UTILIZING REFLECTIVE JOURNALING TO ENHANCE FOURTH GRADE STUDENTS’ PERFORMANCE ON WEEKLY MATH ASSESSMENTS

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Master of Arts
in
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by
Jason Prakash
Summer 2012
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DEDICATION

In loving memory of my dad, Jai

I am the man today thanks to your love and support. Thank you for always giving me the advice and encouragement that I needed. You will always be in my heart and in my thoughts. I love you dad.

My Sister, Josie “N.J.”

I admire your resilience and strength that you have showed me after dad’s passing. I have seen you grow from a little girl to a smart independent woman. I am so proud to have you in my life.

Miranda “S.T.”

I am so glad I met you through this program. Thank you for always keeping me informed of due dates and keeping me on track this year. With the program over, I look forward to seeing the future we build together.

My Family and Friends

I want to thank you for always being there for me. Your love, support, and guidance have helped me achieve my accomplishments thus far and will throughout the rest of my life.

The RTR Crew

Thank you for all the late night study sessions we had this year. I am so glad that I met you all and I know that I have made some long lasting friendships.

My Mentor, Kimberly Tyler

I want to thank you for opening your classroom to me and showing me what a true professional is. Through your guidance and support, I have gained the knowledge and ability to be a successful teacher. Thank you.

My Advisor, Laurel Hill-Ward

Thanks for all the guidance and advice this year. Though the program you have went from an advisor to a friend.
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ABSTRACT

UTILIZING REFLECTIVE JOURNALING TO ENHANCE FOURTH GRADE STUDENTS’ PERFORMANCE ON WEEKLY MATH ASSESSMENTS

by

Jason Prakash

Master of Arts in Education

California State University, Chico

Summer 2012

Since the introduction of No Child Left Behind Act (NCLB), teachers have created different methods in preparation for state-wide testing. Through NCLB, the government has identified mathematics as one of the subjects in which students need to reach proficiency by 2014. However, the current state of student mathematical performance may make reaching this goal more difficult. For instance, students are accountable for knowing more concepts and are evaluated with higher standards than previous years. For students to reach proficiency, students in the elementary grades need to have a clear understanding of these concepts.

The following action research study examined the question, “How does the use of reflective journaling impact fourth grade students' performance on weekly math
assessments?” From this central question, an additional question was addressed, “How does reflective writing impact students understanding of academic language?”

These questions were investigated by creating and implementing reflective journaling at one school site with one low-performing fourth grade math class. In the classroom, 11 students’ data were collected during the second and third trimester. The data were triangulated by collecting and analyzing the students’ assessments, homework, and reflective journals. In the second trimester, the students’ assessments and homework were collected and analyzed. The data were then compared to the data collected from the students’ third trimesters’ assessments, homework, and reflective journaling. Within each journal entry, an academic language component was also addressed. After the reflective journaling was implemented, the students’ assessment scores increased, and the students were also understanding and articulating the academic words used in each lesson.
CHAPTER I
INTRODUCTION

Background

“I don’t know.” This is the response many teachers get from students when asked to explain a mathematical concept. But what really do the students not know—a segment, or the entire concept? This question becomes even more complex when working with low-performing students. With this population, many factors can arise. Students can be missing areas of learning that are needed to understand certain concepts. For instance, in long division students need to understand the many operations that are needed to obtain the solution. For other students, not learning the concepts is not as alarming as learning it incorrectly. For these students, unlearning the misconception is just as difficult as learning it correctly. Some students may have impairments, like specific learning disabilities, that inhibit them from understanding mathematical concepts. Whatever the reason, understanding why or what this population “doesn’t know” can be difficult for teachers. For this reason I began researching different modalities that I can utilize during my math period.

Through classroom research, I explored the use of reflective writing in math to possibly answer this question. According to Kostos and Shin (2010) reflective writing can be a tool that enhances a student’s ability to communicate and learn concepts in mathematics. The authors explain, “written communication helps the students become
active learners and improve their academic achievement because students use language to facilitate their understanding and writing provides the student with opportunity to communicate what they know and do not know” (Kostos & Shin, 2010, p. 225). For students and teachers, this writing can be a valuable tool. When low-performing students lack in their ability to verbalize what difficulties they have, reflective writing can provide the link in communicating their needs.

One method of writing that provides students with the reflective capability is the use of journals. Hubbs and Brand (2005) state, “the reflective journal provides a vehicle for inner dialogue that connects thoughts, feelings, and action” (p. 62). Baxter, Woodward, and Olson (2005) further explain that journaling provides students the opportunity to explain their mathematical thoughts in a manner that goes beyond oral conversation. When writing in journals, students are deliberating what they want to communicate, more so than in oral conversations. In oral conversations, students can communicate what comes to mind, without putting too much thought into it, but when students take time to write in their journals, the quality of the dialogue is more attentive intentional.

Using reflective writing is also beneficial for teachers. Reflective writing can be a tool used to assess students’ understanding. According to Kostos & Shin (2010), “journals can help to drive instruction for one student or the entire class and identify students’ strength and/or weaknesses” (p. 225). Furthermore, Boden, Cook, Lasker-Scott, Moore, & Shelton (2008) assert that teachers can get a glimpse into the inner processes of a student’s mind on a particular concept. By reading the student’s words, and level of
coherency in the journal entry, teachers can assess student knowledge, and in turn, provide the correct feedback/intervention the student or class needs.

These findings led me to examine my students at my school site. At my school site I worked in a learning center with the lowest achieving 10 percent of fourth grade students. I knew that my students had a difficult time and needed more clarification on subject material. This was particularly evident in my math class. When I taught the students concepts in math, I taught in small groups, and I used lessons and homework to see if my students understood the material. For the most part, my students were interactive during the lesson; they asked clarifying questions, and/ or went through the process of an algorithm. However, I noticed that once the lesson was over, my students did not seem to retain the material learned in the lesson for the weekly assessments. Before administering each assessment, the class reviewed concepts learned that week, but still the students performed poorly. When I asked the students what they did not comprehend about the material they usually said, “I don’t know.”

One day during my lesson, one of my students asked me why he needed to know this material. I considered the question. I knew that the concepts were the stepping stones for more complex math later to come in life and that the student needed to understand these concepts to be successful in school. At that moment, I realized why the students were not performing well on the assessments. It could be that students were not relating to the material and truly understanding the importance of it. I was surprised by this, since during my teaching, I always provided the students with a rationale for why we were learning each math skills. However, I could see from the students’ comments that they were not relating personally to the material. This realization led me to work creating
and utilizing journal prompts that I could use to make the material more meaningful and relatable to the students.

Statement of the Problem

For this study, I intended to examine the question “How does the use of reflective journaling impact fourth grade students’ performance on weekly math assessments?” From this central question, an additional question was discovered, “How does reflective writing impact students understanding of academic language?”

Since the population of my students was in the lowest 10 percent of the fourth grade in mathematical performance, I introduced the beginning journal entries with prompts with specific question. As the year progressed, the prompts were being more opened-ended to elicit the students’ opinions and feelings. Moreover, the journal entries were not additional work for the students. At the time, the students had bell work for fifteen minutes at the beginning of the class period. During that time the students would write in their journal two days a week, and work on their traditional bell work the remaining three days, rotating the activities every other day.

The journal entries were also a low-stakes activity so that students could focus on their own thoughts rather than feeling anxious about the grade. Boden et al. (2008) stated that presenting reflective journaling as a low-stakes writing assignment, where students concern themselves about grades, spelling, or writing mechanics, allows them to “develop writing, critical thinking, and reflection skills” (p.12). Since many of my students felt like writing was a high-stakes assignment, the journals were presented as an opportunity for the students to write their words on paper without feeling anxious.
Students knew what they wrote was between them and the two teachers in the classroom. In addition, the journal was not a graded assignment, so the teachers encouraged students to continue to write until the end of the activity. By providing a low-stakes activity in a comfortable setting the journals could “help students involve themselves more in the ideas or subject matter of a course. It helps them find their own language for the issues of the course; they stumble into their own analogies and metaphors for academic concepts” (Elbow, 1997, p. 7).

