THE EFFECTS OF MATH JOURNALING
IN AN ELEMENTARY CLASSROOM

Stacee M. Banko

Submitted in partial fulfillment
of the requirements for the degree of
Master of Education
Moravian College
Bethlehem, Pennsylvania
2006
ABSTRACT

This qualitative research study documents the observed and reported experiences of fourth grade math students and their teacher when math journals are implemented in their curriculum to increase student understanding and motivation to write in math class. In this study, the teacher explored the process of designing journal prompts, establishing a routine in the classroom where these journal prompts were completed, and fostering motivation within the students to adapt to this new classroom routine.

The author designed the study so that the students saw a purpose for each prompt, engaged the students in writing and sharing, and provided opportunities for students to work collaboratively using their journal entries. In order to maintain complete journal prompts, the author established a routine for writing, a connection to content being taught with journal prompts, and assistance when students needed prompting for their entries. The teacher engaged in dialogue with the students through the journals as well as feedback during group observations.

The author discovered many of these implementations to be successful for the students in the classroom. Since the classroom contained a variety of diverse learners with different learning styles and needs, the author found that some students had different strategies that enabled them to be successful with their writing.
ACKNOWLEDGEMENTS

First, I would like to thank all of the fourth grade students in my math class. Not only were they the focus of my study, but also the motivation for me to keep going. They provided me with the “aha” moments which made my study successful. They were as dedicated to the study as I was to conducting it. The light bulb going off in my students gave me those feelings of assuredness I needed to see the study through. Their continual motivation to write and explain helped me see the goal and the light at the end of the tunnel.

I cannot thank my parents, Bill and Sandy Banko enough. They have been my rock and support system my entire life. They have seen me through the toughest times, but always kept encouraging and motivating me to achieve my goals. They were my babysitters every time I had class for the past 3 1/2 years at Moravian, and even allowed me every opportunity I needed to have my own quiet time to work. Thank you for being my cheering squad.

Small and mighty; next I need to thank my precious daughter Hailee. Hailee always encouraged me to work on my study as she insisted she was working on her own study (just to be like mommy). Hailee was very understanding every time I had to write and couldn’t play a game or read a story at that particular moment. When needed, she attended a few Moravian classes, and even visited the children’s section of Reeve’s Library all so I could get my work done.
Next I would like to thank my colleague and friend, Amanda Strawn. Amanda and I supported each other throughout this process. Without a question or complaint, Amanda took time to read different sections of my thesis and offer comments and suggestions even though she was working on her own thesis.

I would also like to thank Dr. Joseph Shosh. Although he was not a sponsoring committee member, Dr. Shosh was my professor for the courses involved in this final process. He was always willing to read excerpts from my thesis, answer any questions I might have had, as well as offer kind words to help calm me down when a feeling of being overwhelmed would take over. Dr. Shosh also shared his extensive knowledge of methodological understanding, his action research and writing experiences, as well as compassion and dedication for this process and the students involved in the process.

Lastly, I would like to thank my committee chairperson, Dr. Jack Dilendik. Dr. Dilendik saw me through several courses, and continued as my committee chair. Dr. Dilendik took the time to read all of the pieces being put into this thesis, offered comments and suggestions, and even questioned me which allowed me to reflect further on my action research study. Dr. Dilendik met with me whenever I felt necessary and was quick to calm me down when that overwhelming feeling would occur. His vast knowledge in research and writing, made it possible for me to write this thesis.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>RESEARCH STANCE</td>
<td>1</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>8</td>
</tr>
<tr>
<td>- Enhancing Student Understanding</td>
<td>10</td>
</tr>
<tr>
<td>- Grading</td>
<td>13</td>
</tr>
<tr>
<td>- Modeling</td>
<td>15</td>
</tr>
<tr>
<td>- Student Attitudes</td>
<td>19</td>
</tr>
<tr>
<td>- Student Reflection</td>
<td>22</td>
</tr>
<tr>
<td>- Differentiated Instruction</td>
<td>24</td>
</tr>
<tr>
<td>RESEARCH DESIGN AND METHODOLOGY</td>
<td>26</td>
</tr>
<tr>
<td>- Field Log</td>
<td>27</td>
</tr>
<tr>
<td>- Journals and Student Work</td>
<td>29</td>
</tr>
<tr>
<td>- Student Surveys</td>
<td>30</td>
</tr>
<tr>
<td>- Parent Survey</td>
<td>31</td>
</tr>
<tr>
<td>- Previous Year Teacher Survey</td>
<td>31</td>
</tr>
<tr>
<td>- Student Interviews</td>
<td>32</td>
</tr>
<tr>
<td>TRUSTWORTHINESS</td>
<td>35</td>
</tr>
<tr>
<td>RESEARCH NARRATIVE: THE START OF SOMETHING NEW</td>
<td>37</td>
</tr>
<tr>
<td>- Pastiche: The first journal</td>
<td>45</td>
</tr>
<tr>
<td>- The first couple of entries</td>
<td>46</td>
</tr>
<tr>
<td>- Play: Breakfast at Miss Banko’s Desk</td>
<td>51</td>
</tr>
<tr>
<td>- Brad: A Vignette</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>When will he be ready to write?</td>
</tr>
<tr>
<td></td>
<td>Moving him closer to me</td>
</tr>
<tr>
<td></td>
<td>From nothing to clear words</td>
</tr>
<tr>
<td>- Math Star of the Month: My first aha</td>
<td>59</td>
</tr>
<tr>
<td>- Drawing and Writing: The story of Jared</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Jared’s first encounter with the journal</td>
</tr>
<tr>
<td></td>
<td>Finding the right words</td>
</tr>
</tbody>
</table>
L. Math Star of the Month Certificate
LIST OF FIGURES

Figure 1 ..................................................................................................................42
Figure 2 ..................................................................................................................42
Figure 3 ..................................................................................................................43
Figure 4 ..................................................................................................................43
Figure 5 ..................................................................................................................43
Figure 6 ..................................................................................................................43
Figure 7 ..................................................................................................................49
Figure 8 ..................................................................................................................49
Figure 9 ..................................................................................................................50
Figure 10 .................................................................................................................50
Figure 11 .................................................................................................................50
Figure 12 .................................................................................................................55
Figure 13 .................................................................................................................55
Figure 14 .................................................................................................................59
Figure 15 .................................................................................................................63
Figure 16 .................................................................................................................69
Figure 17 .................................................................................................................69
Figure 18 .................................................................................................................81
I can remember math coming very easily to me. I always worked well with numbers. If given a problem, I could solve it and I was pretty sure that I always had the right answer. This made me eager to participate in class. I always had my hand raised ready to be called on. This continued for me through elementary and middle school. I was able to show my work and present a reasonable explanation for how I arrived at my answer. This desire to work with numbers lasted until I walked into Algebra II in tenth grade.

Algebra I came to me easily, so naturally I assumed the second part of it would be a breeze. I was wrong. I began to become frustrated right away. The numbers were not easy for me. There were equations that I had never seen before and everything seemed so new and foreign. The teacher moved at a rapid pace. We were quizzed every Friday on the material taught to us throughout the week. The problem was that I was unsure of the material. I always wanted to ask questions, but we moved at such a rapid pace that I was afraid to raise my hand. In my opinion, this teacher felt it was more important to cover the material, rather than stop for a student who didn’t even know how to phrase a question for what wasn’t being understood. I decided one day to write down what I didn’t understand and give it to the teacher after class. I figured that this would serve
two purposes for me. One, I would not be laughed at by my peers, and two, the teacher would not have to stop class for me. I was wrong.

I had given her this note on a Friday afternoon. On that Monday, there was a note on my desk when I walked into class. It read, “Don’t you think you should have asked these questions earlier?” That is all it said. I was mortified. I felt like the size of a pea that day in class. From that point on, I was turned off to math. I even began to do poorly at it. I didn’t try as hard because my motivation was gone. I made it through the class, but took easier classes dealing with math for the remaining years in high school.

Once I got to college, I began to volunteer in various classrooms. I remember beginning my first tutoring assignment in a center city school. It was with fourth grade students. I walked into the classroom and felt as if I had culture shock. I had grown up in an almost all white school with little diversity, and this was the absolute opposite. I also came from a school district where supplies seemed unlimited, and we had spacious classrooms with lots of teacher supplies. These classrooms looked very rundown and had few supplies. The teacher informed me that they were pretty much on their own for supplies. It was a poor neighborhood so students did not come with state of the art binders and backpacks either. For the first day I just sat back and observed. I noticed during math that all students had what looked like a book made out of construction paper. For the most part they looked tattered around the edges and some were ripping from
students playing with the corners. I could see paper in them and was very curious as to what it was. After the students left, I inquired as to what these scribbled on, hand made books were. The teacher explained that these were the students’ math journals. I had also noticed that there weren’t many textbooks within the classroom, and she explained that they basically created their own curricula. She then began to show me some of the sample journals. Here is where the students explained their work and showed how they solved the problems. They could draw pictures to solve problems, create charts or graphs, write explanations, etc. The students had decorated their journals to their own liking so they were theirs. I was very intrigued by this, and began to watch the students as they wrote in their journals. They would solve their problems and even put question marks next to things they did not understand, or stars next to a problem when they got something right. It was a way to give themselves immediate feedback, as well as praise/recognition. At the end of the year, the students got to take their journals home and, in essence, they had their own math books.

When I got my own classroom several years later, I remembered that experience. I wanted to start math journaling right away. As a novice teacher, I had so many ideas of things I wanted to do in my new classroom that math journaling got pushed to the back burner for the first year. I was so overwhelmed with the paperwork that I had to get done and the curriculum I was required to cover, that creating math journals seemed almost an impossible task.
My second year as an educator approached, and so did the “Problem of the Day.” This was a flip chart from our math series where students would solve a problem each day. I figured that this was a perfect chance to begin these journals. My pilot study of journals was successful. I purchased pretty little loose-leaf composition books and wrote all of the students’ names on them. I even put pretty little dots at the ends of all of the letters. I did not have the students decorate them. Every day we did a problem of the day in the journal. The students would solve their problem and write their answers within the journals. My students seemed to enjoy journaling. In fact, the journals became organizational tools for them. They knew that they had paper on which to complete the problem of the day and they always knew where it was. My students gained an appreciation for writing in math class that year and enjoyed the journaling. We continued the journaling off and on for the entire year. At the end of the year, I sat back and realized what was missing. While I had made their journals pretty with my dot letters and smiley face stickers, I realized that it was not as meaningful to my students. It felt like they were mine, not theirs. I was the one decorating them, but it should have been the students doing the decorating. I remembered that classroom I had visited with the journals with the tattered edges. While those covers looked like they had gone through a washing machine, the students who created them took pride in the artwork displayed on their covers because it was theirs. I wanted my students to feel like they had ownership their journals.
I continued this same process for year three of my teaching career and even did some reading on journaling. I found different strategies to try and different questions for children to answer within their journals. From completing this two-year mini-study, I began to develop my own questions about math journaling. I was coming up with questions and new ideas for improving journaling in my classroom. I read a lot about communicating with my students through journaling. I hoped that journaling would provide another way for me to effectively communicate with my children. Through a form of on-going dialogue I hoped that my students would find ways to ask me questions they did not understand. I also wanted to expand beyond journaling just about the problem of the day. As I sat and thought about my hopes and expectations for my study, I remembered that Monday long ago when I was in tenth grade and I received that dreadful note back from my Algebra II teacher. I was determined not to make any of my students feel that way. I had decided that I would also expand the journaling to include questions from students. Since this was going to be a dialogue between teacher and student, I wanted my students to feel comfortable using it as a place to drop me a line letting me know that there is something they didn’t understand. Lastly, I decided to let them decorate their journals. This would provide them ownership of the book we were creating together.

Before beginning my research I placed myself in the shoes of a student in order to get an idea for math journaling and math class in general. The idea of
math journals sparked in my mind as a way for students to work through math, yet at the same time be held accountable for their learning.

I felt that math journals were providing my students with the opportunity to demonstrate their understandings of concepts being taught in class. They were able to share their feelings about the concepts, which provided me with an idea of what students were learning and applying to other situations. Math journals also allowed students to work through concepts. Students were able to record examples as well as go back to examples in their journals.

Since I have worked with journals in a variety of ways, I have seen them become very beneficial for students when it comes to problem solving. Students are taught to write detailed explanations for how to solve a problem, and I have seen students make tremendous strides through their explanations in their journals. They refer back to other explanations to see how they worded certain thoughts, and they are able to look at concepts they worked through to apply them to other problems they’re currently working on. With journaling for problem solving purposes, I was able to see tid-bits of what was not understood and what I needed to re-teach. All of this provided me with greater insight into the thought processes of my students; something I wish my Algebra II teacher would have noticed about me back in high school.

Through examining research and conducting an action research study in my classroom, I had hoped to see and increased motivation to write in math, an
increased understanding of topics through writing, as well as the development of students to collaboratively work together to share their findings and ideas about math.
As I began researching journal writing in a math class, I realized that there was a wealth of published information pertaining to my topic. While I had purchased journal prompt books and books that contained everyday writing ideas, I soon realized that there was much preparation involved within journal writing if it was to be successful. Math journals can take on a variety of forms. Some teachers might use them as places to write down problems, vocabulary, or have students express their thoughts about math in general. Before I conducted my actual study, I had attempted journaling in my classroom, whereby I would choose topics for students to work on in class or I would pose problem-solving questions. My technique was not very consistent, however, and I was met with a great deal of resistance from some of my students. While I was initially hesitant to study journaling in my math lessons as a result of these previous student tensions, my subsequent review of the literature has helped me to learn how to implement and use these journals in new ways.

Mayher et. al (1983) advocate journal writing by saying, “Writing to learn, to discover connections, to describe processes, to express emerging understandings, to raise questions and to find answers provides the best single means of making the acquisition of vocabulary an active and lasting process” (p.
The authors go on to suggest that writing to learn will only help promote understanding if the writer finds it to be purposeful.

When we’re looking for the appropriate place to use writing in the school environment we must first look at those areas of the curriculum that include a language component…In mathematics, the language component might be defined as the non-numerical part of learning math; that is, in solving and writing word problems, in writing out the steps one goes through to solve and equation, and, finally, in those areas where applications of math concepts to real world situations are taught. (p. 87)

The review of literature I have synthesized will examine the effectiveness of journal writing in math class, and reveal important aspects to focus on when using journals in the classroom. The following review of literature is organized into sections which reflect issues of significance to my study. The sections are: enhancing student understanding, grading, modeling, student attitudes, student reflection, and differentiated instruction.

**Enhancing Student Understanding**

While research has given me great insight into the attitudes of students after writing in math journals, a great deal of research led me to see benefits in student understanding. Through a study with 4th, 5th and 6th grade classrooms,
Gordon and MacInnis (1993) introduced dialogue journals to the students. Students were instructed to either answer questions from prompts or write freely expressing any ideas or concerns they were having in math class. The authors found that students did not need much motivation; rather they could pretty much begin on their own once the activity became routine to them. Through writing, students were more willing to share their frustrations and concerns. Dialogue journals are journals only between the student and the teacher. As a teacher, I have noticed that children at this age are very sensitive and can become apprehensive when having to ask questions in class. Gordon and MacInnis (1993) found that through their writing, students became more aware of what did and did not work for them as learners. Students were able to see their misconceptions and work through them. Students were also more open to share their frustrations and concerns because they knew that they were not being assessed.

Koirala (2002) also concluded in her study that students who did not speak in class were comfortable with journal writing because they found a way to express themselves. Although her study dealt with students who were prospective teachers, even this age proved to be apprehensive writers. Her students had to write 1-3 page journals weekly either reflecting on what was being taught in class or sharing frustrations and/or concerns. All journals received feedback, and Koirala found that 80% of the journals contained writing about beliefs and attitudes toward mathematics. Like Gordon and MacInnis (1993), Koirala’s study
engaged in a type of dialogue journal because the professor used the journals as a way to respond to concerns in the course or to math in general. It was noted that if students were asked to reflect on particular concepts then they showed an in-depth understanding within their writing.

Jurdak and Abu Zein (1998) found students gained a sense of conceptual understanding when they had time to write and then read and process what they wrote. While Mett (1989) found students were attaining that meaningful use of mathematical vocabulary through their writing, the same was happening to the subjects in the Jurdak and Abu Zein study. Jurdak and Abu Zein (1998) found that students were learning more and processing more through their own personal writing. They were using their journals as automatic feedback where they could see what they had written and make necessary changes to their explanations/entries. The authors found that journals allowed for students to see what was and was not working for them as learners.

Goldsby and Cozza (2002) discuss how “…correct answers can hide a lack of understanding, but writing about the problem solving strategies used can reveal levels of conceptual understanding” (p. 520). Goldsby and Cozza discussed how they were able to see understanding in the written explanations. Sue Lichtenstein, a teacher whom they wrote about, also points out that, “…if you are using the right processes, you are better off than someone who just happened on the answer with no understanding. Their explanation of their work allows me to
see what they really understand” (p. 520). Goldsby and Cozza feel that journal writing allows us to look into students’ understanding and look for misconceptions. Lichtenstein also stated that “…if I am still unsure that a student is clear about a process, I will ask the student to explain to the class. This helps clarify for the student and for me what they do understand” (p. 519).

Beleveau (2001) conducted a study in a 6th grade math class. “My study originated when I realized that my sixth graders did not understand the difference between a product and a sum” (p. 1). She explained that she was becoming frustrated with the math communication within her classroom. She focused her study on math journals, exit slips, and vocabulary units. According to Ediger (1996), as quoted in Beleveau (2001), “Mathematics content is retained for a longer period of time if it is used in written work” (p. 2). Beleveau found growth in several areas of her study. “Written work of my students proved to be the most valuable indicator that my students were indeed mastering the language of math” (p. 5). On quizzes and tests, instead of merely providing numerical choices, Beleveau (2001) was asking more word related answers, and students were providing appropriate explanations using the learned math vocabulary. “For example, a geometry test asked students, ‘What is the difference between a regular and irregular polygon?’ Oliver, an ESL student responded, ‘A regular polygon has equal sides. And an irregular polygon has no equal sides’” (p. 5). Beleveau (2001) also discovered that students need to have a solid understanding
of a content to be able to explain it in their own words. She allows and encourages her students to share their answers with other peers. As cited in Beleveau (2001), according to Karen Wood (1992), “Frequently the best way to learn a subject is through another student” (p. 5).

