math and some just don't understand it – and doing more work won't help.			
I don't think I am very good at math.			
I prefer to work by myself.			

Appendix C

Post-research Survey
Attitude survey

Mark the box that applies:
A – Always
S – Sometimes
N - Never

	A	S	N
I look forward to going to math class.			
I feel comfortable doing math work on my own.			
I feel comfortable asking for help when I don't understand something.			
It is important for me to do well in math class.			
I like to work on math problems.			
I like hearing how my classmates worked the math problem.			
I understand math when we do more practice problems.			
I am comfortable sharing my ideas with the class.			
I finish all the math work assigned in class.			
I think some kids were better at math and some just don't understand it – and doing more work won't help.			
I don't think I am very good at math.			
I like presenting my homework solutions to the class.			
Helping my teacher and classmates is important.			
I prefer to work by myself.			
I understand the math topics better when another student explains it to me in addition to my teacher's explanation.			

Appendix D

Individual Student Interview Questions

Student Understanding:

- What is your definition of homework?
- What is the purpose of homework?
- Do you think you learn more when you had homework?
- Do you think it is important to understand most of the vocabulary words you see in each problem?
- I would like you to work on this math problem, please say aloud whatever you were thinking as you work through the problem. Please include all of your thoughts on how you arrived at the solution. (Depending on what we were currently studying, I will insert a relevant problem).

Teaching Effectiveness:

- What makes math easy or difficult for you?
- What could I do to help you and other students with math?
- Has your attitude about math changed during your 6^{th} grade year? If so, how?
- How do you feel about the amount of homework assigned?
- This semester I had changed some of my teaching practices. What advice would you give me about continuing these changes next year?

Appendix E

Personal Journal Prompts

- What changes had I noticed in my students' attitudes and efforts relating to homework?
- What changes had I noticed in my homework expectations?
- What changes had I noticed in the students' homework expectations?
- What changes had I noticed this week in students' ability to do math this week?
- What had I learned from my observations that will benefit my teaching next week?
- What went well or not so well this week?
- What did I notice in students' homework presentations?
- Where there any differences in the presentations of those who volunteered and those that were assigned?

Appendix F

Homework Assignment on Divisibility Rules

Name _____

DIVISIBILITY RULES:

ODD Numbers: 1, 3, 5, 7, 9 EVEN numbers: 0, 2, 4, 6, 8

	RULES
2	A number is divisible by 2 if the last digit is divisible by 2 {The last digit is 0,2,4,6,8}.
3	A number is divisible by 3 if the SUM of its digits is divisible by 3.
4	A number is divisible by 4 if the last two digits were divisible by 4.
5	A number is divisible by 5 if the last digit is divisible by 5 {last digit is 0,5}.
6	A number is divisible by 6 if it is divisible by 2 AND 3, or if the SUM of the digits is divisible by 3 and the last digit is divisible by 2.
8	A number is divisible by 8 if the last 3 digits were divisible by 8.
9	A number is divisible by 9 if the SUM of its digits is divisible by 9.
10	A number is divisible by 10 if the last digit is divisible by 10 {last digit is 0}.

Homework Problems

By using the divisibility rules to decide whether each number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10 and COMPLETE THE CHART.

	2	3	4	5	6	8	9	10
235,789								
539								
385								
27,720								
123								
1,234,567								
3,248								
713								
318								

Appendix G

Homework for Finding Area and Perimeter

Name _____

Area and Perimeter of a Rectangle

Directions: Find the area and perimeter of each rectangle.

Perimeter is the distance around an object

Area=Length*Width and is measure in square units

1.

9

22

Area = **Perimeter =**

2.

13

17

Area = **Perimeter =**

3.

4

20

Area = **Perimeter =**

4.

9

11

Area = **Perimeter =**

5.

Area =

Perimeter =

Appendix H

Homework for Finding Mean, Median, Mode and Range

Name _____

Math Homework

Different ways to describe a data set

How can you describe this data set? 1, 3, 3, 4, 4, 5, 5, 7, 8, 8, 10, 10, 10

The **mean** is the quotient of the sum of the data divided by the number of data points in the set. Mean = 78 ÷ 13 = 6	The **median** is the middle number when the data were arranged in order. For an, even number of data points, the median is the average of the two middle numbers. Median = 5
The **mode** is the number or numbers that appear most often in a data set. Sometimes a data set has no mode or has more than one mode. Mode = 10	The **range** is the difference between the greatest and the least values in a set of data. Range = 10 – 1 = 9

Find the mean, median, mode, and range for each data set. Please show your work.

1. 2, 5, 6, 3, 4, 4 _____

   Mean _____

   Median _____

   Mode _____

   Range _____

   8, 4, 3, 9, 8, 9, 2, 8, 5 _____

   Mean _____

   Median _____

   Mode _____

   Range _____

2. 10, 12, 15, 15, 10, 10

_____

Mean _____

Median _____

Mode _____

Range _____

4, 5, 7, 6, 1, 3, 2

_____

Mean _____

Median _____

Mode _____

Range _____

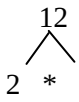
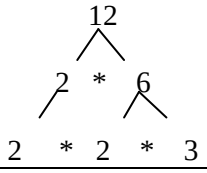
Appendix I

Homework for Prime Factorization

Name _____

Prime factorization

Find the prime factorization of 12

Step 1: Start with two factors that had a product of 12	Step 2: Factor 2 and 6	Step 3: Rewrite the prime factorization using exponents.
		$2 * 2 * 3 = 2^2 * 3$

Draw a factor tree to show the prime factorization of each. Then rewrite, using exponents.

1. 25

_____

_____

2. 65

_____

_____

3. 50

_____

_____

4. 27

_____

_____

5. 100

_____

_____

6. 45

_____

_____

7. 47

_____

_____

8. 820

_____

_____

9. 111

_____

_____

10. 1,000

_____

_____