**Purpose of the Study**

The information presented from this study can be beneficial for teachers in preparation for state wide testing. State testing has been a frequent subject of discussion in the media since the “No Child Left Behind Act,” which was signed by President Bush in 2002. The act declared that 100% of all students be proficient in English, reading, and math by 2014. The proposal is to raise test scores in our schools, kindergarten through twelfth grade, in subjects like math, reading, and writing. In 2002, 95% of all the student population took the first cycle of standardized tests and those scores are being used for future evaluations. Each year the schools take standardized test until 2014, and once that round of tests happens, evaluators will judge everyone’s progress. Their goal is for the schools that scored the lowest in 2002 to be, by 2014, up to the national average.

Beyond statewide testing, the information in this study can be beneficial for other teachers at my school. My school is classified as a Program Improvement (PI) school. Under the Elementary and Secondary Education Act (ESEA), PI schools are schools that do not make Adequate Yearly Progress (AYP) on the state testing. The
ESEA requires schools to create an accountability system to increase students’ abilities in subjects like mathematics and language arts. The timeline for schools to reach this goal is five years, making improvements each year. To reach this objective, the teachers at my school can use the information in this study and incorporate journal writing in their classrooms.

**Theoretical Bases and Organization**

Two key underlining theories that influenced the current action research project are John Dewey’s active learning theory and David Kolb’s experiential learning theory. John Dewey (1933) stated, “We may not need to do any thinking now when some event occurs, but if we have thought about it before, the outcome of that thinking is funded as a directly added and deepened meaning of the event” (p. 21). Dewey believed that reflection could enable students to actively deliberate ideas and create a stronger bond to ideas that are lacking. Through reflection, students could refer back to their experiences to help them elucidate ideas or concepts with which they are concerned. With regards to students using reflection in mathematics, by referring to concepts that the students understand, students can transfer this understanding help them grasp concepts that they find confusing.

Expanding upon Dewey’s idea of active learning, Kolb’s (1984) experiential learning fosters the idea that one’s experience plays a crucial role in the learning process. Kolb identified four modes of experiential learning: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE)
(Kolb, 1984). As students learn, they utilize each of these modes to process information.

Kolb states:

They must be able to involve themselves fully, openly, and without bias in new experiences (CE), they must be able to reflect on and observe their experience from many perspectives (RO). They must be able to create concepts that integrate their observation into logically sound theories (AC), and they must be able to use these theories to make decisions and solve problems (AE). (p. 30)

When applying Kolb’s four modes of experiential learning in reflective writing, in the first two modes the students’ writing entry may begin with a description of the concept (CE), and follow with a reflection (RO). With the third mode, students may discuss or question the significance of the concept (AC). Finally, in the fourth mode, “students conclude the writing by applying new meanings, interpretations, or understandings” of the concept (Hubbs & Brand, 2005, p. 62).

Limitations of the Study

There were three primary limitations to this study. The first limitation of this study was the sample size from which the data were collected. The research took place within a fourth grade classroom during the mathematical period, which consists of 75 minutes. Previous to the research, the students were assessed school-wide and then placed in math classes based on their performance on the last year’s assessment. With each trimester’s assessment, students could be reclassified by their performance. By the second trimester, the population for the research was 11 students, including two males and nine females, within the low-performing math class. The students ranged in age from nine to 11 years old.
The next limitation of this study was the time frame for data collection. The time in which the data were collected was from the beginning of the second trimester to the ending of the third trimester. Each trimester was three months, wherein students’ progressed through three to four chapters in the mathematical curriculum. By the end of the trimester, all students were assessed for the trimester testing. The data collection in the beginning of the second trimester consisted of students’ assessments and homework. During the middle of the second trimester, the implementation of the reflective journaling was initiated and the data collection consisted of students’ assessments, homework, and journals until the end of the third trimester. The justification for the short amount of time for data collection was that the students had the possibility to be moved to a different classroom for the math period after every trimester’s testing, meaning data collection on those students would be lost.

The final limitation of the study was the decrease in assessments in the third trimester. The decrease of assessments and homework from the second trimester to the third trimester was due to weeks that students did not have assessments, spring break and intersession weeks (no school for one week), review weeks, state testing, trimester testing, and end of the year activities (school Olympics and end-of-the-year celebrations).

Definition of Terms

Assessment

The evaluation of students’ ability to recall and apply information and concepts that they have learned.
Elementary and Secondary Education Act (ESEA)

A federal law signed in 2001, which was created to meet the needs underprivileged and minority students in kindergarten through twelfth grade.

High-stakes Assignments

In this study, I use the term high-stakes to mean writing assignments that are graded carefully for grammar and clarity and are weighted more low-stakes assignments.

Journal

An ongoing record wherein students write to record their thoughts and experiences regarding mathematics. Borasi and Rose (1989) explained that the use of journals in their study meant “keeping of a log or personal notebook, where students can write down any thought related to their mathematics learning, throughout a whole course” (p. 348).

Low-performing/Achieving Student

Students that are performing below or far below basic as underlined by the California Department of Education.

Low-stakes Assignments

In this study, I use the term low-stakes with regards to writing assignments that are not graded on grammar or mechanics, which allows students to write free from anxiety.

No Child Left Behind (NCLB)

A federal law signed in 2001, which was created to meet the needs of underprivileged and minority students in kindergarten through twelfth grade.
Reflective Thinking

Thinking in which a person reexamines an idea in his or her mind and offers it thoughtful attention (Dewey, 1933).
CHAPTER II

LITERATURE REVIEW

As per the No Child Left Behind Act of 2001 (NCLB), the federal government has identified mathematics as one of the subjects in which students need to reach proficiency by 2014. However, the current state of student mathematical performance may make reaching this goal more difficult. For instance, students are accountable for knowing more concepts and are evaluated with higher standards than previous years. Increasingly, students in middle school are required to use more algebraic understanding in their mathematical curriculum than previous years (Ketterlin-Geller, Chard, & Fien, 2008). For this to be possible, students in the primary and elementary grades need to have a clear understanding of these concepts before moving to middle school.

According to Kostos and Shin (2010), written forms of communication help students to become active learners in the classroom, as well as advancing their academic achievement. By being an active learner in their education, students take ownership of their learning. In addition, by communicating this with their teachers, they can work on deficits that impede learning. This is viable because students use language to communicate their thoughts and understanding, and by incorporating writing, students can convey what they do and do not know. Furthermore, written work allows students to explain their thoughts on a lesson or concept in a manner that expands verbal
conversation (Baxter et al., 2005). One form of writing that provides students with the experience of writing thoughts on paper is journal writing.

Reflective Journaling

Reflective journaling can present tangible evidence of the inner workings of a student’s mind. Journals can “make thoughts visible and concrete, giving a way to interact with, elaborate on, and expand ideas” (Kerka, 1996, p. 3). When students reflect using journals, they examine and articulate the subjects and lessons they learn in the classroom. With regards to complex or difficult ideas, journals are especially helpful as students attempt to retain all the information on their own (Burns & Silbey, 2001). Journals can be even more beneficial for low-achieving students. As they write down their mental processes, students can visually see their thoughts and possible errors in their thinking. In addition, as students write in their journals, they are creating an “ongoing chronological record of their learning experiences” (Burns, 2004, p. 30). Additionally, as low-achieving students journal their learning experience for a particular subjects, they can visually see their progress from their initial entry.