**Grading**

Brandenburg (2002) was a calculus teacher who began having his students keep writing journals, taking essay tests, as well as developing portfolios. “Writing is an excellent tool for extending and deepening student understanding, especially in math class” (p. 67). After doing some research and talking with other math teachers, he decided to employ some different writing activities in his classroom because he saw his students struggling with developing explanations for what they were doing. He found that students in upper level calculus and pre-calculus classes were nervous about writing in math class. “I had learned that students in these upper-level classes could work out the problems when I taught the material, but “putting it all together” seemed incredibly difficult” (p. 67). Students would sometimes provide a product that was quick, illegible, off-task. Brandenburg suggests developing a specific grading rubric for students who are writing in math classrooms. He found that by assigning a grade to his students’ writing helped to hold them accountable and to produce a worthwhile entry.
While grading entries may help to ensure a successful product on the part of the students, Brandenburg (2002) suggests only beginning the writing project with one class at a time because of how time consuming it is to grade journal entries. While Brandenburg said it was a long fight the first year to get the journal writing off the ground he also found that he “…saw a tremendous increase in students’ comprehension and their ability to explain what they knew…my students learned to formulate and express their mathematical thinking in a clear-cut and substantive manner using correct vocabulary. They became mathematically literate” (p. 67-8). Coreen Mett (1989), a professor in the Department of Mathematics and Statistics at Radford University, conducted an action research study that provided evidence of learning through journal writing in her math classes. Mett felt it was important to assign a grade to the completed work, but only counted the journals for completeness, and this comprised 10% of students’ overall math grade. Mett had provided sample entries and rubrics prior to her study so students were aware what they had to do to earn the full credit for their entries. Williams and Wynne (2000) also conducted a research study examining journaling in math classes. They collected two journal entries a week for evaluation, and limited the writing to one page in length so they had sufficient time to grade them. Williams and Wynne cautioned their readers to limit the number of entries due to grading constraints. Concurring with Brandenburg (2002), Williams and Wynne (2000) also state that it can take a long time to grade
just one entry. Williams and Wynne felt that one page was sufficient as a completed product for students to turn in. Brandenburg (2002) says to be firm and having spelling and grammar count within their math grade. Brandenburg (2002) said, “…have a specific rubric for your writing assignments before you assign them. Keep the rubric as simple as possible. The best idea is to grade on one or two points” (page 67).

**Modeling**

Modeling is important to eliminate time off-task as well as answering any lingering questions that students might not want to ask. Mett (1989) provided a good modeling technique for students to follow, sharing a completed writing for a model which contained a summary of new material learned in class, a discussion of individual work outside of class, and an analysis connecting difficulties and open questions. Mett (1989) provided each student with a sample journal entry at the first class. She explained how the entry contained three aspects of a complete writing. These aspects were that there was a summary of the new material learned in class, that the journal entry provided a discussion of the individual’s work outside of class, and that provided was an analysis of connections, discussions, or any unanswered questions. Risk (1988) attempted a new writing project in her class where there was a problem of the week on a bulletin board. Students
selected a problem, copied it down, solved it, and explained how they got their answer in at least one paragraph of writing. Risk knew that this concept was new to her students so she developed a set of guidelines for her students to follow. In their journals they needed to ask:

- What is my problem?
- What have I accomplished?
- Have I restructured the problem and do I need to revise my strategies?
- What worked well and what didn’t?
- What should I do differently next time?

Risk found that students were able to go off and work on their own with little help from the teacher because they knew the next step. They had their guidelines in front of them, and they could share their reflection in their journals. Risk also used student samples as a way to display the correct responses and exemplary writing. She viewed this as a way to publish student writing and create peer models in the classroom.

Burns (2004) provided a variety of ideas for teachers who want students to write in their math classes. Burns feels that it is important not only to present a prompt as a guide for students to learn from, but also to establish a purpose for writing so students understand that the teacher wants to assess their learning and support their progress. Students might view writing essentially as a waste of time, so providing them with justification for it is a way to get them “on board.”
Although my study took place in a fourth grade classroom, Fuqua (1997) provided me with insight using her kindergarten classroom. She used an idea called the “big book” in her classroom. She not only had writing examples in her book, but she found it good to motivate her students before even introducing the new activity. Her students were already writing a great deal in class. Fuqua discussed how her students kept shared journals and created fact books in her class already. She also addressed how her students would write during holiday time or after they read a story. Fuqua was interested though because she kept hearing about colleagues in her school experimenting with them in other classes. “Teachers would read a story problem related to the theme their class was studying and the students would then individually record, using drawing and/or writing, how they came up with an answer. “Math journals intrigued me because I like the idea of children tangibly representing their findings, both as a record for themselves and to show others how they solved a problem” (p.73). To motivate her students, she pasted photographs from class-made charts and graphs into the big book/journal, so students could begin to see what might go into their big book. This provided me with the idea that not all samples needed to be written words. I realized that some journal entries might consist of charts or graphs, so it was important for me to have these samples available for students to examine.

Albert and Antos (2000) conducted a journal-writing project in a fifth grade classroom. The purpose of the study was to engage fifth grade students by
having them further examine and explore mathematical concepts. Since their project was to begin the first day of school, these researchers had to be ready to introduce it to the students in its entirety. The students and teachers brainstormed a variety of mathematical concepts and how they were used in everyday life. This was the first time that students were journal writing, so the teachers provided a model entry so students could get a sense for the depth of writing that was expected of them.

When I thought about modeling and how I might present journaling to my students, I also wanted to learn more about when this should occur. I took a lot of advice and ideas about writing in class from suggestions presented by Ryan and Rillero (1996), who recommend what they call the “Write Now” approach. This idea would be for students to respond to an open-ended prompt as they enter the room. The authors shared how this only took a few minutes and could be done at the beginning of class. One of the benefits of this would be that students would be on-task from the time they enter the classroom. After reading through their article, I realized that I could use this at the beginning of the day as a management technique, getting students motivated right away, and keeping them on task while I take attendance, conduct the lunch count, and take care of administrative things in the classroom.
Student Attitudes

Ponce and Garrison (2005) discussed an action research study in a third grade classroom at Sunflower Elementary School. The teacher, Mrs. Segura, discovered that 70% of the students did not pass the fourth chapter test in the math class. She also realized that a majority of the math test was problem solving and writing. The teacher began a project where students had two sentences on the board to correct as they came into class. The students corrected these in their journals, which required them to write and use mathematical vocabulary. The teacher and students would go over these as a class, and then directly after that they had five to ten minutes to solve math problems in their journals. As a result of this, the students adapted the math vocabulary to their word problems. Their test scores went up and they became excited about math. The students enjoyed writing in math as a result of this project.

While some students may come to math already enjoying it, they may find writing to be stressful. Marilyn Burns (2004) advocates writing in math classes at all ages. Burns says that students should not view the writing as having to produce a publication, like in a language arts class perhaps, but rather students should see it as a tool to extend their thinking. Some students might need motivation to begin writing in math journals, so Burns (2004) provides ideas for writing in math class. She suggests allowing students to discuss their responses in groups, which might
help them formulate new ideas for writing, or at the same time it might help
students open up in discussion. Burns (2004) assures teachers that if they take on
the challenge of writing and make it a regular process, teachers will see students
accepting writing as a regular part of math class and they will begin to enjoy and
be motivated by it.

As an educator, one of my goals is to see the children happy in class. I try
to eliminate as much frustration as possible. When I sat looking at my question
and really preparing to begin my study, I worried that I might overwhelm or
frustrate my students. I wanted them to walk away from this experience excited
about writing and benefiting from it at the same time. Williams and Wynne
(2000) conducted an action research study within their high school math
classrooms. They began by giving students time to write in class, but the students
had to finish any left over writing at home. Students had tensions from the
beginning. They did not think writing should be a part of class. Mid-way through
their study, they found that one class had more zeroes for incomplete entries. To
eliminate the stress and try to finish their study successfully, they shortened the
number of entries to one per week. With this stress released, students became
comfortable with writing as a regular part of their class. By the end of the study,
students expressed that they wanted to continue writing in the journals because
they were able to express themselves freely and they enjoyed the immediate
feedback. Both Borasi and Rose (1989) and Jurdak and Abu Zein (1998) found
the journal writing in a math class helped to develop positive attitudes towards
math. The studies showed little similarities, but both produced favorable results.
Borasi and Rose integrated journals three times per week, and students received
feedback from the teacher. Jurdak and Abu Zein were much more formal using a
control group with particular outcomes in mind. Both studies found that students
felt it was an enjoyable activity where students could express their feelings and
help eliminate frustrations. One of my goals is to allow my students the
opportunity to feel comfortable expressing themselves.

Burns (2001) provided great ideas to motivate students to want to write by
allowing for group discussion and sharing. Albert and Antos (2000) found that
students became more comfortable with their writing after they shared it with
their peers. The authors found that students were being able to identify with others
by learning about their experiences. After reading ideas prompted by Burns
(2001) and results from Albert and Antos (2000), I have some confidence with
this working for my students and bringing about positive feelings towards math
and writing in general. Ponce and Garrison (2004) also noted changes that Mrs.
Segura saw in her classroom.

As Segura implemented this strategy, she started to notice a
difference in what was happening during the mathematics period.
Students began to comment that mathematics was fun and that
they enjoyed it. When doing word problems, fewer students
would raise their hands immediately after starting the assignment. There was less frustration and more excitement about solving mathematics problems. (p. 259)

While students continued to make progress in class, Mett (1989) also found ways to interest the students. Mett was able to foster a positive attitude towards writing and math by using journals at the beginning of class or at the end of class to get students interested in an idea or to summarize what they learned.

Student Reflection

Borasi and Rose (1989) used journaling in the classroom as an integral way to maintain teacher/student dialogue. They found that through journal writing, students went farther into their reflection than they did through class discussion alone. The researchers felt that journal writing could induce further reflection for students. Through journal writing, students were learning mathematical content better. Borasi and Rose found that “…the mere fact of reporting them (thoughts and feelings) on paper creates a new awareness and may induce further reflection, which in turn can be recorded in the journal itself. Furthermore, the journals will provide a record of the writer’s development through time, which can itself provide new awareness and stimulus for reflection” (p. 353). I found this to mirror the results in an action research project conducted
by Mett (1989). Mett found students to engage more personally which allows students to really look at their work and make connections with personal knowledge. This concurs with how Borasi and Rose (1989) found that they became more aware through their own writing how they were “doing” mathematics. They were reflecting on the meaning of mathematics and not just their answer.

By reflecting on their own (the students) thinking as well as the thinking of peers, Albert and Antos (2000) found that students could reconstruct their own ideas and identify with that of others. Johanning’s (2000) study involved 48 students in a 7th and 8th grade pre-Algebra program. Through the course of the year and seventeen writing prompts, students discovered that they could find their own mistakes easier with writing, and they could easily recall the problem in subsequent group discussions because it was organized in a journal. Brandenburg (2000) wrote an article to discuss the benefits of writing in math. He feels that writing can deepen the understanding within a math class. Brandenburg found that his students could now express their mathematical thinking using correct concepts and vocabulary. They were then applying this vocabulary to other mathematical situations. He also saw students being able to pinpoint confusions they were having with certain concepts. Where students are able to determine mistakes or confusions, teachers will be able to focus and drive their instruction in new ways.
Jurdak and Abu Zein (1998) found that the positive effects of journal writing on conceptual understanding could be related to the self-controlled processing of the concepts as well as the self-involvement in writing. They were able to look at their own work as automatic feedback of what they were trying to demonstrate through writing.

**Differentiated Instruction**

Ryan and Rillero (1996) found that teachers could monitor growth in their students through journal writing. Their study focused on management concerns, but through the writing time they were able to see where students had misconceptions and could tailor their instruction to meet the students’ needs. Through written explanations and discussions, Johanning (2000) found that the teacher could drive his instruction from the students’ writing. He was able to see what students hadn’t mastered, and therefore lessons were tailored around the needs of the students. This allowed for student success. Through journal writing and researching, Brandenburg (2002) was able to learn more about how his students learned math. This, in turn, helped him discover new ways to teach it. Goldsby and Cozza (2002) found through their study that teachers could assess their own instruction through writing in math. By giving students problems and asking them to write an explanation for how they came about the answer, students
were learning to see not only the “why” but the “how,” too. They were being provided with feedback and direction from the teacher as well as other classmates. This became a comfortable setting for students and their writing became more meaningful which allowed for deeper connections. The teacher could then assess his instruction and modify or differentiate in ways to suit those individuals. Lichtenstein, the teacher discussed in Goldsby and Cozza’s (2002) article, said, “I always read the journals and adapt my instruction for the next day based on what I read. I may have to revisit a topic to clarify something that was not understood. I make a note to revamp explanations for future classes. Sometimes I see that students know more than I thought. The insights they demonstrate are helpful for altering my approaches to topics” (p. 519).
RESEARCH DESIGN AND METHODOLOGY

I teach in a public school located in a suburban town that houses roughly 630 students. The majority of the population at the school is Caucasian. There are some ESL students within the school, and as the years progress our culture continues to become more diverse. The class I chose to focus my study on was my math class. There are 22 learners within this classroom. Of the 22 students, five are learning support students and receive pullout services in other areas of study. All remain with me for math, and therefore are included in my study. There is one student in my classroom that has a one-on-one aide to assist him in all areas of learning. There is also another aide who comes into my room during math to support those students who receive learning support services. She also supports other children in the classroom who need extra assistance.

Before being able to begin my study, I submitted all documents to the Human Subjects Internal Review Board (HSIRB) at Moravian College (See Appendix A). This document outlined the purpose of my study as well as ensuring the anonymity of all participants involved in the study. After a few minor changes, I was granted permission to begin. I was hoping to involve all of my students in my study so I sent home the parental consent form (See Appendix B). This form explained all of the procedures involved in my study and also assured the anonymity of all of students participating. I also received permission from my
principal via a consent form (See Appendix C) to complete the action research project within my classroom.

I was now ready to create the methodology for my study. Hubbard and Power (2003) said that, “Observational studies help the teacher understand the student’s world from the student’s point of view rather than from that of the teacher’s own culture” (p.1). I had found this was going to be true. The students were the subjects in my classroom. I knew I was going to learn from them by listening to them, reading what they had to say, and working directly with them. Without their voices and actions I would have been lost. Hubbard and Power (2003) provided me with “The Artist’s Toolbox” of strategies suitable for action research. I narrowed down the different qualitative data collection strategies I would use to the following:

**Field Log**

The Field Log I created served as the bible of my study. My field log began with a section that contained all of my parental consent forms, followed by a section that held interviews from last year’s teacher (See Appendix D) and parent surveys (See Appendix E) I sent home. The next section of my field log was what I considered to be the heart of my research - my field notes (See Appendix F). As Ely, et al. (2005) said, “… field notes are the written record of
the data as shaped through the researcher’s eyes, with all that this implies about
the way individuals see the world, how they interpret what they see, both
explicitly and implicitly, and why” (p. 17). Being the main teacher in the
classroom, there was no time for me to sit back and really just watch my students.
One of my main procedures was my participant observations. As MacLean and
Mohr (1999) term it, a participant observation is, “The combination of teaching
and learning in a classroom…” (p.106). I conducted these observations on an
average of two to three times a week. Newman (1998) said, “The hardest part of
beginning an action research project is developing the discipline to keep a written
account of what’s happening, particularly when you have no idea what you are
looking for” (p.3). I tried to get students writing in their journals three times a
week, but time always played against me.

When I conducted these participant observations, they usually looked like
scribble on a piece of paper. I tried to carry a clipboard with paper, but found that
I would set it down more than use it. Instead, I kept a notebook accessible at my
desk. I could then go right to it and jot things down. If I had time in school I
would then type these up, but if not I’d do it at home. Arhar, Holly, and Cazden
(2001) said that, “Observation is the foundation to all good research” (p. 137).
Included in the observational notes were the date and time of the activity, a title
for the activity, and as much as I could remember from it. I took what I had
scribbled down and replayed the entire lesson in my head. I was able to recall
important details from the lesson when I had time to sit and reflect. I found these
to be so valuable for me to make connections with their journals because I was
able to see them at work on activities that were going into their journals. As I was
typing these observations up, I left wide margins and double-spaced them.
Hubbard and Power (2003) gave good advice when they said, “Teacher-
researchers, in addition to leaving wide margins, also double space their notes”
(p.50). This proved to be a very good strategy because it allowed me space to go
back and comment as I read through my observations at a later time. As I was
taking notes for these observations, I also began to bracket off my thoughts and
feelings, or how I felt my students were feeling. I called these my observer
comments. Ely et al. (2005) say that, “To be available to situations as experienced
by those who are living them, qualitative researchers are counseled to bracket
preconceptions, prejudgments, beliefs and biases as observer comments” (p. 351).
As Price notes in Ely et al. (2005), “…bracketing is a continuous, recursive self-
reflecting process” (p. 351).

Journals and Student Work

The journals were the most important source of information from the 22
students in my study. Hubbard and Power (2003) point out that students' work is a
valuable form of data collection for any teacher. Since my question was framed
around journaling in my classroom, student work was vital to my study. I was able to see what they wrote, their understandings or misunderstandings, and I was able to compare their journals to work they were completing in the classroom and look for patterns. Students wrote in their journals at least twice a week, in response to prompts that I provided. Students also wrote about their feelings on a topic we were covering. Along with their journals, the students completed “exit tickets” (See Appendix G). The exit tickets were to be completed at the end of math class every Friday. These tickets were a place for students to write something they learned that week in class. They also provided an opportunity for students to ask questions they might still have about what we were doing. While these were planned for every Friday, I found that, because of time constraints, this happened on a less regular basis than I would have liked.