Reflective journals also allow teachers to evaluate the classroom’s progress. Through students’ own words, teachers can learn the amount of comprehension of a subject, as well as the strengths and needs of the students. As students reflect upon lessons and subjects, teachers can examine student responses and provide “feedback that reinforces reflections compatible with the goals of the journaling assignment” (Hubbs & Brand, 2005, p. 65).
Incorporate Reflective Journaling in the Classroom

Reflective journaling can be organized various ways. Teachers can have students create their own journals by stapling or binding sheets of lined paper into booklet with construction paper as a cover. By having students create their own journals they can personalize them, and have a new booklet for each lesson or subject. Teachers can also give their students notebooks, but providing notebooks can become a costly investment throughout the year. Burns (2004) suggests whatever the method of journaling, the teacher should collect the students’ journals so that students do not lose them, and so that the teacher can read and comment each on journal individually.

Once journals are created, Kerka (1996) recommends three criteria essential for the process of incorporating reflective journaling. First, students need to have a sense of trustworthiness in the reader. It is important for students to know that the information contained in their journals will be read by a certain audience, for instance their teacher (Hubbs & Brand, 2005). When students are unaware of who the reader is, they can be less inclined to reveal aspects of their journal that they deem secretive or personal. By having a positive relationship with the teacher, students can write freely and create a dialogue with the teacher that is genuine. Next, Kerka (1996) recommends that teachers need to clarify their expectations for the journal entries. Clarification of the purpose of the journals can assist with any misunderstandings and also reduce students’ anxiety. For instance, if the journal is a low-stakes assignment where grammar is less important than communicating the meaning, then the teacher needs to emphasize this to the students so that they clearly understand the purpose of the journaling. Finally, Kerka (1996)
recommends the quantity and quality of the feedback is essential for the effective journaling. If students receive generic comments like *good job*, then students may turn in entries that are less thoughtful. In turn, if students receive comments that are individualized and focused on the student’s individual reflection then the student can be more willing to give a more thought out response and be more eager to continue the dialog with the teacher (Hubbs & Brand, 2005).

**Types of Journals**

There are many types of journaling but dialogue, class interactive, and personal journaling are most widely used in the classroom. The dialogue journal provides an instrument for the student and teacher to continue an individual dialog with one another on a particular lesson or issue. The process involves the teacher responding with feedback or comments about the writing on a student’s initial entry. After the response, “the student may respond to the teacher’s comments or proceed to the next journal assignment. This iterative process is repeated, creating a dialogue between the student and teacher” (Hubbs & Brand, 2005, p. 66)

Unlike the dialogue journals, which create a conversation between student and teacher, the class interactive journal offers a forum for discussion for students to interact with each other. This type of journaling creates a network where students share their entries with each other and provide comments and giving feedback to each entry (Hubbs & Brand, 2005).

The personal journal or sometimes referred to personal diary is usually a narrative explanation of the student’s mental processes. Personal journals are valuable for
students to visually see their inner thoughts on paper but these types of journals are not usually read by anyone else but the owner.

**Journaling in Mathematics**

With the significant implications of high-stakes testing, the ability to communicate math concepts is receiving greater attention in education today. Students are not only required to demonstrate that they can solve math problems but also explain the reasoning behind them (Kostos & Shin, 2010). Borasi and Rose (1989) state:

Most mathematics students seem to interpret their role as essentially acquiring (i.e., memorizing) facts and algorithms that can be immediately applied to the solution of given exercises; few students expect mathematics to be meaningful and fewer still see mathematics as a creative undertaking. Consequently, students are too often comfortable with externally manipulating symbols and doing routine problems, without ever reaching a deep and personal understanding of the material. Unfortunately, even though these attitudes and expectations may allow some students partial short-term successes, they are not conducive to the development of conceptual understanding and problem solving skills necessary to succeed in mathematics in the long run. (p. 347)

To foster math concepts in students, a reflective journal can be utilized in the classroom. Reflective math journals help students extend their thinking and make sense of mathematical concepts that can be confusing or frustrating (Burns & Silbey, 2001). Burns (2004) further explains that journaling in math class aids learning because it asks students to reflect and clarify their ideas regarding math concepts. Furthermore, when students reflect in their writing, their entries provide a chronological order and an insight into their comprehension, their fallacies, and their opinion about the material they are learning. Kostos and Shin (2010) also explain that reflective journals do not only offer students the chance to express their understanding of the concepts but to also “ask questions without fear of embarrassment” (p. 224).
Incorporating Reflective Journals in the Classroom

To engage students, math instruction should be presented in various modes for solving problems, while also teaching students to monitor and reflect on their understandings of the material. Reflective journaling develops both of these skills (Burns, 2004). The purpose of math journals will depend on the teacher, but he or she should also consider the age and ability level of the students in the classroom (Burns & Silbey, 2001). For instance, for students who perform low academically, journal prompts would need to be ability-level appropriate with the proper amount of scaffolding.

After students understand the audience, procedures, and how they will get feedback for journal entries as outlined by Kerka (1996), teachers can begin by giving journal prompts to help guide the students. Kostos and Shin (2010) discuss that “teachers can pose questions that require students to explain their thinking to solve a math problem. If students have difficulty explaining, teachers can use additional probing questions to encourage students’ thinking” (p. 224). Furthermore, with low-achieving students that are having difficulty with the journal entry, Burns and Silbey (2001) recommend that it can be beneficial for students to explain their thinking verbally before writing it down. With time, students who have difficulty writing their journal entries should be able to verbalize less and write more.

Not all of the journal entries need to focus on a math concept or math problem, but they can instead be related to the students’ learning during math class. According to Burns (2004):

Students might discuss their favorite and least favorite activities in a unit. Or they might write about the qualities of a good problem-solving partner in math class.
Sometimes they write directions for an activity or a game so they can teach it to someone at home. Teachers can also have students write letters describing the activities we do in class, to be used as an introduction for visitors before they observe one of our math lessons. (p.32)

By providing different topics for journal entries, students can be less inclined to become uninterested in the writing process. Teachers can also see a wider scope of students’ strengths and needs regarding mathematics.

**Benefits of Student Journal Writing as Students Write Their Journals**

The freedom of the journal writing experience can invoke students to reflect on thoughts, feeling and ideas that they may have not originally considered or valued. Borasi and Rose (1989) assert “the mere fact of reporting them on paper creates a new awareness and may induce further reflection, which can in turn be recorded in the journal itself. Furthermore, the journals will provide a record of the writer’s development through time, which can by itself provide new awareness and stimulus for reflection” (p. 353). In addition, students also internalize mathematical concepts and rules when they restate and reflect using their own words. Subsequently, this connection fosters students to create their own meaning for concepts in order to convey them in the journal entries. How could this serve a student’s math reasoning? How could it serve his or her language development?

Reflective journals also help students identify difficulties that they might not have otherwise realized (Borasi & Rose, 1989). When students write their journal entries they can re-read their words and see areas that they misinterpreted. They can also go back to the beginning of the journal entries on a particular concept or lesson and compare and contrast the knowledge that they gained through each activity.
Benefits as the Teacher Reads the Journals

Reflective Journals can provide the teacher with a “wealth of information about students and the course which could be lost otherwise” (Borasi & Rose, 1989, p. 358). Most coursework and class activities can disclose a small amount of the student’s individual difficulties, responses, and behavior. Through the journal’s informal nature, students can provide more information that is rarely visible. In addition, journaling also gives teachers the ability to learn about each of their students individually, which might not be possible within the normal time constraints of class.

Borasi and Rose (1989) state

another pedagogical benefit of reading journals is the unique feedback about the course they can provide to the teacher. If students are sufficiently comfortable in sharing specific responses to the structure, procedures, and teaching of the course, the teacher can use this information to improve the teaching of the course itself. (p. 359)

By reading and giving feedback to each student, journals can also provide teachers with information that can change and improve their instructional practices.