**Student Surveys**

I conducted student surveys at the beginning, middle, and end of my study (See Appendices H, I, & J). The first survey asked students about their feelings about math and writing. They were to respond just by circling an A- for always, S- for sometimes, and an N- for never. The survey in the middle of my study provided insight into what my students thought about journal writing at that point. This would allow me to adapt or make any changes to my study if necessary. I
asked the students on the middle and end surveys to share their true thoughts about journaling with me. I had a feeling that since these were confidential answers that no eyes but mine would see, my students might go in depth more with their answers rather than if I asked these questions aloud.

**Parent Survey**

A parent survey was sent home at the beginning of the study with the parental consent forms. This survey was designed to help me get a better understanding of my students. This also would give me an inside view as to how the parents feel about writing as well as how they feel their child might feel about writing.

**Previous Year Teacher Survey**

This short questionnaire was designed so that I could see how much writing students had already done in the form of math journaling during their previous school year. This would provide me with the knowledge of whether or not this was a new concept to the students and introduce math journaling as a whole new activity, or if I could introduce my activity with the student having prior knowledge of writing in math.
Student Interviews

At the end of the study I decided to conduct a whole class interview (See Appendix L). Eder and Fingerson (2002) discussed interviewing when they said, “One clear reason for interviewing youthful respondents is to allow them to give voice to their own interpretations and thoughts rather than rely solely on our adult interpretations on their lives” (p. 181). The interview would play a important role in my study. I decided to present the interview in a whole class setting due to the large number of students. Having 22 participants limits the number of one-on-one or small group interviews I was able to conduct, and I did not want to short-change anyone in this process. As Mertz (2004) states, “Eder and Fingerson (2002) suggest the whole-class interview because of the natural, relaxed classroom setting. Eder and Fingerson state that because the students outnumber the adults, students might more willingly contribute their opinions” (p. 29). From the interview, I hoped to gain an insight into what the students really thought about journaling. I want to know what they found to be easy and what they found to be a challenge when it came to writing. I also wanted to know what they enjoyed about journaling as well as any aspects that might have left them with a bitter taste in their mouth. Cazden (2001) said, “After all, one of the functions of the public school is to give students opportunities to develop their abilities to
communicate with a wider world. But the teacher, for her part, has to convey genuine interest and a willingness to learn” (p.17). While I could read surveys and look at journals, I had a feeling my students would tell me more if I sat there and listened. This would show them I cared and was conscious of their feelings.
Trustworthiness

As I prepared to begin my study, researcher trustworthiness became a concern. As stated earlier, I obtained consent from the HSIRB to conduct my study. My thesis proposal laid out all of procedures and how within the realm of my study I would protect the confidentiality and anonymity of all of my participants. This included students, parents, and other staff members. Protecting the anonymity of my participants was always my number one priority. Names were automatically changed not only to ensure anonymity, but also to ensure confidentiality with my students. As Arhar (2001) suggests, I had built a community based on respect, and to protect that trust, I needed to make sure that the key ingredient of confidentiality was in place. My parents received their parental consent form outlining all of the procedures and safety measures for them. Upon returning the form, they received a copy of it for their records. Parents were also aware that they could withdraw their child from participating in the study at anytime. If a student withdrew from participating they would still be expected to keep a journal, but there would not be any data written up on that child.

I was able to protect all participants in my study by keeping everything in a secure location. My pseudonym list was kept at home in a locked filing cabinet. It was also stored on my computer at home, which was password secure. All of
the notes I typed up were also stored on my computer at home and were password secured. As surveys, interviews, and student work were completed, they were filed in a locked filing cabinet at home where only I would see them. If I needed them at school to work on them, they were kept in a locked drawer at my desk. Taking these safety precautions allowed for my participants to remain anonymous at all times, and their confidentiality was ensured.

Having a research support group also helped to provide the feedback I needed to ensure trustworthiness in my study. This allowed for other perspectives on my data and helped me to see patterns emerge that I might have missed. It helped having someone I was comfortable to work with in my group. I knew I would be spending a lot of time in my group, and wanted that person to challenge me and propose different strategies and suggestions to me other than what I might have been doing. MacLean and Mohr (1999) said, “The group challenges each other’s assumptions, proposes alternative interpretations, offers suggestions about research methodology, responds to drafts, and often lends personal as well as professional support” (p.21). This was what I wanted. I wanted someone who could be truly honest with me about my study, as well as someone I could trust would maintain the confidentiality of my participants.

I did a thorough investigation of the literature on journaling. I researched a variety of other studies and sources to find methods that were safe and credible. The sources, I have noted in my full bibliography, have provided me with tools
for data collection that allowed for triangulation to occur. By collecting data and conducting further research, I was able to see the benefits and possible negative aspects of using math journals in an elementary classroom. Using surveys, interviews, and actually coding student journals was crucial to my study because I wanted first hand views of students responding to the journals. Student work allowed me to examine what they did and did not understand in the class. I also wanted to capture as much of their own voice and spirit through this process. I maintained a regular write-up of my participant observations. I continually re-read through my field notes to allow myself to see patterns and connections. The interview I conducted at the end of my study allowed me to compile student input, which I could later use in future classroom planning. As I worked through all of my data, I was able to see how I was maintaining trustworthiness and how I was benefiting my students from my study. I realized that my study was not only benefiting my students, but was benefiting me, the researcher, as well.
RESEARCH NARRATIVE

THE START OF SOMETHING NEW

As I began to delve into my research over the summer, I realized something important - not only was journaling going to be a relatively new project for me, but fourth grade was new to me as well. Since I began my teaching career four years ago, I had always taught in the same fifth grade classroom. I was very comfortable there. I knew the teachers I worked with, I usually met the upcoming students in the halls during the course of the year, and I had a pre-existing knowledge of what they were coming to me having already learned and what they needed to learn by the time I walked them up the stage at fifth grade graduation. This was all about to change. As I sat in my principal’s office for my end of the year meeting, I was greeted with the news that I would be teaching fourth grade in the upcoming school year. I wasn’t really sure how to take the news. I was pretty much devastated. I was comfortable in fifth grade. This was a curriculum that I knew how to teach. I wasn’t looking forward to learning a new curriculum. My principal saw the look on my face, and reassured me that I would do a great job in fourth grade, and that this would give me the opportunity to try new things. The only positive image I got from this news was the fact that I could try new things- and this meant math journals.

The thought of switching grades gave me the motivation I needed to truly begin my research on implementing math journals. I had asked my principal if she
thought math journals would be a good choice of topics for me to research in my classroom. She loved the idea. My upcoming fourth graders had just taken the PSSA tests in their 3rd grade classrooms. They would take it again in fourth grade and again in fifth grade. We both agreed that math journals could be very beneficial for the students because the PSSA tests require students to formulate their thoughts through writing. It is important that writing be the focus on at any grade level. I felt a little bit better about grade switching at this point, and immediately ordered my students’ journals for the start of the school year.

As I sat down during the summer, I realized there was a lot I needed to know to implement these journals and make them successful. I focused my efforts on constructing the draft of my literature review. This enabled me to gather a wealth of information and great ideas that I wanted to implement. I did realize that I would have my work cut out for me, but I was beginning to look forward to the new teaching team and the new hallway I would call “home.” As I was sifting through research, I remembered back to the classroom I had been in while I was volunteering as an undergraduate. I remembered their tattered journals they were so proud of. Then I thought of my few short years as a teacher and how I had constructed their journals for them. I was excited at the thought of giving my students time to design the covers of their own journals. I wanted to let them know right away that these books were theirs and this would be a way to show ownership for them.
I was gaining a new perspective on math journals as I went through all of the research I was finding, but I realized that I wasn’t learning anything about my soon-to-be fourth grade students. I decided to implement my “previous year teacher survey” to get an idea of the type of experience these children have had with writing in math class. I created a small survey that asked a few simple questions of these teachers. I found the results to pretty much concur from teacher to teacher. Out of the six teachers I sent surveys to, I received feedback from three of them. I was aiming for 100% feedback, but I was satisfied with half. The three teachers that did respond explained that they used journals as a place for children to take notes and write examples. Mrs. Smith said, “I used journals in math class to write math vocab. & definitions; also the journals were used to model examples of different math problems.” On the average journals seemed to be used about two times per week. I was curious as to why these teachers used them in such small amounts, but Mr. Green explained that, “I feel that journaling can be beneficial in math. However, because of the ages of the students, many of their writing skills are still at a beginning level. It also can be time consuming.” I had read in the research that journals can take on a life of their own and become a lot of work, but I was determined to try and implement them on a regular basis.

At the same time, I realized that while these teachers were providing me with insight into the students and journaling, I wanted to find out what the parents thought of their children’s writing. When I sent home the parental consent letters,
I also attached a parent survey. My parental consent letter also had a section for the parents to give me consent to use the data I received on their surveys. I was very excited with the first survey I received back. I had asked the question, “How do you feel your child would benefit from writing about math concepts on a regular basis?” The parent responded by saying, “I think that writing is always beneficial for children. Writing about math may help them to better understand the concepts.” This answer gave me the spark I needed to get started with the project. Parents, for the most part, agreed that their children would benefit from writing in journals, and acknowledged that they had some past experiences with journals. There were a few concerns about it taking time out from learning, but as a teacher my goal was to intertwine writing in math with learning the concepts. As Mrs. Davis said in her survey, “I believe writing and writing well is one of the most important things a child can learn.”

The first day of school finally arrived. As every first day of school, I had butterflies in my stomach and couldn’t remember a thing I wanted to do with the students even with my lesson plans in front of me. I did one last sweep of the room before the students entered just to make sure everything looked the way it should. There sat colorless, blank journals on their desks. It was hard for me not to decorate their journals with my stickers, but these were to be their journals; not mine. As students came in, they began to greet each other and quietly sift through the items on their desks. At this point, they were still too nervous to ask any
questions, but I knew at some point they would begin to talk. As the morning
progressed, students opened-up, and one little boy smiled with his hand raised. I
asked Justin if he had a question. He answered me by saying that he wasn’t sure
why he had two writing journals. I walked over to his desk curious as to why I
had really given him two writing journals. An instant of panic that I had messed
something up went through my body, but was followed by instant relief. Students
did in fact receive a writing journal, which I decorated for them, but he was
referring to the blank composition book on his desk, which was really his
undecorated math journal. While my lesson plans were written for me to
introduce these later in the day, I decided to introduce them now.

I explained to the class that I was going to be taking classes just like they
were. I explained to them that on Tuesday afternoons and evenings, I would be
attending Moravian College to learn ways to become a better teacher. I explained
that I had been going to Moravian for over three years, and was nearing the end of
the program. I then went on to explain that they were lucky because they were
going to get to help me with the class I was going to be taking. Justin raised his
hand again and said, “Does that mean we have to help you do your homework?”
Other students began to laugh, and right there I realized that Justin would play an
important role in my study. I answered his question by directing it towards the
rest of the class. I explained that I would be gathering research on what they wrote
in their journals this year. I then introduced them as their math journals. I
explained the purpose of my study, and told them that they wouldn’t really be
doing my homework for me, but by completing their journal entries they would be
helping me with my homework. I then pointed the students toward the supply
shelves and gave them the opportunity to decorate their covers. I told them that
the only thing I required was that they put their first and last name on their
journals for me. Students quickly went to town. They were coloring and creating.
They were very motivated to decorate them. There were some students who put
the minimal effort into their covers, but some students went the extra mile and
were still busy expressing themselves artistically. Below are some sample covers
that students created during the first day of school.

Figure 1. This cover depicts a math journal where a student got very colorful
with her artwork. Figure 2. This figure represents a student who created a cover
on day one.
Figure 3. This cover depicts a student illustrating her cover with math symbols.

Figure 4. The cover shown here is Jared’s rainbow.

Figure 5. This cover illustrates no artwork on the part of the student.

Figure 6. Another example of a cover colorfully decorated.
As students finished up their covers, they saw a prompt on the board. The prompt read, “Please tell me your feelings about math and writing. What do you find difficult? What do you find easy?” I started with this prompt because it was a nice ice-breaker. It gave me an insight to my students and allowed for me to hear their voices; not just what they thought was the correct answer. Below is a pastiche depicting how students responded to the first prompt.
Pastiche: The first journal

How do you feel about math?

I love doing math on the computer. It makes math more fun.

I don’t really like math. I think it’s kind of boring.

Math is great

**I DISLIKE TIME**

I like adding and times tables

*I like multiplication and division the best. My favorite problem is*

8X3=24

I don’t dislike math at all

*I like that we get to play games and at the same time learn*

I get frustrated sometimes

**I LIKE USING CALCULATORS CAUSE I THINK IT’S FUN**

I don’t like homework

I like shapes with lines

I don’t like tests

Math is my strongest subject

I don’t like some of the tricky stuff
These entries took me to their “Beginning of the Year Surveys.” I administered these early on to get a feel for my students. I did not want to overwhelm them with questions to answer, so I created a survey in which they could actually circle a response based on whether they felt something was always, sometimes, or never true. Out of the 22 students I surveyed, I found that twelve of them agree that “sometimes” they struggle to find the right words to start writing an explanation. I was hoping that journaling would be a good place for them to work on learning how to start their written explanations, and that this would encourage them to write more. Unfortunately, only 10 of my students agreed that they “always” enjoyed math. I was really hoping for higher numbers. Past experiences as a teacher have lead me to conclude that as students become disengaged or discouraged from math, it is hard to convince them to continue to put forth the effort needed to be successful.

The First Couple of Entries

Before I could even begin journaling, I spent an entire class period modeling a sample journal entry. Although the students had experience with journaling, I was not sure what that experience entailed as far as the mechanics of journaling was concerned. Like both Mett (1989) and Burns (2004) shared,
modeling an entry gives the writers a visual of the teacher’s expectations as well as a purpose for writing. I used the overhead projector to demonstrate a sample entry. I asked the students to take a few moments and scan the sample entry and see what they noticed about it. Students pretty much responded by saying that they saw that the date was at the top, the prompt was copied down, the problem being worked on was copied down, and there was a thorough explanation. Erin raised her hand and explained that the sentence written after the problem was explaining what the addition problem was. I was glad to see that she could see that the writing was an explanation of what was written. The next hand up was Justin’s. He said, “The person wrote the why.” I walked over and gave him a blue token. Blue tokens are part of a behavioral reward system we use in our school. Students can trade them in for items on our “token cart.” I was excited that Justin realized this. I have quickly noticed that while Justin is a bright boy (I saw this on his beginning of year test scores), he does not put forth much effort. Homework is completed to the minimum, and class work takes motivation and reminders to get accomplished. When Justin volunteered the “why,” other students caught on and saw how this was an important piece to the entry. I explained to the class that by explaining the why allows me to see how much students understand and I can then re-teach or try other strategies if I see that students are not understanding something. The conversations then ended, and journaling was set to begin.
For the first couple of entries, the students copied the prompt off the chalkboard during homeroom. Ryan and Rillero (1996) wrote an article discussing an approach called the “Write Now” approach. They advocated having students writing from the time they entered the room. This allowed for on-task behavior and the opportunity for the teacher to get routine management items complete. Homeroom preceded math, so I tried to incorporate an independent math activity. I did this for two reasons:

1. I could easily transition them to math from homeroom if they were already focused in a math activity.
2. I had administrative things I needed to accomplish during homeroom such as lunch count and attendance.

This seemed to work out well. Students were copying the prompt, solving the problem, and then placing their journals in the journal bin. I like to have my day start out organized, so I always tried to have their journals back on their desks the next morning with comments. I have 22 students in my classroom, so I realized right away that this would be a time consuming venture. Students were responding to my comments. If I asked a question within their journal, I found that they were answering it with their next entry. I was glad to see that. Students were showing me that they were reflecting on what I was writing to them. When I had previously dabbled with journals in my fifth grade classrooms, I found that students would look at what I wrote, but they would then move on to the next
entry. After they wrote an entry, they considered themselves to be finished. At the time, I was not as concerned about it as I was this past year. My goal was to begin to have students reflect not only on their work, but also on what I was giving as feedback. This was a personal dialogue they were going to have with me.

I have added some sample journal entries to show how students were really completing them from the beginning. They were putting the date, copying the prompt, and giving thorough details to their answers.

Figure 7. This depicts an early entry showing complete work with explanation.

Figure 8. Early on journal entry with a strong explanation.
Figure 9. This entry depicts a answering all of the questions posed by the prompt with good explanations.

Figure 10. This entry (above) demonstrates a student answering a question I posed to him through our dialogue.

Figure 11. This figure (to the left) demonstrates a student’s ability to solve each individual problem and provide a brief explanation.
I found that some students were taking a long time to copy the prompt down. I have safety patrol students who come in late so I realized that students weren’t going to finish on time, but I was having some students who at 8:30am (start of math) were not finishing. I did not want to ask them to finish their journals at recess because they might lose their motivation to write. I was worried they would get to the point early on where they would just write anything down, and would not be putting effort forth in their journals. There was one student in particular who came in late every day due to safety patrol. Her name was Mary. Mary was a very sweet girl, always smiling, always out please the teacher. Mary and I seemed to begin the school day with the same conversation everyday. Below is a play that describes a typical homeroom at my desk with Mary.

**Play: Breakfast at Miss Banko’s Desk**

**Act 1: At Miss Banko’s Desk**

*Scene: I am sitting at my desk taking care of lunch count, attendance, parent notes, etc. All of the students are quietly working. Mary walks up to my desk, and stands there staring at me.*

Miss Banko: Is there something I can help you with Mary?

Mary: *(Smiling)* Do we have to copy all of those words?*

Miss Banko: Yes.

Mary: *(heavy sigh)* So we do have to copy the prompt off of the board?
Miss Banko: What does the morning letter on the board say?

Mary: *(guilty smile)* To copy down the prompt first.

Act 2: Back up at Miss Banko’s Desk

*Scene: Mary eventually sat down and unpacked her belongings, but she quickly returned back up to my desk.*

Mary: *(Bubbly)* I copied the prompt down, now what?

Miss Banko: Now you need to work out the problem and answer your explanation.

Mary: *(Nervous and biting her lip)* I don’t get it.

Miss Banko: *(Seeing she doesn’t get it, I prompt her thinking by quickly recapping what we did yesterday in class as a precursor to the journal entry).*

Mary: *(Smiling)*. I just like to make sure I am right.

Miss Banko: It might be helpful to copy some extra examples into your journal in case you forget again.

Mary: *(Bubbly- as always)* That’s a great idea!

These conversations with Mary occurred pretty much every morning for a few weeks, until I came up with an idea. I realized that the writing of the prompts was time consuming for some of my students; not only because they were lengthy at times, but also students were coming in late and some students even struggled with the mechanics of writing. I decided to try taping the prompts in their
journals. This was more work on my part, but copying and pasting them in a word
document saved the headache of some children having to write them down. They
also could read the prompts more easily. I had found that when students rushed
they had difficulties reading their own entries. I tried this because I could see
what the students were really thinking without having them feel crunched for
time. This worked beautifully. Students came in, completed their morning
routines, opened up their journals, and were pleasantly surprised to see the prompt
ready to go. Julie even came up and said, “Miss Banko, I really like the scissors
you used to cut out the prompts.” I gave in to allowing them to decorate their own
journals to show ownership, but I couldn’t take the fun out of everything for me. I
used my scrap booking scissors to make nice jagged edges. I wasn’t hoping for
anyone to appreciate them, but it did put a smile on my face. I decided that, for
every few journals entries, I would provide the prompt in their journal for them. I
did this because then they could spend as much time as needed answering their
prompts, but at the same time, I was able to use these entries to evaluate their
handwriting skills. A grade is factored into the Language Arts for handwriting
each marking period, so their journals were an excellent place for me to evaluate
their writing skills. I also feel it is important to put some responsibility on
students. I find too much that students expect things to be done for them. Having
them copy the prompt not only gives them the responsibility of completing their
work, but also helps them to think about their entry as they are copying the prompt.

**Brad: A Vignette**

*Here I am, another day at school. This backpack is heavy, but I am almost to the door. There is Miss Banko sitting at her desk. Oh no, she saw me. Now I know I have to be ready by the time the bell rings. I guess I will sit down for a while. I hate unpacking my backpack. I never know where anything belongs. Now I have this pile on my desk and I still haven’t signed up for lunch. It’s such a far walk from my desk to the ice-cream cone sign-ups. Here I go. Miss Banko might ask me if I am ready for the day. I will just say yes. She tells me to read the instructions on the board. I cannot understand any of it. I want someone to help me, but I don’t want anyone to think I am dumb because I cannot read it. Sarah has her math journal out. That must mean all those words on the board are another math prompt. I don’t like journals. I have a hard time writing, I can’t spell the words, and no one can understand what I write. Sarah is looking at her homework. If I can find the homework in my pile, I will do that too. No one will know I am confused.*

Brad and I got off to a rough start in the beginning of the year. This was Brad’s first year at Shafer. He was always sauntering in late, and didn’t show
much concern in the classroom. He was always very disorganized and always on the defense. If I asked Brad to do the smallest thing like sign up for lunch, it was sure to be a struggle. As I began reading journals, I could not make heads or tails of several of Brad’s entries. The letters were backwards, and the prompts he copied off of the board were not the correct words. Brad was a pull out student receiving special services in Language Arts. He was in my room for math, science, and social studies; any language arts activity was completed in the resource room with the learning support teacher. He had a nice demeanor about him though. When he was in the room, he always participated and smiled. If I called on him though if his hand was not raised, he usually hesitated or did not answer at all.

Figure 12. This figure illustrates an early entry completed by Brad. It is very illegible, and I could not decipher it to respond.

Figure 13. Another attempt by Brad to complete an entry independently.
When will he be ready to write?

His journals were concerning me. After realizing that Brad struggled with writing and basic comprehension skills, I decided to start him in a small 5-minute review group with me. I also copied his prompts into his journal for him all of the time. This would hopefully eliminate frustration right away. He did well in the review group. He didn’t say much, but he paid attention. The problem was when Brad left the review group. He would sit at his desk laughing at himself. He wasn’t paying attention to what he was supposed to be doing in his journal. Being very organized and having given him specific instructions, I would feel the tension mounting in myself as he disobeyed me. When I called on him to write in his journal or get started his response was, “I don’t have a pencil.” My first reaction was frustration. I told him that I didn’t care and he should use a crayon. Naturally I regretted this statement the minute it came out of my mouth, but it just seemed that he was always looking for an excuse.

Moving him closer to me

I told him to bring his journal and sit by me. His desk was only two desks away from mine, but it took him almost two minutes to move his chair and journal to my desk. He could not read the prompt I had placed in his journal for him. As I
was reading the prompt to him, he continued to ignore me as he sat there and bit his nails. I told him it was time to focus and he said, “Ok.” We began looking at the prompt together and I asked him about the patterns he saw. All he could say was, “It looks different.” While with any other one of my students, I would have been confused as to what they meant, I could see Brad was really starting to think it through. He asked if he could go get his math sheets from class. I must have been beaming when he said that because he smiled at me. I was so glad to see him begin to make an effort. I was giving him the attention he needed. He was telling me in his own way that he needed help.

*She is helping me. If I get my worksheets, I might understand what I am trying to do. I like math, but I don’t know how to write in my journal. I know she wants to help me now because she looked proud of me. Ok, I have my sheets, here we go.*

**From nothing to clear words**

When Brad returned, I asked him to tell me what he saw on his sheets. He hesitated, but he began to tell me the patterns he was noticing with skip counting. “It skips every other number, so the boxes don’t get an x.” I was so excited. I began to copy down what he was telling me. He kept going on about different numbers and why he colored certain boxes or put an “x” in them. He could not
write this down, but he could clearly tell me what he was seeing. Having learning
difficulties hinders him from reading well and writing correctly. Giving Brad the
few minutes it took for him to explain his thoughts to me really helped me to
determine that he understood the concepts. Our dialogue did occur in journals, but
it also occurred face to face. It happened with him telling me what he was
thinking about a concept or what patterns he saw, and I copied down his words. If
writing were not a frustration for Brad, it would have been his handwriting in the
journal instead of mine. Whenever there was a journal prompt on the board, Brad
and I worked together. It was time on my part, but it was crucial for Brad. Not
only did he get to complete his journal entries like the rest of the class, but he also
realized that his teacher was there to help him, and if I could not do it one of the
aides in my classroom was always there to help him. Brad showed an increased
motivation in class. He knew the faster he came in and got ready every morning,
the faster we would work in his journal. He would even go back to his seat after
we worked together and he would look through his journal at what we had written
together.
Figure 14. This entry is when Brad and I began to work together. This shows me copying the prompt for him as well as scribing what he is saying.

Math Star of the Month: My First Aha

“Math Star of the Month” was a program started at our school by our math specialist. The program was designed to recognize students for their efforts in
math. It was a new program for the 2005-2006 school year, so I had yet to figure out how I was going to choose my Math Star each month. As it turned out, my first “math star” was also my first “aha” moment with my journaling. It was September 19th. I was administering the first math test for the year in my classroom. There was nervousness in the room. I was piloting a new math series for the district, which involved a lot of writing, so the children were concerned how the new test would look. It asked in-depth questions that involved written explanations. After going over the directions and passing out the test, the students began. I allowed the students to use their journals for the test. When I told them to keep their journals out for the test I said, “You will not find the answers to questions in your journals, but you have worked through similar problems in your journal as well as documenting strategies that you used. For the purpose of this test, the journal will serve as a resource for you in case you need to look back and remind yourself how to work through something.” I was anxious to hear the quiet conversations that were taking place as I passed out the tests. One group of students was saying that they thought the test would be easy now because they could use their journals, while on the other hand another group was saying it must be a hard test because I was letting them look things up in their journals.

For the most part the students worked quietly. As I sat there and jotted observations down for my project, John came up to my desk. John is a quiet, sweet boy, but he always looked nervous. He doesn’t say much. He rarely
volunteers, but when he does or if I call on him, he usually has the right answer. When he was at my desk, I did not notice him right away because he stood there quietly. When I did notice him he said, “I do not understand number 4.” The question was to be built off the question preceding it. They read:

- What is the total value of 1 quarter, 3 dimes, 1 nickel, and 2 pennies?
  Show your work.

- How much more money would you need to make a dollar, and what coins could you use to do that? Show your work.

I decided I needed to get him to talk through this with me, so I asked him how he solved question number three. He told me what he did. After he explained his process to me, I instructed him to go back into his journal and look for strategies that might work for finding the difference or adding up to the one dollar that he needed to make. He looked at me blankly, but walked away. As he was working at his seat, other students brought their finished tests up. They seemed to grasp the concepts well, and they had good written explanations from what I saw.

Finally, John brought his paper up for me to see. He turned it over and showed me number four since that was the one he was working on. He looked nervous. As I read his answers, I could feel my eyes light up. He went back into his journal to look for strategies to solve the problem. I assumed my prompting him would have taken him back to the entry about money, but it didn’t. He went back to an entry dealing with a game called “Close to 100” that we had played and discussed in
class. He wrote about how he looked at his numbers and decided what he needed to get to 100 because that was the equivalent to $1.00. His explanation was thorough and concise.

I was so proud because he demonstrated a transfer of knowledge as well as good journal use. I asked him why he used the “Close to 100” strategy as his answer. Quietly, he said, “When we first did close to 100 we worked with estimating. You then had us estimate with money. I wrote about both of them in my journal, but I found it easier to write about the game and the estimating. I was able to see how to use it for money so I went back into my entry and found it, and then I looked at my problem and figured it out.” I was so proud of John. This really made me feel safe and secure about implementing journals with my students. He was able to demonstrate an understanding of concepts within his journals, and then he felt safe and sure of himself to use those strategies and apply them to his assessment.

As Dewey stated, “He must be aware of the potentialities for leading students into new fields which belong to experiences already had, and must use this knowledge as his criterion for selection and arrangement of the conditions that influence their present experience” (p.76). John was able to look at his experiences in math and connect the prior knowledge and build upon it as he took his test. This was such an “aha” moment for me that I instantly realized who would be my first “Math Star of the Month.”
Figure 15. This entry is completed by John. This describes his reaction to our first math test.

**Drawing and Writing: The Story of Jared**

When I had heard of my grade change at the end of the school year, I also heard about Jared. My principal told me that Jared would be placed in my classroom with me. She described Jared as a sweet, loving boy with many special talents. Jared was born with autism. She also informed me that Jared would have a one-on-one aide with him. I had taught Jared’s brother that year, and I got to know the family well, but I had limited encounters with Jared. I had seen him in
the halls a few times, and colleagues told me that he was very sweet, sensitive, and loved to draw. I was also told that Jared kept a daily writing journal, so I immediately had high hopes for introducing the journal to Jared.

**Jared’s first encounter with the journal**

When I introduced the journals to the class, Jared was very excited to be able to color it. He came up, interrupted me while I was talking to another student and said, “Look, I draw a rainbow on my journal. Now I can write in it?” I wasn’t sure how to handle the fact that he was interrupting me, but I knew this was going to be a learning experience for me, so I thanked him for showing me his good drawing. I then explained to him that this journal was not going to be his daily writing journal; rather this would be for when we do special things in math. He responded by saying, “I like math.” He walked away with a smile. I had a feeling Jared would work out ok with the journals.

Jared’s first encounter with peer sharing did not go so well. I had put students in groups and asked them to share their writing, and then discuss the strategies they used in their problem. When I visited Jared, he was working with his neighbor Justin. I looked at his journal and could see that he got the answer correct. The problem was about adding and regrouping. I could see he had a written explanation, but it was very straightforward. Justin sat there after he had
explained his entry and waited for Jared to talk. Jared sat there running his fingers through his hair. He had nothing to say. I prompted him by asking what he did. He responded with, “I added.” He is very to the point. He told me exactly what he did with the problem, which was exactly what he wrote in his journal. With continual prompting, I got him to tell us that he added the ones and then the tens. Justin, seeing that Jared was getting a bit frustrated, told him that was a good idea to add them in that order. Jared was very easy going and responded with, “Yeah.”

I realized that, when presented with a problem, Jared could usually solve it with little assistance. He mainly needed prompting to remain on-task. On one occasion, Jared was presented with a prompt which required that he create a problem to solve within given guidelines. This was an activity to be completed by the entire class. When I walked over to check on Jared he was in tears. There were multiple steps to completing this problem, and it was obviously frustrating him. Through tears he told me there were too many words for him.

From watching Jared in math, I had learned that words were tough for him, but he could draw patterns. Then in his own words, he could describe his pattern. I asked him to bring his journal and sit with me. I took each scenario to the multiple-step problem and drew them separately. We were working with candy, so he enjoyed being creative with the way he drew. After he drew the different amounts of candy, I asked him what we didn’t know about the girls and their different amounts of candy. He pointed to the name that didn’t have any
candy amounts and said, “No drawing of candy.” That was his way of telling me we didn’t know how much candy she had. I then continued to prompt him with the problem.

I could see he was getting tired of the activity because he kept propping up his head with his hand, but he had come such a long way with math journals and writing that I wanted to keep going. Journals were a time for the children to write and think independently, but I knew that Jared was always going to need some prompting, but if it got him to think further I was willing to take the time and do it. I showed him the two amounts of candy he had drawn and asked him how we would find out how much was left after taking half of one of the drawings away. He knew we needed to subtract. So together we counted the amounts, but by himself he set up a subtraction problem in his journal. He figured out the problem, circled his answer, and said, “All done!” He then even went one step further and asked if he could draw the candy the girl had. I smiled and said sure. He even detailed the candy, when he was getting very tired of the activity about 10 minutes prior. This was the gratification he needed for himself after having completed a difficult journal entry. For him, this was a personal reward. For me, it was rewarding to see Jared be successful. In a way, that answered a question for me about journaling. Even with Jared, there is motivation to write; I just needed to cheer him on.
As journaling continued, Jared did his best to work through problems. If there was a situation where objects were discussed, I had him draw them as a way to figure them out. The drawings seemed to help him write as well. As Gardener (1993) discusses, Jared seems to do well using visual-spatial learning strategies. He was able to have that visual as a way to come up with two to three sentences to put in his journal about why he completed the problem the way he did.

**Finding the right words**

Jared and I also worked on using correct math terms in class. Since I was often with him when he wrote up a response to a problem, I often corrected him if he said “minus” or “plus.” We worked on saying and writing, “add” and “subtract.” On one occasion, Jared was working on a money prompt in his journal. I could see the frustration, so I told him to draw the dollars and coins needed to solve the problem. I continued with my usual prompting with him telling me what he had to do next as he read and grasped the prompt one sentence at a time. He told me he had to “minus” to figure out the change. I looked at him and asked him how he could figure out a better way to tell me what he had to do. He stared at me for a moment, but I could tell he was thinking so I waited to prompt him. All of the sudden, he began to page back into his journal, and he said, “Here, I write subtract.” I was excited. I gave him a high five. He was able
to think back to previous work done in the journal, and he found a better way to show me what he had to do. He even kept his finger in the page as he spelled the word subtract in the entry he was working on.

In Brandenburg’s (2000) article which provided suggestions for beginning journal writing in math classes, he discussed how he found students were applying the correct math vocabulary they had documented in their journals to different situations within the classroom. While Jared did not often elaborate much into his entries or write his feelings about certain concepts we were covering, he had written detail in his journal that he could understand. He was able to recollect activities we used the journal for, and he used the journal to help reinforce vocabulary he needed to learn. This was a very big step for Jared in class.

When we worked with rotational symmetry and mirror symmetry, Jared’s journals shined. He loved having to draw images and work with shapes. I had the students cut them out and glue them in their journals. They completed the images for homework one night, and I decided to have them write about what they did and why in their journals the next day. He was very apprehensive to cut his for fear it might get wrecked, but he had created extra ones at home because he enjoyed it so he quickly got over that fear. I realized with Jared that if it was a topic that he understood or showed interest in, then getting him to write about it
was not a challenge on my end. The prompting was minimal, and he was able to articulate sentences that described his patterns.

Figure 16. This journal entry was completed by Jared. This illustrates his explanation for rotational symmetry.

Figure 17. This is Jared’s rotationally symmetrical design. He really enjoyed this activity.

Mid-Way There

When my study was mid-way completed, I administered a survey of open-ended questions to the class. I did this because I felt they had some good experiences with their journals up to this point, and they might have some good thoughts to share with me. I hoped that their answers would help to shed some
light on how my study was going, and reveal whether there was anything that
needed to be changed to continue with the study. I tried to capture their thoughts
in a poem.

**How we feel about Journaling**

Sometimes I think it’s cool

It helps me remember some lessons

I like hearing what other people said

I would love to keep journaling because it is a lot of fun

It helps me by understanding math

I like to write in my journal

It’s good to think about things

I like the problem in the journal because then I don’t have to write it

It helps me get out my feelings

I’m not a public speaker

I think some things need to be kept between Miss Banko and me

I think you should have us keep journaling in math
The Do’s and Don’ts of Group Sharing

Journal sharing was promoted in several of the studies I’d read, but I did not start out with it right away. My students were very used to working with others in groups. Within my classroom, we worked collaboratively on a variety of projects. Journaling had begun as a dialogue between the students and myself. Only I had read their journals up until this point, but I decided it was time to try out something new.