Math Journaling and Assessments

Math journaling not only helps students express their thinking in a more coherent and thoughtful manner to their teachers, but it can also be utilized as a tool to help assess their learning (Burns, 2004). By seeing how students articulate and explain math in the entries, journals also provide teachers with an opportunity to see if their students understand the material (Kostos & Shin, 2010). Borasi and Rose (1989) further discuss that journals allow teachers, as readers, to realize the specific difficulties and
needs of each individual student and if the problems are “cognitive or affective in nature” (p. 358).

Math journals can be beneficial in assessing students with various achievement levels. In a study, Baxter et al. (2005) demonstrated the advantages of math journaling with low-achieving students. In their study, the researchers incorporated journals and determined that the students who seldom contributed in discussion during math lessons were eager to express their thoughts in journals. These students displayed affective responses, in an understandable and rational reasoning through their own words and illustrations. The journal aided the students understanding of the math concepts and assisted their mathematical reasoning.

In addition, Kostos and Shin (2010) found that math journals were also beneficial in their study. Through their research, Kostos and Shin found that that the students improved their mathematical thinking from their pre-test to their post-test. The students were also able to improve their academic language. As the students explained concepts verbally, they would use the academic language that they wrote in their journals. In addition, the teacher was able to use the math journals to assess students’ mathematical thinking by using the journals as an indicator to see whether the students understood and explained the mathematical concepts fully.

Lastly, math journals assist teachers in assessing students’ comprehension on concepts on an ongoing basis. By having multiple journal entries, teachers can see what the students have more difficulties with and if the instruction needs to be altered. Moreover, the journals entries can provide information in seeing if the change in instruction made any significant impact on the students learning before the test.
Conclusion

With a greater emphasis in the mathematical curriculum, much research has been developed in increasing students’ mathematical ability. This is especially true when working with students who perform poorly in this area. While many factors can impede learning for this population, teachers still need to teach material in a manner that supports students learning. One method teachers can implement to foster students learning of mathematical concepts is reflective journaling. When students use journals to reflect, they examine and articulate the concepts and lessons they learn in the classroom. By scaffolding journals to students’ ability level, reflective journaling has the potential to increase content knowledge for each student.
CHAPTER III

METHODOLOGY

Through action research, this thesis investigated the impact of using reflective journaling to enhance fourth grade students' performance on weekly math assessments. This inquiry came to be through discussions with my mentor teacher regarding our students’ math assessment scores. We noticed that students were performing poorly on weekly assessments on concepts and materials they learned throughout the.

In the learning center, our classroom was structured to teach in stations; I taught the main concepts for the week and my mentor teacher taught concepts from the unit. By teaching this way, our students were exposed to materials in my mentor teacher’s station before coming to my station. When the lessons were presented, our students interacted by providing the process of the algorithm or by asking clarifying questions. However, once the lesson was over, our students did not seem to be able to retain the material for the weekly assessments. I reviewed before each lesson, and my mentor teacher reviewed before administering the weekly assessments; but the students still performed poorly.

Looking at the assessment scores, I contemplated different approaches to help the students retain the concepts and the material. After deliberation with my mentor teacher, I decided to implement reflective journaling, wherein students would write and
reflect on journal prompts I created, based on concepts and material students were learning throughout the week.

Design of the Investigation

For this study, I intended to examine the question “How does the use of reflective journaling impact fourth grade students' performance on weekly math assessments?” As previously stated, this question was developed as an inquiry to address my concern about making the math material more meaningful, and the low assessment scores of my students. From this central question, an additional question was discovered, “How does reflective writing impact students understanding of academic language?” This question became apparent when developing the journal prompts for the reflective journals.

To investigate my central question, I created journal prompts that reiterated concepts and lessons learned throughout the week and also correlated with the weekly assessment. I examined my students’ second trimester assessment scores to find any specific clues that would guide me in making my journal prompts. I wanted to know if my students had issues with entire concepts or specific skills taught throughout the week. By understanding my students’ difficulties, I was able to focus my future journal prompts on concepts or specific skills.

Next, I looked back at the homework to see if the students made the same types of errors on their homework as they did on the assessment. Students worked on the homework after the math period, so they would need to rely more on what they learned
from the lesson. The homework also established triangulation with the prompt and the assessment.

Once the focus of journals prompts was established, the students wrote in their journals twice a week. As they wrote, I walked around with a checklist for each student. By the end of the week, the assessment score was added to the checklist and the week’s homework, journals, and assessments were evaluated.

Population

This study was conducted in a fourth-grade learning center in a rural elementary school located in Northern California. In the classroom, the teachers were in a co-teaching model where one is a mentor teacher and the other is a resident teacher. The students who participated in the study were classified by performing in the lowest 10% in mathematics within fourth grade. Previous to the research, all students in the school were placed in math classes based on their performance on the last year’s test. Trimester assessments led to performance-based reclassification of some students. By the second trimester, the population for the research was 11 students, including two males and nine females, within the low-performing math class. The students ranged in age from nine to 11 years old. The students ranged from performing poorly in the subject of mathematics, to having an Individual Education Program (IEP), to having a 504 plan. One student was also classified as an EL student.

Treatment

The data collection began at the beginning of the second trimester and consisted of students’ assessments and homework before introducing reflective
journaling. At the beginning of the third trimester, reflective journaling was initiated and students’ assessments, homework, and journals were collected until the end of the third trimester.

Assessments

For the 11 participating students, all of the second and third trimesters’ assessments were collected and evaluated. Each weekly assessment consisted of lessons taught throughout the week. After a unit was completed, a unit assessment was given. At the beginning of second trimester, the assessments were collected and examined to discover if students had difficulties with entire concepts or specific skills. By analyzing the assessments that the students already completed, I was able to have an idea of the focal point for the journal prompts.

When analyzing the students’ errors on the assessments, I wanted to understand if students had trouble with entire concepts such as long division, or with specific skills such as computing errors like subtraction within long division. When coding my data, I looked at each student’s assessment individually to understand the types of errors he or she was making. If the student did have an error, I coded to distinguish if the error was due to a concept error or a specific skill error. For instance, in the assessment for November 18, 2012, the students had 10 questions, with two multiplication questions and eight long division questions (see Appendix A). For that assessment, I coded one student having concept errors and nine students having specific skill errors. For the student with the concept errors on this particular test, I found that his errors were consistent with the division problems. For each division problem, it appeared that he would find the answer to the quotient, but then he would add more numbers to
continue the problem until he had an answer with two digits (see Figure 1). For the students who had specific skills errors, their errors were also in long division. They consistently had the correct answers, but they did not go through the steps of long division (see Figure 1).

Once the reflective journals were implemented, the assessment scores were examined to see if the journals had any impact on the results. The assessments were also used to ensure the validity of the journal prompts. For instance, the journal prompts needed to address aspects that were consistent with lessons taught throughout the week and tested at the end of the week.

**Homework**

Math homework was also gathered from the beginning of the second trimester until the end of the third trimester. Homework was given to the students to take home and complete. The homework was a review of the lesson taught that day. Each student was given four homework assignments that corresponded to the four lessons that were taught in the week. When a lesson had to be retaught, the homework correlated to the re-teaching.

Because the students were performing in the lowest 10 percent in fourth grade, the homework was also differentiated by the quantity of questions they had to complete. When the students were given the homework worksheet, the number of questions they had to complete was seven. This allowed the students to pick and choose which seven questions out of all the questions on worksheet they wanted to complete. The homework usually consisted of 10 to 20 questions relating to the lesson learned.
Figure 1. Student 11/18/2012 assessment examples of concept and skill error analysis.
Questions on the weekly assessment were of a similar type to those on the homework. For instance, the manner in the way the questions on the assessments were presented and needed to be solved was parallel to the questions on the homework. Therefore, the homework’s analysis was also used to compare to the assessments analysis to ensure validity of the journal prompts. Finally, the homework was also used to address concepts students had difficulties with, in the reflective journal prompts for that week.

**Reflective Journals**

In the middle of the second semester, I established the level of difficulty for journal prompts by creating journal prompts and administering them to students (See Figure 2). Since my classroom had a wide range of performance levels in math, I wanted to create journal prompts that would be viable for all of my students. Furthermore, I wanted to ensure that these prompts would be a low-stakes activity for all my students. In the beginning, I focused on assessing the students’ reflecting skills by asking various types of reflective questions that were concrete and abstract (see Figure 2). I also wanted to incorporate an academic language component. During the practice journaling, I was neglecting one critical element to the action research, and that was correlating the journaling directly to the students’ assessments and homework. Once I included the computing component that directly related to the students’ assessments and homework questions, I was prepared to introduce reflective journaling to my students.

At the beginning of the third trimester, the reflective journals were implemented. After establishing how to focus journal prompts, students were told the purpose of and procedures for journal writing. The students wrote in their journals twice a week during the beginning of the math period. Each day, the beginning of the math
Figure 2. Two early stages of reflective journaling prompts, used to assess students’ ability of completion.
period consisted of fifteen minutes. I kept all journals, and, on days that students wrote, I
distributed them and collected them once the students were finished with the entry. Each
journal prompt correlated with the lessons that were presented throughout the week.

During the days that students wrote in their journals, the journal prompt was
presented on the document camera. Once all students were situated and ready with their
journals, the teacher read the prompt. The students copied the prompt in their journals,
reflected and answered the question in writing. Each prompt consist of three tasks. The
first task was to read a prompt and fill in the blanks using academic language. Each
academic word or phrase was located on the prompt in the designated box. For example,
for journal prompt 3/7/12: the students needed to fill in “Mrs. Tyler uses _____ to
remember ______.” The academic language that was available in the box was down, and

\[
\begin{array}{c}
\text{Down, } \\
\text{Denominator}
\end{array}
\]

\[
\begin{array}{c}
3/7/12 \\
\text{Circle the denominator}
\end{array}
\]

\[
\begin{array}{c}
\frac{4}{11}
\end{array}
\]

\[
\begin{array}{c}
\text{Mrs. Tyler uses } \\
to remember
\text{I remember denominators by}
\end{array}
\]

\[
\begin{array}{c}
\text{by}
\end{array}
\]

Figure 3. Three journal features: academic language (purple), reflection (blue), and computation (green).
component. In the same journal prompt the students were asked to reflect using the following prompt “I remember denominators by…” and they had of write how they remember denominators (see Figure 3). The third task was for students to complete the computations in the box. Again, for the same journal entry, the students were given the fractional number 4/11 and asked circle which number represents the denominator (see Figure 3). Once the students complete all the sections, they raised their hands. Next, I would come around and discuss the prompt with each student and then collect the journal entry.

Teacher Checklist

I visited students as they wrote in their journals, and, for each student, I recorded information on a checklist. The check list was not used as a tool for analysis; it was used as a tool to gather data from the assessment, homework, and reflective journals. The checklist consisted of:

- Date of the prompt.
- The homework worksheet and number of problems correct. The homework correlated with the calculating portion of the prompt.
- If the teacher needed to re-teach the concept of the prompt for the student to begin writing.
- If the student was able to give an example from his or her experience. This correlated with the reflection portion of the prompt.
- The number of academic language/math operation words used in the journal. This correlated to the fill in academic language portion of the prompt.
• The week and the number of questions the student answered correctly on the weekly assessment.

Before the prompts were given, I was able to add some information to the checklist. For instance, sometimes I pre-recorded the homework worksheet and numbers of questions that students answered correctly. While walking around and observing the students, I was able to note if the student needed re-teaching. Once the journals were collected and read, I completed the cells for “example” and “academic language.” Finally, after the assessment was given, I filled in the fields for “week” the assessment was taken and “score” the student received.

Data Analysis Procedures

After establishing my action research data through homework, assessments, reflective student journals, and teacher checklists, I began analyzing my data. I used procedures based on grounded theory to analyze my action research data. Developed by Glaser and Strauss (1967), grounded theory involves the method of discovering a theory through the analysis of various data, analyzed over time. Grounded theory can be used with qualitative or quantitative data. When analyzing my data, I considered qualitative data, (students’ responses in the reflective journaling), and quantitative data (students’ scores on their homework and assessments). The teacher’s checklist was used as a tool to organize all the data for further analysis and coding.

Qualitative Data Analysis

With my students’ reflective journals, I drew conclusions from the academic words and reflections. With each journal prompt, I placed words that were used to answer
the academic words component in the box above the writing portion (See Figure 3). Students needed to place the words in the correct order. For instance, in the journal 3/7/12, academic words the students needed to use were *down* and *denominator* in the following order: “Mrs. Tyler uses *down* to remember *denominator.*” If reversed, even though used, these words would not make sense with the journal prompt. With regards to each prompt, I had to establish if the academic words used were relevant to the present prompt. By using my teacher’s checklist, I was able to note which students were not able to use the correct words and which words they placed instead.

The reflective component was also qualitatively analyzed. After reading each student’s response to this section of the journaling, I was able to see whether the student was able to reflect, and the completeness of the reflection. Using the teacher checklist, I also noted which students were or were not able to complete this section. This data helped me to further understand students’ proficiencies with reflection.

**Quantitative Data Analysis**

Data collected from my students’ homework and assessments were analyzed quantitatively. When analyzing the homework, I looked at the how many questions (out of seven) each student computed correctly. As previously stated, the students’ homework consisted of 10 to 20 questions, and the students were responsible for completing seven questions of their own choosing. Once the homework was graded, I transferred each student’s score out of seven, if applicable to the journal prompt, on to the teacher’s checklist. The scores were also used to see if the action research study impacted the number of questions each student received credit for.
The students’ assessment scores were also analyzed in the same manner as the homework. Once the assessments were graded, I transferred the student’s scores to the teacher’s checklist. The scores were also used, like the homework, to see if the action research study impacted the number of questions each student received credit for.

Conclusion

By collecting data on homework, assessments, and student journals, I found essential information relating to my action research. Through examination based on Glaser and Strauss’s (1967) grounded theory, I was able to code and analyze each set of data to further understand my question: How does the use of reflective journaling impact fourth grade students' performance on weekly math assessments?
CHAPTER IV

RESULTS AND DISCUSSION

For the purpose of answering the question: “How does the use of reflective journaling impact fourth grade students' performance on weekly math assessments,” I implemented reflective journaling with the 11 students in the study. As previously stated, I began creating journal prompts that related to my students’ ability levels during the second trimester, before administering the journals. To further establish validity of this action research thesis, I triangulated the data by also collecting and analyzing data gathered from students’ second and third trimesters’ assessments and homework. I incorporated the findings from the data I gathered from the second trimester assessments and homework to assist in creating the journal prompts, implemented in the third trimester. For instance, when analyzing the second trimester’s assessments and homework, I examined each question to see if students made an entire concept error or a specific skill error. An analysis of the second trimester’s assessments and homework revealed that students were having more concept errors than specific skill errors. This information led me to concentrate on concept errors as the focus area for the next reflective journal. Once the students were writing in their reflective journals in the third trimester, I analyzed the students’ third trimester assessments and homework to see if the journaling had an impact.
Presentation of Findings

Reflective Journaling

Once I was able to establish the degree of completion for the journals by all the students and the focus of the journal prompts, I implemented reflective journaling in the beginning of the third trimester. The reflective journaling consisted of students’ reflection on ten journals prompts that spanned March 7, 2012, to May 3, 2012. As previously stated, the journal prompts had three components that students needed to complete: an academic language component, a reflective component and a computation component. The rationale for the three components are for the students to strengthen their academic language used in the math concepts, to reflect on concepts which could help with retention, and to connect their reflection to the computation of questions that they have seen on their assessments and homework.