My students were what I always called my, “Creatures of Habit.” They always liked to know when something was occurring. They also liked routine. My students quickly adapted to coming in, signing up for lunch, getting ready for the day, and working in their math journals. So the day I asked them to keep their journals at their seats when they were done instead of placing them in our bin really threw them for a loop. Finally, Kate came up to me. “Miss Banko, I am done with my journal. Why don’t you want it? I thought these were for your class.” I replied by telling her that they were for my class, but we were going to try something different. Once the class was assembled, I introduced the idea of sharing our entries within their groups. Sarah immediately asked if they had to. To ease her worries, I had told the class that we were going to start out small and share with the partner they were sitting with.

I knew the way to successful sharing was to first model it with the class. I had created a sample entry, and I shared it in front of the class with the support
teacher within the room. I was very specific by telling her which set of problems I
solved first, and any strategies I used to solve them. She then took a turn to tell
me that she had used similar strategies, but that she had also used a few different
ones. This gave the children a clear idea of what a conference should look like.

I was able to circulate the room to see how this was working. I was very
excited to see how on-task the students were. When I visited Mary’s group, I saw
that she had actually gotten cubes to demonstrate her write-up in the journal.
Mike, her partner, was even adding a strategy she used because he did not use that
one. When I visited Jared’s group, he was working with Justin. They were talking,
but Justin tended to carry the conversation. I explained to Justin that he might
want to read Jared’s response and ask him questions about it. That seemed to
work for them. My first attempt at group sharing was successful. All students
were involved and on-task.

As the study progressed, I tried to include group sharing at various times. I
have learned, through my research and my experience with children, that some
children learn better from others. Other attempts at journal sharing were a bit
chaotic. I had students pout when they were not happy with their group. They
were used to the people they sat by, so whether they were good friends or not,
they were able to work with that person. When I would assign groups on my own,
there were moans and groans. I was very upset by this because I had always tried
to promote a positive, safe community within the classroom. I was worried that
this would intimidate some students and keep them from sharing. If they did not feel wanted in their group, they would not share their entries for fear of peer criticism. I immediately spoke with the class about this issue discussing the importance of being able to work with others as well as pointing out how it is important to listen to and work with peers because they might have something to add to someone’s journal that could help them better articulate what they were trying to say. Below is an excerpt from my field log. I was able to capture some conversation after I have talked with the class.

*Miss Banko wasn’t happy with us. I don’t like when she assigns our groups because then I cannot work with Tara or Ryan. I like working everyone, but we have fun when we work together. Miss Banko said we would not be able choose our groups anymore if we can’t work in groups she assigns. I guess it is important to work hard in our groups, so we can still choose other groups.*

*I like when Miss Banko picks our group. I don’t like to be the only person without a partner or a group when we do it ourselves. I don’t feel like anyone ever wants me to be in their group. I feel like I don’t have any friends in the class. I hope sometime I get to work with Maggie. She seems smart and I really like her.*

Mid-way into my study, I decided to send the journals home as a homework assignment because there were times when I did not have enough time in the day to get the entry in. The next morning I was having my students share their findings in groups. Several problems arose. Some students didn’t have their
homework done. This led to a problem with sharing because groups weren’t even, and some students feared that the ones who didn’t have their homework done would copy their answers. One of my students, Maggie, could not focus. Her aunt was having a baby, so when it was her time to share that is what she shared with her group. Kevin did not have it done, but tried to cover it up with a different entry, and then when that didn’t work he made the excuse that he copied the wrong prompt down. Little did he know I was standing behind him.

Group sharing had its ups and downs. I did have the students in sets for a while at their seats, and I had one group in particular that worked well together. I had observed them several times before, and each time they were always on task and working well. It gave me the confidence to continue having the students work through their journals by sharing them with others because I felt they were benefiting from each other’s feedback. Here is a vignette to set the scene for what the success of group sharing looked like for this particular group.
Vignette: Group Sharing at its Best: The Story of Sean, Kate, Julie, Justin, and Mary

My design did not turn out to be rotationally symmetrical. That’s ok Justin. How could you make it so your design would work? Well I think I could cut something off and…No Justin that would not work. Julie you should let him finish. It is one of Miss Banko’s rules during sharing. “Each person gets his or her turn to talk”. Well I want to help him. Justin, you don’t need to cut anything off because you could just switch some of your shapes around. See if you look where your trapezoid is, that is causing the problem. If you move it over to this side it would look better and you could move your triangles. That would make it work. Wow, that would work! Thanks Julie. Hey guys, I know how to fix mine now. What did you figure out Mary? Well I was listening to Julie, and I see what I can do with my design to make it rotationally symmetrical.

Their story continued as they built off of each other’s ideas. This was something I continually noticed from them. While they pointed out for Julie that she was breaking a rule of group sharing, they were building off of each other’s ideas and individuals in the group were benefiting from their conversations. Mary wasn’t necessarily one to share a lot but, she was sparked by the conversation around her, and she was able to work through her journal entries this way. Mary received learning support services for Language Arts, but remained with me for
math. I had an aide in the room for math that assisted with students who received pullout services for other subjects. I noticed that Mary relied on her help, but when Mary was in her group for sharing, she seemed to have a confidence that she was ok to work with just the members of her group. Group sharing worked well for Mary. It increased her self-esteem, and her risk-taking within the classroom. Below is an excerpt from a non-participant observation with Mary in her group.

*Ok guy let’s get started. I have my journal with me. I can start since my journal is open. I wrote about the estimating activity we did yesterday. My group had to count corn kernels. We thought it would be easiest to estimate a cupful at a time. I thought it was easy, but it took a long time. Then we had to multiply the cups we used by the corn we counted. I thought that was hard. (Julie interrupts) Why did you think that was hard? Because I am not so good at multiplying and I didn’t want to make any mistakes. I never get when you need to start a new line with multiplication and where to put the zero. It is just confusing.*

Mary was comfortable to share her struggles with multiplication in her group. The aide was not in her group for this, but Mary started out the discussion, and followed through when Julie asked her what she thought was hard.
Journaling: The Candy Problem

Halloween came and went; we had been journaling for well over two months. The students would work on prompts I had given them and would respond to them. The students were deviating between copying the prompt off of the board and having the prompt in their journals for them. With Halloween having just passed, the students were not very motivated to write at all. I decided to shift gears and try something different. The students had been answering prompts for me with the questions I provided them with, and now I decided they would write the question for me. I wanted to see if they could transfer their knowledge of solving problems to creating them. At 12:50 pm, I put the following situation on the board:

“Jen received 36 pieces of candy trick-or-treating. Ryan, a girl, only received half of what Jen got. Isabella got the most candy. She had 12 more pieces than Jen.”

The students, who were supposed to be reading silently, were watching me with anticipation. They wanted to know what we were going to be doing. It wasn’t journaling time. It was the afternoon, and journaling took place in the morning. I chose this time to do it because I knew the students would be involved in the activity, and at this point I was barely keeping them awake. I wanted to do something that would stimulate them.
At 1:00 pm, I asked all of the students to clear off their desks and focus their attention on the chalkboard. I read them the three statements on the board and posed the following question, “What question is this asking you to answer?” The room fell silent for a few minutes. Then some hands went up. Doug said, “Who has the most candy?” Mary said, “What kind of candy did they get?” Julie said, “Who had the fewest pieces of candy?” Finally I called on Scott. He responded by saying, “It doesn’t ask a question because it is just a bunch of sentences.” I was very glad he saw that.

I explained to the class that their job was to individually create a story problem using this scenario from the chalkboard. I continued by explaining that we had been using our journals so far to solve problems or write about concepts. I told them that I wanted them to take what they had been learning and find a way to construct a problem for others to solve. No one looked happy. They all looked nervous and confused. What better way to fix that than to model one for them. They paid very close attention. I changed the numbers around in mine so it couldn’t be mirrored. I explained the process I used to complete my problem, and how I would solve it. Before I knew it they were off and writing. They were very quiet while they were writing which had me a little nervous. They are a chatty group, and I was concerned that they were unsure what to do. They usually check with each other while journaling. As I walked around the room, I could see they were hard at work. They were busy writing. By now, I had figured out who was
usually done with their journals first. Students would rush through them at times, but there were those students who put forth a lot of effort with journaling.

Scott, who had figured out the scenarios earlier, was usually done first. I walked over to his desk and asked him how it was going. He said, “I wrote my problem, and now I am writing how I would solve it.” This intrigued me. I liked that he was taking the initiative to write how he would solve it. These are concepts I had been trying to get the students to work on in their journals. Our state tests require that children explain their thinking, and this is what he was doing. I asked him why he was choosing to explain how he would solve the problem and he said, “On the board you modeled how to write a problem, and you walked us through how to solve yours. I figure if we have to share this and someone else has mine then they will understand what they need to do if they get confused.” I was very proud of the initiative he took on his own.

I continued to walk around while students were still busy constructing their problems. I stopped at John’s desk next as he was writing. John is a bright boy, but like I had said earlier he is very quiet. I watched as he was writing. I saw that he had the names confused on the problem he was creating. I asked him to look at the problem he was writing and compare it to the scenarios I had placed on the board. He looked at it, and then he looked at his paper. For fear of being wrong, he would not look at me. I asked him if he noticed anything different. He quietly told me that he had the names mixed up. I assured him that this was not a
big deal, and that he could just erase the names and correct them. All of the
sudden, he began to erase everything. I stopped him quickly. I told him that his
problem was not wrong, rather he just needed to put the correct names with the
scenario and it would work fine. He still just sat there. I was very confused as to
why he was doing this. Part of me wondered if he was nervous that I was
watching him work, or if he was embarrassed that he had gotten something
wrong. I could see he was tensing up, so I moved on. You will see below that he
left the mistakes, crossed them out and kept going.

I liked this activity. It really got the students thinking. They came up with
good journal entries of problems for others to solve. The students had commented
that they liked the activity as well. They liked being able to create problems for
others to solve. This, for me, was gratification. There are times when I was
concerned that they were not responding well to writing. But this was an avenue
for them to write as well as add their own creativity. This was ownership for
them, but at the same time they were being teachers, by showing me they could
explain what to do as well. They were taking their thinking to the next level by
adding the explanation to the candy problems they were creating. Below are some
sample entries of candy problems they students created.
Figure 18. “The Candy Problem” This is John’s candy problem where he crossed out the names of the girls where his mistakes occurred.

Figure 19. This figure is another example of the candy problem. Here, Scott went into detail about how he would solve it.
The Big Entry: A Journal Prompt Quiz

Routine was established for the year, and as the students came in on November 9th, I did not have to explain what to do. They completed their usual morning activities and got their journals out, but this time their normal routine was changed. On the board it told them to sit quietly with a pencil and their journal and wait for instructions. I saw some students look into their journals to see if the prompt was there, and I realized some students were still looking on the board for the prompt. When “Student News” ended, I explained that their journal prompt for that day was going to count as a quiz. This seemed to blow them away. I gave the students explicit directions as to how I wanted this done. They were to copy the prompt off of the board word for word, and then figure out the total cost for all of the food items purchased, and then show and label their work. The prompt read as followed:

“You went to McDonald’s to eat. You were hungry! You ordered a Big Mac for $3.29, Supersize fries for $1.99, a large coke for $1.89, and a McFlurry for $2.59. You paid with a $10.00 and a $5.00 bill. What was your total cost? What was your change? Show or write two different ways to get your change back.”

We had been working with money for a while, so I was not concerned about the level of difficulty with this problem. I was pretty sure this would be an
easy problem for my students to solve. After I read them the prompt, I instructed them to check it over when they were done, and then turn it in. I also mentioned that since this was a quiz they were not to discuss their answers or strategies with their partners at their sets for any reason. They were quickly writing. The room was silent as they wrote. I went to Jared’s desk first and copied the prompt down for him to eliminate potential frustration that a significant amount of writing might cause for him. I covered the prompt up line by line and read it with him. This way he was not seeing a lot of words at once. He was able to tell me that he needed to find the total cost. After prompting him and asking him how he would do this, he immediately pointed to the process and told me to add them up. Since we had been working together on looking in the journal for math vocabulary previously written down, he was doing much better with using words like “add” and “subtract.” I was able to walk away from him as he began to add the numbers up because I could see he was on the right track. Next I went to Sean’s desk. I could see that he had copied down some of the prices incorrectly. I asked him to look at the prompt on the board and then look at what he had copied down and see if he could see anything different. He turned very red and quietly said, “I copied some of the prices down wrong.” I reassured him that he could just erase the wrong prices and fill them in with the right ones before he went any further. He looked relieved. I think he thought since this was a quiz that he could not fix it,
and he instantly became worried about a bad grade. That feeling passed when I
assured him it was ok to use the eraser.

I went back to Jared who was sitting there looking at his journal. He
needed prompting on what to do next. He looked very sad that there was more,
but with positive reinforcement from me, and little steps, he continued on. Scott
soon finished. He walked up and showed me his journal. I noticed that students
always showed me their journals before they would place them in the bin. It was
as if they were looking for reinforcement from me.

Julie and Michelle came up next. Both girls had incorrectly copied the
prompt off of the board. I told them I saw mistakes, and that they should look at
their prompt and see if it matched mine. I saw them go right to work because
when I looked at them at their seats they were erasing and re-writing. Jared’s one-
on-one aide went and sat with him because he needed prompting to get through it.
The journal problem took about twenty minutes to complete. Like I had
mentioned earlier, we had been working with money, so I felt this problem was
somewhat of a review for them.
Figure 20. This illustrates an example from the journal prompt quiz. The child solved the problem and using drawing to depict the different ways to receive change.

Coming to an end

As the study came to an end, I conducted a whole class interview and a student survey. I did both because I thought I might get some different responses with the survey. I knew here the students could write and know that only I would see it. With the interview I wasn’t sure if they would share everything they felt, but I knew they might be able to piggyback off of other answers, which would
spark a good discussion. In an attempt to capture the survey and interview, I created a pastiche expressing some of the feelings students had with the journaling project.

**Pastiche: Success Through the Eye’s of the Students**

*It helped me explain stuff better*

*You can write stuff only Miss Banko will see*

*You can tell the teacher what you like and don’t like about math*

*It helped us learn to write in math*

*It helps me express what I feel in math*

*It’s a good way to keep strategies that you used.***

*In the math journal, I always got a reply***

*I like having my journal for tests***

*It is a good place to tell your teacher how you are learning***

*Keeps things organized***
Data Analysis

According to Arhar, Holly, and Kasten (2001), “Interpretation (making sense of the data) is not a separate part of action research that comes at the end of a cycle: we are constantly trying to understand our students, their work, their world, and ourselves” (p. 193). The study I conducted within my classroom was action research, so it continually evolved as I continued with the study and analyzed my on-going data. I used a variety of forms of qualitative data collection and analysis such as a field log, coding and binning the log, creating my theme statements, writing a variety of narrative forms such as vignettes, pastiches, poems, and plays, as well as writing analytic memos as I reviewed my field notes.

My analysis began with coding the log. Ely, Vinz, Downing, and Anzul (1997) said, “In actual practice, we read and reread a portion of data and provide labels- usually notes in the margins- that identify a meaning unit. This process is called coding” (p. 162). To code my data, I would read sections of my notes, and look for topics within a paragraph. If I saw something emerge, I noted it in the margin. Those were my codes. This coding was an on-going process for me, so as I saw distinct patterns and behavior changes, I could modify my study accordingly. With this coding, I found where I was writing my thoughts and feelings about situations within my notes. According to Bogdan and Biklen (2003) these thoughts and feelings are called observer comments. Ely, Vinz,
Downing, and Anzul (1997) also discuss observer comments, and pay attention to the brackets put around the observer comments. “To be available to situations as experienced by those who are living them, qualitative researchers are counseled to bracket preconceptions, prejudgments, beliefs and biases as observer comments” (p. 351). As I continued to code my log, I began to chart these codes in a log on a separate sheet of paper. This code log consisted of the codes and their page numbers from my field log. This allowed me to see recurring patterns as codes were found on multiple pages within my log. According to Ely, Vinz, Downing, and Anzul (1997), “…all analysis is sorting and lifting” (p. 206).

The next step of the process was called binning. According to Ely, Vinz, Downing, and Anzul (1997), “bins” are “the first broad categories” (p. 162). Using Microsoft Word, I designed a web of bins and codes. Within these bins, my theme statements began to develop. An example of my graphic organizer is shown below:
Bins and Theme Statements

<table>
<thead>
<tr>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routines</td>
</tr>
<tr>
<td>Planning &amp; Preparation</td>
</tr>
<tr>
<td>Time Management</td>
</tr>
<tr>
<td>Lack of Routines</td>
</tr>
<tr>
<td>Expectations</td>
</tr>
</tbody>
</table>

| Differentiated Instruction |

<table>
<thead>
<tr>
<th>Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Conversations</td>
</tr>
<tr>
<td>Student Questions</td>
</tr>
<tr>
<td>Teacher-Student Interactions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Frustration</td>
</tr>
<tr>
<td>Off-task</td>
</tr>
<tr>
<td>Time Management</td>
</tr>
<tr>
<td>Teacher Apprehension</td>
</tr>
<tr>
<td>Student Frustration</td>
</tr>
<tr>
<td>Student Apprehension</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scaffolding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-Directed Instruction</td>
</tr>
<tr>
<td>Teacher Prompting</td>
</tr>
<tr>
<td>Teacher Modeling</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
</tr>
<tr>
<td>Student Reactions</td>
</tr>
<tr>
<td>Student Reward</td>
</tr>
<tr>
<td>Motivation</td>
</tr>
<tr>
<td>Peer Encouragement</td>
</tr>
<tr>
<td>Student Engagement</td>
</tr>
</tbody>
</table>

Research Question:
What are the effects of journal writing in a 4th grade math class?