Academic Language. Academic language was the first component in the reflective journal. The academic language was a tool in assisting students in reflecting in their journals. All the journal prompts used academic language from the concept discussed. It was established that in order for the students to answer the reflective component of the journal, they needed to understand the language used. Each prompt had a fill-in-the-blank component where students had a list of words that could be used to fill in the blank. For instance, in the journal entry on 3/13/12, students needed to fill in: “We use ________ operation to simplify fractions.” The academic language terms that were available in the box were addition, subtraction, division, multiplication. The answer to filling in the blank was division. The academic language used would then be utilized in the reflective portion. The students could use the term or describe the term. For instance,
in the same journal entry, 3/13/12, students needed to answer the reflective question: “I remember to simply fractions by______.” One student wrote: “I remember to simplify fractions by division,” while another student wrote “I remember to simplify fractions by - you can make it smaller number” (see Figure 4). Both students were also able to correctly complete the computation portion.

Reflection. The second component was students’ reflections in the journals. As previously stated, students could refer to the academic language portion to assist them in answering the reflective portion of the entry. For instance, some students wrote down the academic language term they used to fill in the academic language portion. For students who wrote the academic language term in their reflection, I examined the students’ computation portions of the prompt. If a student was able to correctly answer the computation, then he or she received credit for accurately answering the journal reflection (See Figure 4: first example). However, if a student used the term but was not able to correctly answer the computation correctly, then he or she was not able to successfully answer the journal reflection. For instance, in the journal entry 3/13/12, one student wrote, “I remember to simplify fractions by using division,” but when computing 4/10, he or she wrote .4, and did not receive credit for the journal reflection (see Figure 5).

An analysis of the students’ abilities to answer the reflective journal entries revealed that their accuracy rate with the journal reflections fluctuated throughout the third trimester (see Figure 6).

For the first journal entry, the majority of students were able to demonstrate their understandings through their journal reflections. However, by the second and third entry, students were not able to demonstrate accurate understanding through their
Figure 4. Student Journal Entry 3/13/12. First example of student using the academic term in reflection and the second example of a student using his or her own words to complete the reflection.
Figure 5. Student Journal Entry 3/13/12. Example of student incorrect computation in the box.

reflections. In the middle of the journaling period, students were divided in their abilities to reflect accurately. By the last four journal entries, the majority of students were able to demonstrate accurate understanding through their reflections.

**Computation.** The final component in the reflective journaling entries was computation. To create computation questions for the journals, I examined questions that students completed in their homework that would also be on the weekly assessment. Using like the homework and concepts learned throughout the week was also the procedure mirrors one that was used in an action research study (Kostos & Shin, 2010). In that study, the teacher incorporated journals to enhance her second grade students’
Figure 6. Accurate journal reflections (excluding absences).

communication of mathematical thinking. When creating prompts for the journal entries the teacher incorporated previously learned material for students to address. For the purpose of this study, when examining second trimester homework and assessments, I discovered that the students were having difficulty understanding entire concepts. As I created each journal entry, I correlated the prompt with a specific homework lesson. For example, journal entry 3/15/12 was created because students were having difficulties with mixed numbers. Specifically, they could not distinguish which number was a whole number. In the homework relating to mixed numbers and decimals, a majority of students made errors relating to the whole number in the problem (See Figure 7). I deemed this to be an entire concept error; because for students who had errors, they were either not able to distinguish which number was the whole number, or they excluded the whole number in the equation. For that matter, journal entry 3/15/12 asked students to reflect on how to
Figure 7. Student homework coinciding with journal 3/15/12.
remember which number is the whole number. For the computation portion, the students were given the number \(3 \frac{1}{2}\) and asked to circle the whole number (see Figure 7).

Furthermore, the specific homework scores correlating with the journal prompts were used to assess if those students who received high scores on their homework were also able to include the accurate information in their journal reflections. When comparing the data, for some students there was a correlation between homework and journal reflections, and for some students there was not. For instance, in the beginning of the third trimester one student received full credit for his or her homework assignments but was not able to reflect accurately in the reflective journals. As journaling continued, the scores on the homework and the students’ ability to successfully reflect in their journals began to coincide.

While the homework was used in focusing the reflective journal prompts, the assessments were used to establish a correlation between student performance on journal entries and weekly assessments. As previously stated, each week students would reflect in their journals twice, and the concepts addressed in journal entries corresponded with those tested on the weekly assessment. Therefore, four assessments were associated with the 10 reflective journal entries (see Figure 8). For the first assessment, only one corresponding journal entry was given. For the journal entries of March 28, March 29, and April 12, homework concepts were used in creating the prompts, but no assessments were given for those weeks.

Just as the success rate in the journaling was fluctuating, so were the scores on the assessment. As shown in Figure 8, by the end of the data collection period, the majority of students were answering the journal reflections accurately, and this coincided
with their higher assessments scores as well. By the end of the trimester, the students were scoring higher on their assessments than they did all year.

**Assessments**

**Second Trimester.** Prior to implementing the reflective journals, I collected and analyzed students’ second trimester weekly assessments. The second trimester began on November 7, 2011, and ended on February 29, 2012. Within the trimester, the students completed nine assessments, excluding weeks that students did not have an assessment, which were winter break, review weeks, and end of the trimester testing. The nine assessments were used for the action research analysis, were they were collecting and analyzed to be later compared the data to the third trimester assessments after implementing the reflective journals.

*Figure 8. Average assessment score coinciding with reflective journal prompts.*
Though analysis, the data revealed a shift from students having a majority of errors in specific skills to having a majority of errors on concepts. In the beginning of the second trimester, the assessments included concepts that related to traditional operation algorithms like multiplication, division, addition, subtraction. By the middle of the second trimester the students were learning concepts that expanded on the traditional operation algorithms to more concepts like fractions, area and perimeter, temperature, estimation, and averages.

After analyzing the type of errors (concept or specific skills) the students made, the assessments were used to compare with the scores of the students’ third trimester testing after the implementation of the reflective journals. As previously stated, the second trimester assessments consisted of nine weekly student assessments. At the beginning of trimester, the average student’s score was 4 out of 10 (see Figure 9). As the trimester progressed, the students’ scores fluctuated between 3 and 5 out of 10. Further analysis showed a discrepancy in the average scores on the assessments due to student absences. When excluding student absences, the assessment scores increased, especially by the end of the trimester, where there were more absences (see Figure 9).

Third Trimester. In the third trimester, students were writing in their reflective journals, and their assessments were collected and analyzed for that trimester. The third trimester began on March 1, 2012 and ended on June 7, 2012. Within the trimester the students completed five assessments that were used for analysis. The decrease in number of assessments from the second to the third trimesters can be explained by interruptions in the normal school schedule, including spring break and intersession weeks (no school), review weeks, state testing, trimester testing, and end of the year activities (school
The purpose behind collecting the students’ third trimester assessments was to compare performance on assessments without (second semester) and with (third semester) reflective journals.

The third trimester data revealed that at the beginning of the trimester, the students continued to make more concept errors than skill errors. However, as the trimester progressed, the errors on the assessments shifted; they began making more skill errors than concept errors. This shift, from concept to skill error, could be explained by the entries in the reflective journals. Each journal entry addressed concepts learned during the week that also would be on the assessment.

The assessment scores from third trimester began gradually increasing. At the beginning, the scores were lower than they had been throughout the data collection period (see Figure 10). This was due to the change of our classroom’s regular routine. Prior to
Figure 10. Students’ third trimester average assessments scores.

the assessments, the students had a review week, intersession week off, and then the second trimester testing. All this activity could have influenced the students’ performance when taking the assessment. Once the classroom routines were consistent, the students’ scores began to increase. The second through forth assessment scores ranged from 3 out of 10 to 5 out of 10. During the end of March and all of April, no assessments were given. This was due to having a spring break, review week, and state testing in a short period of time. While students did not have assessments during this period, the students did, however, continue reflecting in their journals. By the fifth assessment, the students’ average score was 6 out of 10 (see Figure 10). Just as they had during the second trimester, student absences affected assessment scores. When excluding the scores of
students who were absent, there was an overall increase in assessment scores when reflective journals were used.

The increase of assessment scores could be due to the subject matter that was incorporated in the reflective journal entries. As previously stated, the students would learn math concepts at stations, while also reviewing the concepts throughout the week. In addition to the reviewing, the students reflected on concepts that would be addressed in the assessments, which provided more exposure to material before the assessment was given. Beyond more exposure to the concepts, each journal entry also included the academic language that was associated with the concepts.

Furthermore, the students were also personalizing the concepts in a way that assisted them in understanding the material. For example, in Figure 4, the students reflected on simplifying fractions, and one student wrote, “I remember to simplify fractions by you can make it smaller number.” When reviewing simplifying fractions, the same student stated that simplifying was when the numbers become smaller. When asked how the numbers become smaller, another student added that the numbers become smaller by dividing. Through this discussion on simplifying fractions, I discovered that the majority of students understood the concept. This understanding was evident on the assessment given on March 16. The assessment had three simplifying fractions questions, and the students who accurately reflected on simplifying in their journals were able to complete these problems correctly. Some students who incorrectly answered the problems incorporated division in the problem but were not able to correctly compute, which meant that they were making a skill error.
When compared to the second trimester, the third trimesters’ scores had a wider range. The second trimester average scores ranged from almost 3 out of 10 to 6 out of 10 (excluding absences). The average scores for the third trimester ranged from 1 out of 10 to 7.5 out of 10 (excluding absences) (see Figure 11). While the third trimester had the highest average score of both trimesters, it also had the lowest score. The highest average assessment score correlated to the reflective journaling. By the end of the trimester, the majority of students were able to accurately reflect in their journals. Therefore, most of the students understood the concepts that would be on the assessment. The lowest average assessment score was due to students coming back from intersession. By having a week off, the students were still getting back into the normal routine; in addition, the students were not engaged in reflective journaling.

Figure 11. Students’ second and third trimester average assessment scores.
Homework

Second Trimester. Along with collecting and analyzing the second trimesters’ assessments, I also collected students’ second trimesters’ homework. The time period for data collection was November 7, 2011 to February 29, 2012. After collecting the data, I analyzed 10 weeks of homework, excluding weeks that student were on winter break, review weeks, and the week of trimester testing. The purpose of collecting and analyzing the homework was the homework’s questions were directly related to the assessments. As previously stated, assessments and homework presented similar mathematical problems. Analysis of the homework was similar to analysis of the assessment. When analyzing the homework data, I examined the homework to see if the students made errors that were related to entire concepts or specific skills. The analysis of homework was also used in establishing the focus of the reflective journals for the third trimester.

When analyzing the data, students’ second trimester homework errors followed a similar pattern of errors to those made on their second trimester assessments. The majority of students began the trimester making specific skill errors, and by the middle of the trimester, the students had shifted to making more concept errors than specific skill errors. In an analysis of the homework, I found the same factors that explained the shift in the second trimester assessments that affected the homework. The concepts that students were learning had moved away from concepts that related to traditional operation algorithms like multiplication, division, addition, subtraction to concepts that expanded on the traditional operation algorithms to more complex concepts like fractions, area and perimeter, temperature, estimation, and averages. This
information was then used in focusing the third trimester’s reflective journaling on more concept errors than specific skill.

**Third Trimester.** In the third trimester student homework was also collected and analyzed. As previously stated, the third trimester began on March 1, 2012 and ended on June 7, 2012. Within the trimester, the homework data collection began on March 1, 2012 and ended on May 4, 2012. The rationale behind collecting the students’ third trimester homework was similar to the analysis of the homework during the second trimester. I analyzed the types of errors (concept or specific skills) the students were making in their homework, and used that data in creating the prompts for the reflective journals.

Again, to ensure a consist manner of analysis, I analyzed the students’ errors for their third trimester homework to see if they made entire concept errors or specific skills errors, just as I analyzed the homework from the second trimester. At the beginning of the trimester, the trend continued, with students having greater concept errors than specific skill errors, as they had at the end of the second trimester. However, as the reflective journal entries addressed concepts students were learning in the week and completing on their homework, the errors shifted from concept to specific skills, just as it did in the assessment. Again, this shift in errors from concepts to skills could be related to the fact that the reflective journal entries focused on concepts rather than skills. For example, in the journal entry of 3/15/12, students reflected about whole numbers. This entry was created after analyzing students’ errors on their homework relating to whole numbers. Specifically, students had difficulty distinguishing which number in the mixed number was the whole number (see Figure 7). After students reflected on the concept of
whole numbers, I gave the homework assignment again as a reteach, and for the student that had the concept errors in figure seven, not only was she able to accurately reflect in the journal entry but was also received a 7 out of 7 on her homework (see Figure 12). In Figure 12 the student did not have any errors, but for students that did have errors, more were skill errors rather than concept errors.

Discussion of Findings

For this study, I intended to examine the question “How does the use of reflective journaling impact fourth grade students' performance on weekly math assessments?” As previously stated, this question was developed as an inquiry to address my concern about the students’ inability to make the math material more meaningful and to fully understand the math concepts, which produced low assessment scores. From this central question, an additional question was discovered, “How does reflective writing impact students’ understanding of academic language?” Again, this question became apparent when developing the journal prompts for the reflective journals.

To address my primary question, “How does the use of reflective journaling impact fourth grade students' performance on weekly math assessments,” I gathered my data through triangulation of assessments, homework assignment scores, and reflective journaling for two trimesters. In the second trimester, I collected and analyzed data from the students’ assessments and homework. In the third trimester, I implemented the reflective journals with my students, and the data analysis consisted of the students’ third trimester assessments, homework, and reflective journals. After analyzing the data from
Figure 12. Student example of accurate reflecting in journal and correlating homework score.
both trimesters, I found that the reflective journal did have a positive impact on the students’ performance on the weekly assessment.

As previously stated, before implementing the reflective journaling, I gathered data from the students’ second trimester assessments and homework. When analyzing the data I examined if the students were making entire concept errors and/or specific skill errors. I also averaged students’ scores on their assessments and homework. At the beginning of the second trimester the students were making specific skills errors but midway through the trimester, the errors consisted entirely of concept errors. This shift of errors was also found in the students’ second trimester homework. When comparing both data sources, both shifted the same week. Through analysis, it was discovered that the concepts shifted from traditional operations such as multiplication and division to more complex concepts such as estimation and simplifying. Furthermore, understanding the types of errors the students were making assisted me later when creating the journal prompts for third trimester.

I implemented reflective journaling with my students in the third trimester. As previously stated, it was discovered from the second trimester assessments and homework errors that the students shifted from making specific skill errors to concept errors entirely. The trend continued into the third trimester. By understanding the types of errors my students were making, I focused my reflective journal questions to address concept errors. In the beginning the students fluctuated in their success rate in the accuracy of their descriptions of concepts in the journal reflection. As the trimester progressed, students were having a higher success rate in their descriptions of the math concepts. This correlated with having higher scores on the assessments as well. Once the
trimester began, the students’ assessments scores were low, but as the trimester progressed the scores began to increase. By the end of the data collection period, the average assessment scores were the highest it was all year (excluding absences). During the second trimester, the highest average score on the assessments was 6.2 out of 10 (excluding absence). During the third trimester, as students reflected in journals, the highest average score was 7.4 out of 10 (excluding absence).