Theme Statements

1. Differentiated instruction is a way for teachers to alter their instructional delivery of material as demonstrated by different needs in the classroom.
2. Interactions between students and teachers and students with other students are essential for demonstrating the understanding of different concepts.
3. Success with journal writing occurred over time, as students became more motivated and engaged in the writing process.
4. Scaffolding is an essential component of journaling for all, but particularly for students with special needs in my classroom.
5. Frustration, on both the parts of students and teacher, develops when the idea of journal writing gets underway and continues as the process evolves.
6. Structure within the classroom for both students and teachers is an essential component to engage children in journal writing as well as maintain the routine process of writing in the room.

Figure 21. These are my bins and themes I developed as I analyzed my data.
Theme statements were simple sentences that summarized the major points that emerged within my data collection. Ely, Vinz, Downing, and Anzul (1997) said, “A theme can be defined as a statement of meaning that (1) runs through all or most of the pertinent data…” (p. 206). My theme statements emerged after I examined the graphic organizer I had created of my bins and codes.

Arhar, Holly, and Kasten (2001) describe analytic memos as, “…a memo to yourself as what you see emerging: patterns of behavior, words, key ideas, events…Analytic memos are personal field notes to ourselves, helping us to notice things we did not notice before” (p. 194). Throughout the data collection process, I constructed reflective memos every three weeks analyzing the philosophical perspectives of prominent psychologists in the field of education including, Lev Vygotsky (1978), John Dewey (1938), Lisa Delpit (2002), and Paulo Friere (1970). Through these lenses, I was able to find salient quotes concurring with data I was collecting, and used these quotes to help construct meaning of my data.

As constructed earlier in this paper, vignettes, pastiches, plays, and poems were used to tell stories while I analyzed the data. Ely, Vinz, Downing, and Anzul (1997) said, “Vignettes…are narrative investigations that carry within them an interpretation of the person, experience, or situation that the writer describes” (p. 70). I used these vignettes to help create the sketch of students I focused on within my study. As quoted by Erin Kratzer (2005), “A pastiche is a compilation of data
that is put together to shed light upon a theme” (p. 97). I also used the narrative form of plays in my writing to bring to life particular situations about students and journaling. I used the form of play to set the stage for the dialogue between characters within my classroom during a particular situation.

The next pieces of data to analyze were my students’ journals. To analyze their journals, I would photocopy entries. I did not want to write my notes in their journals because we were going back and forth with our dialogue, and there were times they had their journals for a few days. I would photocopy entries that showed me they really understood the prompt, entries that showed me they had misunderstandings, and entries that showed me they went above and beyond in their explanations. With these photocopied entries, I highlighted sentences that stood out to me, as well as coded in the margins. I found that doing this helped me to see patterns that were emerging through their writing. I also did not look at the cover of the journals as I was reading them. I did not want to know who the students were, so I could not have any preconceived notions when reading their journal entries.

Throughout the study, I administered three student surveys. Each survey was designed to provide insight to my students’ feelings about journaling. I also administered a whole group interview at the end of my study. From these forms of data collection, I was able to identify salient quotes to use in the pastiches and poems throughout my “Research Narrative.” I also administered a parent survey
as well as a previous year teacher survey. It was these two surveys that allowed me to see what experiences my students already had with journal writing, so I could modify my study accordingly.

Through these various forms of data collection and analysis, I was able to learn more about my students, myself, and math journaling within my fourth grade classroom.
FINDINGS

My study was focused on six overarching themes that I developed as I worked through analyzing my data. These themes arose after creating my bins of codes. This section of my paper is broken up by themes to demonstrate the findings within my action research study. The six themes I identified focused on structure, frustration, scaffolding, success, interactions, and differentiated instruction.

Structure

Structure within the classroom for both students and teachers is an essential component to engage children in journal writing as well as maintain the routine process of writing in the room. If journal writing maintains itself as a regular part of the daily routine within the classroom, then students are more willing to put forth the necessary effort. If students see journal writing as a filler activity during the day, then they rush to finish and it is difficult for a teacher to assess for student understanding.
This was evident through my data collection. As journaling became more routine throughout the school day and students saw an established purpose for it, there was an increase in purposeful entries.
Figure 24. This is an entry as we progressed in the study. It is completed correctly, with a thorough explanation.

Figure 25. This illustrates another entry early on where the students provided a thorough in-depth response for what we had completed in class.
There were some times where journaling fell into a different part of the
day rather than during homeroom, and I noticed a difference in the content of the
entries turned in by students. As I stated throughout “My Research Narrative,” my
students are creatures of habit and they do not respond well to change. They
became accustomed to journals falling within the homeroom time frame of the
morning and when I changed that time, then I saw a change in the completeness
of entries. My students would walk into the room each morning and on days
where we had journaling they expected to see the prompt on the board or in their
journal for them. Homeroom is an independent work time, so I found my students
relying on their instructions to be found on our “menu” on the board so they could
follow through with beginning the entries. If the day was changed for whatever
reason and journaling was either eliminated that day, changed to another day, or
moved to a different time in the day, the students had a harder time explaining
what they had to say mathematically in their journals.

Time management is an important aspect of journal writing, because it
gives students the opportunity to express their thoughts clearly. Journaling did not
produce the effective results I hoped for when it was used as a part of homework.
Students saw journaling as an in-class activity, whether it was homework or work
to finish during recess, the desired results were not produced.

Journaling needs to occur during the day when all students will be giving
the time to completely work through an entry. Safety patrol students, for example,
had less time to complete their journal entries because they came into homeroom late, and it took them a long time to copy the prompt down. I realized early on that time management was an issue, as students who came in late would continually ask if they had to copy down the prompt in their journal. Time was also a constraint when schedules changed. Lesson plans are created to be followed through, but when there is a glitch in the schedule, journaling seemed to be the first thing put on hold. Students depended on that routine, and if that routine was abandoned due to a time constraint journals fell to the wayside at times. Exit tickets were also employed at the beginning of the study. I would end math class early on Fridays to give students the opportunity to write their thoughts for the week on their exit tickets. These salmon colored tickets provided the students with yet another avenue where they could foster their feelings onto paper. But with all time constraints, as soon as math got more involved and more hands on- I found that I did not have time to complete both journals and exit tickets. I thought exit tickets would only take 5 minutes, but my students were taking up to fifteen minutes to answer these. As I sorted through them, I found they were writing good things, but it was more a repetition of what I was getting from their journals, so I cut them out early on.

Planning and preparation on the part of the teacher is vital for the students to complete their entries with success. Students rely on routine and planning, and when that is absent journals are not as successful. When working out of routine,
students, just like adults; feel disorganized and out of sorts. When I was absent for a week due to vacation, journaling did not get completed even though it was planned. When I returned, the students were out of focus. They work well under my guidance, but fall into disarray when I am not there facilitating for them. An essential element for journaling is that all three elements—time management, structure/routines, and planning and preparation—be intertwined and fall into place together. When these were abandoned for a period of time, I saw the frustration level in students rise when I expected them to be able to get right back into the routine of writing. Their motivation for writing was not there. They were more interested in hearing about my trip. When the absence of journaling does occur for more than a week, students need to be re-taught the routine of writing.

Figure 26. This is an example from an entry after I returned from vacation. There is minimal response provided.

Figure 27. This figure above illustrates another example of student work when routine is abandoned. This student did not correctly answer the question and provided no explanation.
These findings were cemented when I completed the mid-way survey. Students were in agreement that they enjoyed journal writing, but they expressed that journals were more difficult to complete when writing was absent for a period of time of more than a day or two.

The question asked on the survey was: Share with me your thoughts on keeping the journal in math so far. Below are some sample responses on how students felt mid-way through my study.

- I think it helps to keep a journal in math because it helps you remember some lessons, but if we don’t write in our journals all of the time I forget some lessons. (Ryan)
- I like writing in journal and I think you should have us keep journaling in math every other day. (Scott)

- We should write in our journals everyday. (Sarah)

When routines are disturbed, students become disengaged in the writing process. Establishing routines is part of building a classroom community. It is the job of the teacher to do the best he or she can to see these routines are followed through, or students will become disengaged. When I abandoned the routine of writing to complete mid-way surveys, students expressed their idea of the lack of routine through their actions. When a journaling prompt was not on the board, the chatter in the room was obvious. I had the students come in and sit down quietly after having completed their usual routines of unpacking their belongings, signing up for lunch, and turning in homework. While I promote social interaction within my classroom, it is on a productive level. I encourage students to become social through journals or other classroom activities. This was not a type of social interaction I was fostering. Students were just talking because their routine was abandoned. They immediately began talking about sports, friends, etc. I realized that I had loosened the control that journaling had on classroom management. My students were used to entering the room on journal writing days, completing their normal morning routines (like I mentioned above), and completing their journal entry. I had to develop a new system to employ when journaling wasn’t taking place. Whether it was another math activity or writing activity, asking them to
wait quietly was not going to work. I decided to employ their regular writing journals during this time because these were not assessed. It was more a time for free writing and drawing on their part. I realized that it kept them working and writing, and I even saw some students drawing objects we were working with in math.

Frustration

Frustration, on both the parts of students and teacher, develops when the idea of journal writing gets underway and continues as the process evolves. Whoever said, any well laid out plan would be flawless, was wrong. While students were excited to begin journaling in math and showed little apprehension towards it, there were still times when they would do things to get out of writing independently or at all. In, “My Research Narrative,” I demonstrated frustration on my part as students continually questioned if they had to copy the prompt off of the board. This was their way of expressing that they did not like that idea. Teachers and students both need to be flexible for things to run smoothly, so after awhile I realized that I needed to be flexible and understand that having them always copy the prompt off of the board was not the best idea. They were losing motivation and enthusiasm to write. While I feel students need to be held accountable for their writing, I found it more beneficial to compromise by
creating entries for them on paper at times. This alleviated frustration from the start and students could focus more on the answer to the prompt.

As a teacher, I experienced frustration when I found students not putting much effort into their work. In the “My Research Narrative” section of my thesis, I provided a spotlight on Brad. I found myself getting frustrated with Brad when I could not get him to work. Until I realized why he was struggling, I felt he was wasting time that could be spent on journaling. I gave my students a half hour per entry because students could then dedicate as much time needed on their entry without the pressure of having to be done within a few short minutes. Students need to be responsible to complete their assignments when routines are established.

Frustration on the part of the teacher also occurred when assigning journals for homework. Asking the students to complete their journals for homework was something I tried to employ within my study. I found that students had difficulty completing their journal as a homework assignment. Students tend to rush through homework assignments in order to do other activities. When assigning a journal for homework, I had planned an activity where students would share their entries together the next day. Without having 100% effort from the students, the journal sharing activity was unsuccessful. This promoted frustration on my end because I had planned activities for math class, and without the homework done I could not move forward in my teaching. I realized on my own
end that this might have been unreasonable of me. I do not always get 100% participation with students returning their homework. If homework is not usually brought back with full participation from all, the teacher should not create activities based on their homework. I also found that the students rushed their journal entries more when I sent them home as a homework assignment. I found the entries were sloppier, with not as much content as entries completed in the classroom. They were writing their explanations, but they had either the “how” or the “why”- not both.

The phrase “student apprehension” appeared several times as I went back through my field log and created my coding index. I also found this phrase to be coined by my students in other ways during their surveys. For the most part, I found that students did a very nice job overall sharing their entries within their small groups. Apprehension was demonstrated, though, when they were asked about it.

When I introduced the idea of sharing journals for the first time, students panicked. They immediately asked if it was an option. After having discussed the idea of sharing with the class, students did a nice job working in their groups, but their mid-way surveys and end of study surveys still showed apprehension on their part. Students were writing that they still liked the idea of only the teacher reading the journal, and they were still nervous to read their response aloud in case they were wrong. I went through most of my study having used sharing
because students did not demonstrate much apprehension within the classroom when it came to sharing. I believe this was because of their need to please the teacher.

There were many reasons that students became off-task during the study. Consequently, when students are off-task, the idea of journaling does not run smoothly like it would if everything were running up to par. As I demonstrated in the play I created, I found that Mary would appear to be off-task when she did not understand something or when she reached her frustrational level with writing. I did not consider students being off-task when they were frustrated with writing. I learned that when this occurs, it is necessary to provide written assistance for the child or the idea of journaling will not be productive. If a child shuts down because he or she is frustrated, then the activity will not have been beneficial for the child, and it might even turn the child off to journal writing. In this instance, I focused on repeated instructions, provided prompts, and positive reinforcement.

Off-task behavior was also evident as students had other things on their minds. Sometimes I forget that students are like little adults. If something is happening at home, it comes to school with them. If they did not sleep well the night before, students are tired in class and they do not demonstrate the effort they normally put forth in school. I have had students come to school on an empty stomach and they cannot concentrate because they are hungry, but I found in my
study that when children are anticipating an event outside of school, then their focus is not always where it needs to be.

As I mentioned earlier, Maggie was very excited that her new baby cousin was about to be born the day we did a group sharing activity. This sparked interest with my students, and their group struggled to accomplish things. Within the same group, Kevin struggles at home. His grandparents are raising him the best they can, but he severely struggles with organization. When he couldn’t find his homework, he continued to look while students eagerly listened to Maggie’s story about her soon-to-be cousin. I realized that routines and activities needed to be abandoned at certain times when they begin to become unsuccessful. I decided that when groups were not working up to par for sharing, then partners seemed to work better or even smaller groups. That way there were fewer students in the group, and they tended to stay on-task much more effectively. I also began to delegate jobs within groups. I assigned an order in which they provided feedback, as well as things to look for within entries. This held students accountable for the work they did within their group because I was able to check to see what they were accomplishing.

Respect comes into play when students are off-task. Although I have two aides in the room, the students view me as the true authoritative figure. They have a tremendous amount of respect for me, and I found this respect to come into play when journaling. When I would be concentrating with one student whether it be
an issue of behavior or understanding, some students would find that as their window to do other things. For example, when I had to work with Mary to get her to understand the prompt I was asking the students to work on, Mike and Erin found this to be a time to not work. When I approached them about it, they were honest. Mike said he hadn’t started working because he was looking at Erin’s eraser. Being that they were two of my top students, I was concerned that maybe if they didn’t understand the prompt then I would need to step back and look at it from the perspective of a fourth grader. The students actually demonstrated their respect by admitting they understood it but just were sidetracked by an eraser. Students will lose focus if they are asked to do too much at once, but they also lose focus if something catches their attention; such as an eraser. I realized that there will always be circumstances that need to be addressed at times, and I found that it is due to the respect my students have for me that I was able to clearly state my expectations of them writing in their journals, and the behavior immediately dissipated.

While frustration was experienced with journaling, I believe that was a natural thing to occur. I have found that whenever I try something new, there are bound to be obstacles to overcome. The goal then is to overcome those obstacles and move on from there. I also saw frustration in a positive sense. I found that students were experiencing cognitive conflict or intellectual challenge. While students experienced regular frustrations with routine and general unsure-ness as
the process began, I wanted to challenge my students within what Vygotsky (1978) called the “Zone of Proximal Development.” Through my scaffolding and continued challenging, I got children to aim to work in their zone. Through dialogue in the journals, I could constantly question the children, which presented them with the opportunity to further question themselves and reflect on their own work. As Vygotsky (1978) said, “Thus the notion of a zone of proximal development enables us to propound a new formula, namely that only ‘good learning’ is that which is in advance of development” (p.89). Vygotsky is proposing that a child should continuously be working towards a higher level. I found this to be occurring as the study progressed. Children were reflecting upon what I had written to them in their journals. They were taking what they had done, reflecting on what I had said, and then going the extra distance to push themselves even further. This is what Vygotsky (1978) considered to be “good learning.” An example of this intellectual challenge would be with my student Scott. Scott would constantly work above his developmental level. He would push himself to make connections within his journal. When we worked with symmetrical designs, students had an entry in their journal where they had to discuss their designs. They had to tell whether or not it was symmetrical, what shapes they used, and how many shapes they used. Well, as it turned out, his shape did not turn out to be symmetrical. He wrote this in his journal like he was supposed to, but he went beyond that and explained why it was not symmetrical and what he could do to
make his drawing symmetrical. This was not a requirement or even stated in the prompt, but he challenged himself by going above his level and attempted to find a way to effectively work through this challenge on his own in his journal.

As the researcher in this study, I wanted to make sure to promote the feeling of safety with journal writing. I continually encouraged children not to give up. I encouraged them to strive to challenge themselves and to think beyond what they wrote. I found that as students completed journal entries, they would come up to me and then turn around. When I would question them about why they were turning around they usually responded by saying, “I just realized I had more to say in my journal.” Students realized that there was no wrong answer. These journals were a place to discover what we knew, and through miscalculation there would be learning that they could reflect upon.

For example, Figure 18 on page 75 shows John’s candy problem. He made mistakes in the beginning with the names of the girls in the story problem. Using the wrong names with the wrong candy amounts could have thrown his problem completely off, but after we talked about it he realized it was okay to fix his answer. He reflected that he needed to read the problem more carefully next time. This was profound because I usually find students working in the moment, but he was thinking about math problems in the future that might be similar and what he could do now to ensure a positive experience next time.
Another example that I feel really captures my students working through cognitive conflict and supports the use of journals is when my students took their first math test of the year. Referring back to the “Research Narrative,” I discuss John (refer to page 56-7). John could not figure out how to solve a money problem. After our discussion and my suggesting he use his journal as a guide, he went back and found an entry that help him develop an answer as well as an explanation. Past experiences as a math teacher, have enabled me to see students give up when they don’t know an answer and either guess or leave it blank. Although John seemed a bit discouraged when he came up to me at first because he was unsure of an answer, he persevered by using his journal to overcome the challenge of not understanding an answer. He even surprised me by finding an entry to support his answer that I did not think of. This demonstrated that as John read his journal he was reflecting on what entry would best support the explanation for him. While there might have been a more obvious entry dealing with money, he took what he knew and found the entry that he could best use to support his answer.

Throughout the process of journaling, students worked through different conflicts using their journals. They learned how to use their journal entries to support different activities they were working on in class. This led to personal achievement with my students. They developed a confidence when responding in their journals, and I believe this stems from my promoting them to take risks with
their answers as well as the continual reflection I fostered through our on-going
dialogue.

**Scaffolding**

*Scaffolding is an essential component of journaling for all, but particularly for students with special needs in my classroom.* For successful journaling to occur in my classroom, the most important aspect for beginning the process was modeling by the teacher. As Vygotsky said, “Children can imitate a variety of actions that go well beyond the limits of their own capabilities. Using imitation, children are capable of doing much more in collective activity or under the guidance of adults” (p.88). Vygotsky meant that children could imitate actions they directly see at the moment. If they are under the guidance of adults who are demonstrating things, children can go beyond what they are capable of doing and they can imitate those actions. Through this quote I found teacher modeling to play a large role in my study. I used modeling to introduce journaling to my students. It was through modeling that students learned what was expected of them. This went as simple as how to set up a journal entry, but it also went as deep as to what an explanation should contain. When I introduced a new type of journaling within the classroom, such as sharing the entries, I always modeled them. I found this to be essential for all students in my class but especially for students with special needs. It gave them a starting point. They realized they
could begin the process on their own without needing someone there every step of the way. Modeling also produced confidence within my students. Due to the fact that I modeled strategies for them, I saw children who I wouldn’t normally see participating, begin the group share. They were imitating what I had modeled for them, but they were connecting it to what they had completed.

“Teacher prompting” was a phrase I repeatedly found myself using as I was coding my log. I realized that for some students, I had to prompt them in order to create a successful journal entry. With journaling, I was asking students to demonstrate on their own, without any imitation of my immediate actions what they understood about different concepts. With most students I saw this possible, but with students such as Jared prompting was the way to complete the journal for him. Jared could complete a problem in his journal, but only under the imitation of the adult that was helping him. I found, though, that some of the greatest understanding I got from Jared occurred during the dialogue we had while I was prompting him in his journal. Prompting allowed me to assess where he was at, and at the same time I could have him working within his zone and encourage where his response would go next. I realized that some students in my class were not ready to thoroughly reach the level of explanation I had hoped for on their own. With prompting though, dialogue took place which allowed me to assess their understanding and guide them towards further reflection at their own independent level.
With modeling, and prompting, “teacher-directed instruction” was a phrase I coined in the margins of my field log a great deal. I have learned a lot about myself as a teacher through this study, and I realized that I do provide a good deal of instruction up front. I use a lot of cooperative learning in my classroom and that was evident during my study through my implementation of group and partner sharing, but I have also found that I am very thorough. I spend a lot of time developing routines during the first six weeks of school. This avoids time lost later trying to re-establish routines. With journaling, I realized that I developed my own set of routines within it. Every morning if there was a prompt on the board, I also had the instructions to write the date as well as the entire prompt (if I didn’t provide it). I also realized that if the prompt occurred at a different time, I reviewed the entire prompt first. I went over exactly what I was asking in it, and how they might begin. I also would reiterate dating the entry. As I look back in the journals, I found this was a benefit for me. I can easily find a journal because the dates are there, and my students, for the most part, were thoroughly explaining themselves. While the instruction or modeling of this might have taken a few extra minutes, I realized that students rarely said, “I don’t get it.” While this occurred at times, I was able to use the data I had collected and analyze whether they had a problem understanding the material or whether I did not present it correctly. The students demonstrated the benefits of my instruction and expectations of them through their writing.
The support placed on students is crucial to their willingness to learn. If they feel supported, they will ask questions, and work to achieve results. I found this with Brad. Once he felt support from a teacher, he was willing to get ready in the morning so he could work with the teacher and share what he was experiencing in math. When I thought of Brad, the words of Dowdy (2002) resonated with me. Dowdy (2002) said, “This opportunity to write and act these familiar characters, gave me a new lease on life. The chains fell from around my tongue, and my brain began to feel as if it were oiled and moving along without hiccups” (p. 10). While Brad’s issue was not so much language as writing, I discovered what a bright and capable boy he was. He grew to process his thoughts better because he did not have to worry about struggling to write the words in his own in his journal. Through support with journaling, Brad’s “chains” were removed for him, and he could feel proud of the thoughts being placed into his journal. He now realizes that no one will tell him they cannot read it; rather someone will sit with him and take the time to decipher it. Had he not felt this support or scaffolding, I do not think I would have seen a change in Brad. I think he would have lagged behind coming in each morning and his entries would not have gotten completed. Due to the support from teachers and dialogue he participated in, I was able to see Brad in a new way. I was able to see what he was thinking, and with prompting I was able to get him to continually reflect further.
Although teacher-directed instruction plays a significant role in my classroom, I found that no matter what I teach or guide my students towards, they think for themselves. I cannot think for them. As Friere (1970) said,

Yet only through communication can human life hold meaning.

The teacher’s thinking is authenticated only by the authenticity of the students’ thinking. The teacher cannot think for her students, nor can she impose her thought on them. Authentic thinking, thinking that is concerned about reality, does not take place in ivory tower isolation, but only in communication. (p.77)

I was able to support my students in a variety of ways throughout the study. I talked to them, responded to their writing, and just plain observed them. I learned that through these different avenues of communication, I was able to communicate my thoughts with them, but it was always the responsibility and opportunity of my students to put all of the puzzle pieces together and create understanding through their thinking. Through our communication, I then had authenticated thinking after hearing my students. I realized that through journaling, my instruction was driven by the opportunities, challenges, and thinking done by my students; not a textbook.
Interactions

Interactions between students and teachers and students with other students are essential for demonstrating the understanding of different concepts.

As students begin to question their own thinking as well as the thinking of others, connections begin to be made. Dewey (1938) stated, “The development occurs through reciprocal give-and-take, the teacher taking but not being afraid to also give” (p. 72). Dewey is suggesting that students are gaining a freedom when they can plan, work, and share in groups. This occurs, but the teacher is still there to support their needs and experiences. I found this development to occur in my classroom as I was there to support my students as they worked towards a purpose or a result by growing and developing socially with each other and with me. For example, when I sat in on Mary’s group as they were discussing their rotationally symmetrical designs, I observed that Mary was making connections to her own work and how to fix her design by listening to the conversation within her group. She began to understand the concept of rotational symmetry, and her next design was flawless. By being in small group with few conversations going on, Mary was able to focus and have the attention of small group to look at her design and get feedback from peers. Like Albert and Antos (2000) had found, students
learned about experiences by identifying with others. This was what I found with Mary. She learned about her own design by being a part of a peer discussion.

I also found the Dewey quote to resonate with prompting. When I questioned the students within their journals, they responded. I never told them what they had to respond to, but they knew the purpose of the journal to be a place to “talk” with the teacher. When I was still employing the “exit tickets” in my classroom, I had a specific student who wrote about something she had learned that week that left me with a great feeling. She said, “the most important thing I learned this week is money because last year I couldn’t count money and now I can.” I was left with such a great feeling, but yet a feeling to know more. So when I had her journal again, I wrote her a little note. It read:

“Dear Tammy,

I am very happy to see that working with money helped your development with the skill of counting. I am curious to know what helped you learn how to count money. We worked with several different strategies for money counting this past week. What strategy worked best for you? How can you take this strategy and apply it to real life situations?”

I found that in my study I was giving and taking in the form of dialogue with my students. I was pushing them to think further, like I did here with Tammy, but I did not give students the answers because that could prevent them from furthering their experiences through their work.
The rule in my classroom has always been “Ask three before me.” I believe this gets them interacting with their peers, and sometimes they tend to understand things better when explained by a peer. That went out the window with journaling. The students were continually questioning with journaling. I found that not only did they question about copying the prompt or how long their entries had to be, but also I found them questioning each other. As I went back into my field log to see what I had written about questioning, I gained some insight into the types of questions my students began to answer. When journaling first began, I was seeing questions that were more organizational such as:

Where do we put the date?
Do we have to write in cursive?
How long should the prompt be?
Do we skip lines?

As journaling progressed and I continually modeled what an entry should appear to look like, and those types of questions diminished. As I placed students into sharing groups and observed conversations taking place in these groups I began to notice a new type of questioning developing. The following are examples of some questions I began to notice as journal writing became more routine for my students:

*Why did you add those numbers first?*

*What could you do to make your design a mirror image?*
Are there any shapes you could use?

Why did you choose those two items if they were not that expensive?

Could you have chosen one of those foods and one that cost more?

I found that as students became more used to writing in their journals, and began to participate more in group discussions, then their questions focused on what students were doing. They were not asking me as many questions, rather they were trying to help others benefit.

As a teacher with 22 students, it is hard to hear all of the conversations that take place in the classroom. Having two aides in my room allowed me to have conversations with them about what they would hear as they observed different groups. Both women agreed that they often heard them questioning each other after a student would read his or her entry to the group.

I was concerned that some students might feel uncomfortable asking questions, but I saw their anxieties of peer sharing go away as they continually interacted. At one point, I even suggested, that everyone in the group take a turn and ask a question after a response was read. While they were not sure why I would say that, I was hoping that students would not feel like they were being asked all of the questions. I was worried this would make them feel inferior to their peers and like their entries were inadequate. Julie’s group even designated a person to sort of be the “group leader.” This person actually told the other students when it was their turn to ask a question and made sure everyone asked at
least one question per person’s entry. I saw that work out because then it went smoothly in the group. They developed their own routine that they benefited from.

The interactions and dialogues I had with the students played a significant role in my study. Through dialogue and interactions, I was able to see what my students understood. It was these interactions on top of their entries that really allowed them to teach me. I was able to see what they were thinking and begin to understand their thought processes. As Friere (1970) stated,

Through dialogue, the teacher-of-the-students and the students-of-the-teacher cease to exist and a new term emerges: teacher-student with student-teachers. The teacher is no longer merely the-one-who-teaches, but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible in a process for which all grow. (p. 80)

As I was analyzing data along the way, I came across that quote when I was reading Friere. This was a quote that really stood out for me. As Friere put it, my students were teaching me through their dialogue. By our dialogue and communicating back and forth, I was able to find misconceptions in what my students were experiencing. For example, it was Tara who I had a conversation with about quarters. I approached her during a journal entry about money. Students were making change from $6.00 in a variety of ways. It was my conversation with Tara that taught me why students used certain amounts of
money. I did not learn it during my conversation with her, but during this time I was prompting her to tell me why she wasn’t using larger coins or bills. She informed me that she was used to working with quarters. She said she really never worked with half dollars so she used quarters. The entries all seemed to use quarters or one dollar bills. I learned then from comparing entries and having this conversation with Tara that at their age they do not have a lot of experience with large bills or even half dollars, so they use what they know. This taught me to spend more time working with types of money that seem foreign to them so they have a basis when asked to use them.

My interaction with Tara was a learning experience for me from a fourth graders perspective, unfortunately due to time constraints my dialogue with her had to end so I could interact with other students. Borasi and Rose (1989) discuss that they found students to reflect further in their journals rather than discussion. This was the case with Tara. As I reviewed her journal entry I learned so much more from her I will always wonder if she would have shared during our dialogue. I realized, that my students were no longer the ones being solely educated. I was just as much in their shoes’.

When students teach each other, meaning is made and a comfort zone is established. As my students progressively questioned each other and shared their entries, the students were learning. I continually go back to the group that Julie, Mary, and Justin were in. Whenever I observed the group or tuned in from a
distance, they were always sharing their entries in productive manner. If students are focused on the activity, they will benefit. This group worked well together and therefore benefited. They would share their own ideas and “teach” each other how they came to the explanation they did, and the others could build upon their entries if need be from what they learned in their groups.

As Friere (1970) suggests, they were teaching each other through the process of dialogue, and everyone, including myself, grew from the experience. It was groups like Kevin and Maggie’s that did not productively teach each other. A teacher comes to work prepared with lessons and plans to follow through for the day. This group was not prepared or organized on several occasions, and I found that they did not accomplish what needed to get done. They were not able to make connections with each other’s thoughts and ideas. This group needed more support and instruction from an adult in the room. With that having to happen, their group did not produce the desired effect I was hoping for. They were not able to learn and build from each other as a group. Rather, they needed to be prompted often and redirected by a teacher, which took time away from the activity.

Success

Success with journal writing occurred over time, as students became more motivated and engaged in the writing process. Students demonstrate success in
journal writing when they feel proud of their accomplishments or can visibly see and understand their accomplishments.

The first way I analyzed this data was by using figurative language. In this instance, I used metaphors. I went back into my field log and highlighted all of the metaphors I had found myself writing. I then analyzed these metaphors looking for their significance to my study. Lakehoff and Johnson (1980) said, “Metaphor is for most people a device of the poetic imagination and the rhetorical flourish-a-matter of extraordinary rather than ordinary flourish” (p. 3). Through the analysis of the metaphors in my field log, I was able to see the successes of journal writing in my classroom. I found that I often used metaphors to describe either things going well with journaling or things that were frustrating me. I found that when a child who might have been struggling with a concept made a breakthrough with journaling, I was very excited for them. These successes began to occur more frequently as we continued on with journaling in the classroom.

With the first metaphor I identified, “…could feel my eyes light up as I read the answer,” I compared feeling proud to actually having light bulbs turning on in my eyes. When children were focused and had well explicated responses, I felt an overwhelming sense of success. It made me realize that things were headed in a positive direction in the classroom. Everyone may not experience this success at the same time or with every entry, but it is important to show the students that even the littlest success is a great feeling of accomplishment. When prompts were
harder or required multiple steps, it was harder to see such proficient responses, but I could still see that students were trying very hard. When I read prompts at home and did not get to give immediate feedback in school, I still had the eyes lighting up experience, it just was noted in the field log rather than the students getting that instant gratification from me.

The second metaphor I examined still focused on a success. “She gave me a huge smile very appreciative of recognition,” was describing a student’s sense of success by handing me a smile. I had noted in my story that with journaling, students always felt the need to show me their journal entry before placing it into the bin. I never realized why they did this because they don’t always do that with work they turn into me, but my theory was that they felt reassured when they handed it to me to look at because I always provided them with a type of positive reinforcement. When Mary would bring her journal up to hand in, she usually had visited my desk four times prior to that visit because she said she “didn’t get it.” When she finally handed in her journal, I would tell her phrases such as, “You see that wasn’t so hard,” or “That looks like you really understood it.” When this occurred she would beam. She would smile and feel proud and successful at the work she had accomplished. As I saw this feedback really affect her, I continually tried to make myself aware to provide positive reinforcement to all of the students in my class, but especially to the students who had struggled to complete a prompt.
The last comment I analyzed from my figurative language analysis dealt with students working together. The comment I picked out was taken from a non-participant observation in my field log and said, “It was hard to catch their conversations, but I heard them picking part the entry.” Being the teacher of twenty-two students, I cannot visit each group every time they are working cooperatively. I do my best to, but when I cannot I at least make sure to spot check and catch a few words from a conversation, when I cannot sit down with them. From this metaphor, I was analyzing that my students were engaged in conversation on the content. The students were not sidetracked talking about other things; rather their focus was on the prompt they had completed.

As journaling became routine, success was evident. Students were writing more in-depth responses, journal entries were completed as required, and enthusiasm for writing was visible. Students respond to the teacher. When positive reinforcement was dished out on my end, students were apt to work harder. For example, when I praised Justin for his participation as I began the writing process, I saw him work harder and stay on-task more than if I has said nothing. Children feel good when they hear positive responses.

When students were praised or encouraged by their peers, students were engaged and successful with their entries. Students realized that they all had the same common goal to work through and entry, demonstrate understanding, and discover areas they might need more assistance in. I found group sharing to be a
good place for peer encouragement. My classroom works well together, and this was an outlet to help each other. They worked through prompts one at a time giving positive feedback and areas to work on. I even found that when students might not have answered the prompt correctly that they still praise each other by finding something that was right. For example, when Mary’s symmetry design did not turn out to be rotational Julie commented by saying, “Even though your shapes are not in the right spot, you still used the right shapes which will make it easier to correct. You can just move them around now.” This gave Mary, and other students who had similar experiences in group sharing, the confidence to continue to share and the ability to take risks and ask for the opinions of others. As explicated throughout my narrative, students began to open up as group sharing dynamics continued. There were students that remained apprehensive and volunteered to share last in their group, but when it was their turn to share that look of nervousness would fade as they received positive feedback.

When students are engaged in an activity, math journal responses are more in depth. As I explained in my narrative, I piloted a new math program for the district during my action research study. This math was very hands-on. The students were involved in many engaging activities. Students responded well to these activities, and as a result students were more motivated to write about them. Jared, for example, really connected to the rotationally symmetrical designs that
we created. He had a very easy time talking about them, and required minimal prompting when writing about them or creating them in his journal.

**Differentiated Instruction**

*Differentiated instruction is a way for teachers to alter their instructional delivery of material as demonstrated by different needs in the classroom.* As I worked through my study, I found that the journal entries my students completed as well as their voices served as a tool for me to decide where I needed to differentiate or alter my instruction. As I read through their journals, I was able to see their understandings and misconceptions of topics. For example, when we did regrouping, I was able to see if children understood the concept of regrouping zeroes when subtracting through their response in their journals. While most students were able to tell me that a zero represented “10,” there were some students who clearly did not fully understand this concept. This was evident through their explanations of regrouping. While reading the journals, I was able to “red flag” those entries that I felt did not show a complete understanding of the concept. From there, I was able to put these students in a small review group during homeroom. I was able to re-teach the concept to them.

Brandenburg (2002) said, “I learned, too. I made discoveries about how students learn mathematics that I never would have without the writing
assignments” (p. 68). I found this quote to resonate with me. This year, I had several students with different learning abilities in my classroom. I have had students with special needs in the past, but this year I had some different learning disabilities in my room. It was through journaling, that I learned that Jared was a very visual learner. Colleagues had told me that Jared loved to draw, but I could not be sure for myself. When we worked on rotational symmetry. It was in Jared’s journal, that I learned how much he liked to draw (See Figure 17, page 68). He was able to easily draw the concept of symmetry as well as explain it better because he had the drawing in front of him. With this in mind, I was able to tailor my instruction with Jared when we completed the “candy problem.” He struggled at creating a word problem, but I knew that he would see the numbers better if he could draw the candy. I was able to provide Jared with the opportunity to complete the entry with little frustration because I altered my instruction with him due to past experiences in journaling.

Early on in journaling, we worked on a concept of creating symmetry using geoboards. Past experiences with geoboards, led me to use them in my class because students seem to become motivated when they get the opportunity to create designs with them. I had created an activity where students got to create designs on the geoboard and then trade them with other groups. The groups then attempted to draw the designs they saw on paper looking for lines of symmetry. This activity was doomed before it started. Students seemed confused and very
unsure about what to do. While I thought I had modeled it correctly, the activity seemed too high-level for my students. About halfway through the lesson, I could visually see the frustration with my class and I ended the lesson. The next morning, the journal prompt asked them to write their feelings about the lesson. I thought that if I could get their opinions then I could decide how I wanted to go about re-teaching the activity to the class. Below is a pastiche of students’ opinions.

Pastiche: The Geoboard Activity

There were too many rubber bands

We could not get them to fit on the board

I could not see the lines of symmetry with all of the rubber bands

It was hard to work with her. She kept trying to do it herself.

I did not understand how to use the geoboard.

I thought symmetry was only when you folded something in half.

The group did not do a good job making their design

Next time, we should do it as a class and not exchange them
Goldsby and Cozza (2002) said, “The writings can help the teacher assess how well instruction has supported learning goals. Student feedback can offer indications for changing, refining, and enhancing the instruction to provide more appropriate evaluation of, and remediation for, individual students” (p. 519). I used student opinions and observations like the ones depicted above to ensure that my instruction depicted a clear purpose for the students as well as being instruction that allowed me to assess what they understood. Through their journals and feedback within their journals, I was able to differentiate my instruction when necessary.

**Surveys, Interviews, Etc.**

To support my action research study, I collected data from a variety of sources. Within this data, I collected a parent survey, a previous year teacher survey, three student surveys (beginning, middle, and end), and a whole class interview. I feel that my previous year teacher survey was very beneficial. This gave me a starting off point for my study. Through this survey, I was able to find out what experiences my students already had with journaling and how often this occurred for them. This allowed me to not have to re-invent the wheel with my students. I learned that students came in with an understanding of what a math journal was. They had used them to solve problems, document examples, and
write important math terms down. While this would need some reintroduction on my part, I discovered that my main focus would be to structure how I wanted their entries to look and the depth I wanted them to go into for explanation purposes.

I sent home a parent survey with my parental consent letters prior to the start of my actual study. I sent it home with the parental consent form because I assumed I had a better chance of getting both items back at once (I also stapled them together). The survey did not play a major role in my study, but findings did show that parents supported the use of journals as a way for students to clarify their thinking mathematically. I also wanted the parents to feel a part of my study, and the survey gave them the opportunity to also give me input on their child and their writing abilities.

As mentioned above, three student surveys and an end-of-study whole group interview were administered throughout the study. The main pieces here I found to be beneficial to my study were the mid-way survey, end-of-study survey, and the whole group interview. From the mid-way survey, I found that students felt they benefited from having the prompts provided in their journals. They expressed that this eliminated frustration of writing. The end-of-study survey and interview proved to show a positive result of my study. Students expressed that they enjoyed the journals and liked being able to write to me. They wanted to continue to writing in their journals. In both the survey and the interview, I found something that surprised me. Several students voiced the concern for group
sharing. As a whole, I felt my class benefited from group sharing. I had seen students begin to participate more, and I saw students who rarely participated to even be the students who were beginning group discussions. As it turns out, students still worry that if their response is wrong that students might make fun of them. They also said that they would rather just share their entries with me because they knew only I saw them. It gave me something to think about with journaling as students would continue the journals even after the study was complete.

I learned a great deal from my study. My findings were cemented by the various forms of data that I collected throughout the action research process. I feel that the triangulation of my data allowed for my findings to develop from my study.
THE NEXT ACTION RESEARCH CYCLE

Through my research this year, I have learned successful ways to implement math journals into my classroom. I feel I have captured a great wealth of information from the data collection in my study. I have learned several strategies to improve the way journal writing functions within a classroom. The design of the journal prompts will affect how students complete them. Through observation, reflection on my own teaching, and analysis of my data, I feel I have a good idea of what my students require from me as their teacher.

I feel I was most successful in motivating the students to write. Beginning by having them feel ownership to their journals, I feel, played a large role in motivating my students to write. By modeling journals and engaging in ongoing dialogue, my students saw a distinct purpose for writing. However, I learned that there were times students thought a prompt was difficult. Through mid-way surveys, students expressed that when this occurred they did not like the journals as much. This led me to a new question during my study. As I continue to implement journals in my classroom, should I allow students to create their own prompts or topics to write about at different times? My students expressed interest when we created the "candy problem." Creating their own word problems did require a good deal of prompting on my part because it was something new, but they showed motivation in sharing theirs with others to solve. Since students did
show this motivation for writing in journals, I hope to find ways to better implements journal writing into my Language Arts classroom.

I plan on continuing the implementation of math journals in the years to come in my classroom. I am prepared to continue dialogue with students because I found my students did reflect upon what I had to say in their journals. Through this study, I did learn that all students learn and work differently. There are students who took off with journals, and rarely required prompting from me. On the other hand, there were some students who required an adult sitting with them a good portion of the time during this writing.

I learned that routine is an integral piece for successful journal writing. It is important to establish a classroom routine for writing, but students need to be taught flexibility. As expressed in my findings, a difference was noted in the quality of journal entries that were completed on days when writing did not occur at its normal time. With routine, organization falls into play. It is important for the structure and organization of journals to be modeled, so students can see the benefits when they need to use their journals as organizational tools. This is as basic as putting the date and copying the prompt into the journal correctly.

As I continue the journal writing process, I will continue to foster dialogue with my students. I also want to add in dialogue with peers. Once my students got accustomed to the idea of peer and group journal sharing, they did a very nice job supporting each other in the group. I would like to see how students do if they
share their journals with a peer and the peer participates in the dialogue writing. I think it would be interesting to see what kind of feedback they provide each other with, and whether or not that feedback differs from what I observed in group sharing.

The students showed benefits from using the journals as a tool during assessments. I want to continue to foster the use of the journal as a resource during these assessments. Students were able to use their journals and go back and find information to help justify an explanation they were writing on their assessment. I plan to require students to use their journals as a way to document information on tests. Most state assessments require the students to go back and highlight the passage where they found their answer. I feel having the students document pieces of their journal in their assessment will help them prepare for the state tests in the future. It will also hold them accountable to have properly completed their prompts based on the models I provide.

An important question I am still faced with is, “Did students show an increased performance on their assessments based on journaling?” This question was raised a few times during my research support group sessions. I am hesitant to answer this question. I piloted a new math program for the district this year. The assessments are 95% open-ended questions. There is some computation, but for the most part students are to explain their thinking and mathematical processes when completing problems. I found it hard to document this change because not
only was this type of test taking new to me, but it was new to the students. I feel if I were teaching the traditional math approach which consists mainly of computation with some emphasis on explanation then I could better answer this question. As I move back up to my home in fifth grade next year, I will be teaching from the regular math book. I will also have the same group of students from my study. With this in mind, I feel I will be able to compare and contrast their test scores, and examine the effect journal writing as on students’ achievement on assessments. I do agree with Beleveau (2001) when she says, “Improvement cannot merely be defined by test scores” (p. 4).

I feel these questions have prepared me for another action research cycle. This semester has taught me a great deal about my students, my teaching, but also about myself as a researcher. While it was a long process, I feel it was a very satisfying experience for me. I think of myself as a better teacher because of this study. My students all contributed positive experiences from the journals, and parents were very open to my study. I would like to say that because of journaling I have enhanced the learning experience for the students in my classroom.
REFERENCES


Beliveau, J. (2001). What strategies strengthen the connections between literacy and math concepts for higher math achievement with culturally diverse students? Fairfax County Public Schools. Glasgow Middle School, Fairfax.


Goldsby, D. & Coizza, B. (2002). Writing samples to understand mathematical thinking. *Mathematics Teaching in the Middle School, 9*(7), 517-520.


APPENDICES A – L
Appendix A: HSIRB Approval Letter

MORAVIAN COLLEGE

August 13, 2005

Stacee Banko
1731 Hastings Road
Bethlehem, PA 18017

Dear Stacee Banko,

The Moravian College Human Subjects Internal Review Board has approved your proposal: Exploring the Use of Journal Writing in an Elementary Math Classroom. Given the materials submitted, your proposal received an expedited review. A copy of your proposal will remain with the HSIRB Chair.

Please note that if you intend on venturing into other topics than the ones indicated in your proposal, you must inform the HSIRB about what those topics will be.

Should any other aspect of your research change or extend past one year of the date of this letter, you must file these changes or extensions with the HSIRB before implementation.

A hard copy of this letter will be sent to you through U.S. mail shortly. If you do not receive the letter by the time you need to begin gathering data, please do not hesitate to contact me. Also, please retain at least one copy of the approval letter for your files. Good luck with the rest of your research.

Debra Wether-Hendricks
Chair, Human Subjects Internal Review Board
Moravian College
300 South College Street
Bethlehem, PA 18015

610-861-3415 (voice)
nweber@moravian.edu
Appendix B: Parental Consent Letter

August 22, 2005

Dear Parents,

During the 2005-2006 school year, I will be taking courses towards a Master’s Degree in Curriculum and Instruction at Moravian College. These courses will help me stay in touch with the most effective ways of teaching in order to provide the best learning experience for the students.

Moravian’s program requires that I conduct a systematic study of my own teaching practices. The focus of my research this year in my fifth grade Math classroom is communicating in math journals to increase attitudes and understanding of math concepts. In doing this, I hope to increase student motivation in math, student’s understanding of concepts, and also heighten student discussion about mathematical topics. Each student has his or her own strengths and needs. Journaling in math will allow the students the ability to shine and communicate through their writing. This study will take place August 28, 2005 to December 23, 2005.

As part of my study of incorporating journaling into my curriculum, I will be observing students through their writing. I plan to have students write in class and at home as part of my research. I plan to have students assess their own writing as well as share their writing with others in the class. I will be conducting interviews and surveys about their thoughts and feelings both formally and informally during class time. Additionally, I will be collecting samples of student’s work to analyze quality and response to the strategy implemented during math.

All children in my classroom will be involved with guided reading as part of my regular reading program. However, participation in this study is entirely voluntary and will not affect the child’s grade in any way. Any child may withdraw from the study at any time. If a child is withdrawn, or the parent or guardian chooses not to have them be a part of the study, I will not use any information pertaining to that child in my study.

All the student’s names will be kept confidential. Neither your child’s name, nor any name of any student, faculty member, cooperating teacher, or cooperating institution will not appear in any written report or publication of the study or its findings. Only my name and the name of my sponsoring professors will appear in this study. Minor details of the student’s writing may be altered to ensure confidentiality. All research materials will be secured in a protected location.

My faculty sponsor is . He can be contacted at Moravian College by phone at (610) 861-1842 or e-mail at . The Principal, Mrs. Davis, has approved my study and can be reached by phone at (610) 759-5228.

If you have any questions or concerns about my in-class project, please feel free to contact me at school or e-mail me at sbanko@nazarethasd.org. If not please sign the bottom portion of this letter and return to me. Thank you for your help.

Sincerely,

Miss Stasee M. Banko

I attest that I am the student’s legally authorized representative and that I read and understand this consent form, and received a copy.

Legal Representative Signature: __________________________

Child’s Name: __________________________

Date: __________________________
Appendix C: Principal Consent Letter

August 22, 2005

Dear Principals Name:

During the 2005-2006 school year, I will be taking courses towards a Master’s Degree in Curriculum and Instruction at Moravian College. These courses will help me stay in touch with the most effective ways of teaching in order to provide the best learning experience for the students.

Moravian’s program requires that I conduct a systematic study of my own teaching practices. The focus of my research this year in my fifth grade Math classroom is communicating in math journals to increase attitudes and understanding of math concepts. In doing this, I hope to increase student motivation in math, student’s understanding of concepts, and also heighten student discussion about mathematical topics. Each student has his or her own strengths and needs. Journaling in math will allow the students the ability to shine and communicate through their writing. This study will take place August 28, 2005 to December 23, 2005.

As part of my study of incorporating journaling into my curriculum, I will be observing students through their writing. I plan to have students write in class and at home as part of my research. I plan to have students assess their own writing as well as share their writing with others in the class. I will be conducting interviews and surveys about their thoughts and feelings both formally and informally during class time. Additionally, I will be collecting samples of student’s work to analyze quality and response to the strategy implemented during math.

All children in my classroom will be involved with math journaling as part of my regular math program. However, participation in this study is entirely voluntary and will not affect the child’s grade in any way. Any child may withdraw from the study at any time. If a child is withdrawn, or the parent or guardian chooses not to have them be a part of the study, I will not use any information pertaining to that child in my study.

All the student’s names will be kept confidential. The name of any student, faculty member, cooperating teacher, or cooperating institution will not appear in any written report or publication of the study or its findings. Only my name and the name of my sponsoring professors will appear in this study. Minor details of the student’s writing may be altered to ensure confidentiality. All research materials will be secured in a protected location.

My faculty sponsor is College by phone at (610) 861-1842 or e-mail at cm. He can be contacted at Moravian

If you have any questions or concerns about my in-class project, please feel free to contact me at school or e-mail me at sbenko@moravchein.org. If not please sign and return the bottom portion of this letter. Thank you for your help.

Sincerely,

Stacey M. Banko

I attest that I am the principal of the teacher conducting this research study, that I have read and understand this consent form, and received a copy. Stacey Banko has my permission to conduct this study at

Principal Signature: __________________________

Date: __________________________
Appendix D: Previous Year Teacher Survey Questions

Previous Year Teacher Survey

Directions: Please take a few minutes to read and complete this survey. This will help me to better understand my upcoming students and their experiences with math journals.

1. Tell me your thoughts about journaling in math class.

2. Do you feel the students benefit from this? If so, how?

3. Are there any other ways that you feel journaling could be done in math classes?

4. How did you implement math journals into your classroom this year, if you did?

5. How often does journaling occur?
Appendix E: Parent Survey

Parent Survey

Directions: Please take a few moments to read and complete this survey. This will help me better understand your child and his/her attitudes towards writing. Please attach any additional sheets of paper if you need them. Please return to school in a sealed envelope (one provided) with your child, and he/she will receive a blue token for use at the token cart. Thanks!

1. Are you familiar with the writing program in our elementary school? If yes, how do you feel about it?

2. Do you feel your child is successful when writing to explain something? Why or Why not?

3. Do you feel your child rushes when writing, or do you feel your child takes his or her time and puts forth his or her best effort?

4. How do you feel your child would benefit from writing about math concepts on a regular basis?

5. Do you feel writing in a journal will cause frustration for your child? Why or Why not?
Appendix G: Exit Tickets
Appendix H: Beginning of Study Student Survey

Beginning of Study Survey for Students

Directions: Please take a few minutes to read and complete this survey to help me better understand your feelings and attitudes for math and writing. Circle the appropriate response for each question.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoy math class.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>2. I feel like I can ask questions in math class.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>3. I am nervous to ask questions in math class.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>4. I enjoy writing.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>5. I become frustrated when I have to explain problems in writing.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>6. I feel confident, explaining in words, how I reached an answer.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>7. I struggle to find the right words to explain what I did to solve the problem.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>8. I don’t know where to begin when writing an explanation.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>9. I feel it is easier for me to write my thoughts and understandings in math rather than to verbally express them.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>10. I feel it helps me to write down and keep track of math concepts taught to me.</td>
<td>A</td>
<td>S</td>
<td>N</td>
</tr>
</tbody>
</table>
Appendix I: Mid-Way Student Survey

Mid-Way of Study Survey (students)

Directions: We are mid-way through Miss Barko’s research study of journals. Please take as much time as you need to thoroughly complete this survey. Your answers give me greater insight into my research study. Please be as detailed as possible. Attach any additional paper you may need.

1. Share with me your thoughts on keeping the journal so far.

2. What part of journaling works best for you? Why?

3. Do you feel you have enough time in class to work on your journal? Why or Why not?

4. What has been most beneficial when journaling?

5. What part of journaling has been a struggle for you? Explain?

6. Do you enjoy sharing your journals with others? Why or Why not?
Appendix J: End of Study Student Survey

End of Study Survey

Directions: Please fill out the survey below. Please answer all questions putting as much information as possible.

1. Did you like using journals as a way to write in math class? Why or Why not?

2. What aspect of journaling do you like best? Why?

3. What part of journaling was most difficult for you? Why?

4. Do you think you will continue writing your thoughts and problem solvers in your journal? Why or Why not?

5. Did you feel it was beneficial for you to share your entries with others in class? Why or Why not?

6. Did journaling with me help you with new strategies in math? Why or Why not?
Appendix K: Whole Group Interview Questions

Whole Group Interview Questions

1. How has writing in math been a different experience than writing in language arts?
2. How has writing in math helped you to better express yourself?
3. Do you feel this is something you would want to continue in class? Why or Why not?
4. How could the structure of the activity change for better or worse?
5. Has journaling helped you to feel more self-confident as a participant in math class when it comes to answering questions? Why or Why not?
Appendix L: Math Star of the Month Certificate

Elementary School

Math Star of the Month

1+3=4

has been chosen as the Math Star of the Month for the month of

March 2006