These findings are supported by the findings from other studies that used journals to increase performance in math. As previously stated, Baxter et al. (2005) conducted a study to address communication for low-achieving students. In their study they had students’ journal about class discussions relating to mathematics. While this study was used in addressing communication, the students in the study also increased their mathematical skills. In the study, some of the journal entries required the students solved math problems. As the study progressed, students who declared that they did not know how to solve were increasingly able to solve math problems as well as describe the steps involved. By the end of the study, “the students were able to explain their mathematical reasoning, revealed their conceptual understanding, ability to explain, and skill at representing a problem” (Baxter et al., 2005, p. 119). This was similar to my finding in that by the end of my study the students also increased their skills in explaining their mathematical reason, which was demonstrated in the reflective journals and also increased their capability in correctly solving problems in the assessments.

Through the reflective journaling, I was able to address my additional question, “How does reflective writing impact students understanding of academic language?” I discovered this question when I was creating my journal prompts in the
second trimester. As previously stated, the students shifted their errors from specific skills to entire concepts. When discovering this, I associated the errors with the possibility of a lack of understanding of the academic language. For instance, students had many errors on the assessments and homework that included simplifying fractions. The students were not able to simplify the fractions accurately. After discussing simplifying fractions with my students, I realized they were not able to articulate the meaning or give an accurate example of simplifying. From this discussion, I included academic language as a component in my journal prompts.

Once the reflective journals were implemented in the third trimester, students were being exposed and used more academic language that was associated with the concepts in the journal entries. On average, students would use two to four academic words in their response to each journal prompt. By the end of the data collection period, students were able to articulate concepts and give examples using academic language in their conversations.

These findings are similar to those in a study by Kostos and Shin (2010), who investigated journals as a tool in enhancing second grade students’ communication of mathematical thinking. Kostos and Shin found that the use of journaling improved students’ mathematical thinking which was measured by their pre-test to their post-test. The students were also able to improve their academic language. As the students explained concepts verbally they would use the academic language that they wrote in their journals. This finding is similar to my study in that by the end of the study my students were able to explain concepts using more academic language in discussion during lessons and reviews.
Conclusion

Through triangulation of assessments, homework, and reflective journaling, I was able to address the question of “How does the use of reflective journaling impact fourth grade students’ performance on weekly math assessments?” By the end of the study, it was evident that reflective journaling impacted my students’ performance on their weekly math assessments by increasing scores. The reflective journaling was also able to increase my students’ use of academic language.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This action research study examined the question “How does the use of reflective journaling impact fourth grade students’ performance on weekly math assessments?” From this central question, an additional question was discovered, “How does reflective writing impact students understanding of academic language?”

The primary question was developed as an inquiry through action research to address my concern about the students’ inability to make the math material more meaningful, which produced low assessment scores. At my school site, I worked in a learning center model with the lowest achieving 10% of the fourth grade students. While the students were interactive during the lessons throughout the week, they were performing poorly on the weekly assessments. After a particular lesson, one of my students asked why he needed to know the materials presented. I considered the question and realized that a possible reason my students were not performing well on their weekly assessments was that they were not able to relate to the material in a way that was meaningful and relevant to them.

This finding led me to explore the research on the use of reflective writing in math. According to Kostos and Shin (2010) reflective writing can be a tool that enhances
students’ ability to communicate and learn concepts in mathematics. When students reflect using journals, they articulate the concepts they learn in the math lesson. With regards to complex or difficult concepts, journals are especially useful instead of students trying to retain all the information on their own (Burns & Silbey, 2001). For low-achieving students, as they reflect in the journals, they provide an insight into their comprehension, their fallacies, and their opinion about the material they are learning. Reflective journals also help students identify difficulties that they might not have otherwise realized (Borasi & Rose, 1989). When students write their journal entries they can re-read their words and see areas that they misinterpreted. For teachers, students’ reflections in journals provide information that otherwise would be undiscovered (Borasi & Rose, 1989). Through journaling, teachers can learn students’ knowledge and misinterpretation on concepts that would otherwise not be revealed through oral communication.

Math journaling not only assists students with expressing their thinking to their teachers in a more coherent and thoughtful manner, but the journals can also be utilized as a tool to help assess student learning (Burns, 2004). Journals provide teachers with an opportunity to see if their students understand the material, by how they articulate and explain it in the entries (Kostos & Shin, 2010). Borasi and Rose (1989) further discuss that journals allow teachers to realize the specific difficulties and needs of each individual student and if the problems are “cognitive or affective in nature” (p. 358). Furthermore, math journals assist teachers in assessing students’ comprehension on concepts on an ongoing basis. By having multiple journal entries, teachers can see what the students have more difficulties with and if the instruction needs to be altered.
Moreover, the journals entries can provide information in seeing if the change in instruction made any significant impact on the students learning before the test.

From the research, I implemented reflective journaling in my classroom with 11 participants. To begin my data collection, I triangulated the data by collecting assessments, homework, and reflective journaling in the second and third trimester. I began by examining my students’ second trimester assessment scores to find any specific clues that would guide me in making my journal prompts. I wanted to know if my students had issues with entire concepts or specific skills taught throughout the week. By understanding my students’ difficulties, I was able to focus the journal prompts on specific concepts or lessons that I would implement in third trimester. Next, I looked back at the homework to see if the students made the same types of errors on their homework as they did on the assessment. Students worked on the homework after the math period, so they would need to rely more on what they learned from the lesson.

In the third trimester the reflective journals were implemented, and the data collection consisted of the students’ reflective journals, assessments, and homework. The students wrote in their journals twice a week. Just as the in the analysis of the second trimester assessment and homework, the third trimesters’ assessments and homework were analyzed to establish if the students were making concept errors or specific skill errors. The data collected from the students’ average scores from the second trimesters’ assessments.
Conclusions

After analyzing the data, the results to the question, “How does the use of reflective journaling impact fourth grade students’ performance on weekly math assessments,” was addressed. Analysis from both trimesters revealed that the reflective journal did have a positive impact on the students’ performance on the weekly assessment.

After analyzing the data from the second trimester, it was evident that the students were making specific skills errors, but midway through the trimester, the errors consisted entirely of concept errors. This shift in errors was also found in the students’ second trimester homework. Through analysis, the results indicated that the concepts shifted from traditional operations to more complex concepts.

Once in the third trimester, reflective journals focused on addressing concept errors that type of errors continued to be the majority of errors that students had in their assessments and homework. In the beginning, the students fluctuated in the success rates in demonstrating their understanding of the concepts in their journal reflections. As the trimester progressed, students were having a higher success rate. This correlated with having higher scores on the assessments scores and homework scores. By the end of the data collection period, the average assessment scores were the highest of the year (excluding absences). During the second trimester, the highest average score on the assessments was 6.2 out of 10 (excluding absences). During the third trimester, as students reflected in journals, the highest average score was 7.4 out of 10 (excluding absences).
After analyzing the second trimesters’ assessments and homework errors, I discovered an additional question, “How does reflective writing impact students understanding of academic language?” I discovered this question when I was creating my journal prompts in the second trimester. As previously stated, the analysis of the students’ second trimester assessments and homework consisted of coding students’ responses for their concepts and specific skill errors. When examining the concept errors, I discovered that the misinterpretation of the error could be from lack of undertaking the academic language involved. From the analysis, I included academic language as a component in my journal prompts. By the end of the data collection period, students were able to articulate concepts and give examples using academic language in their conversations.

Through the triangulation of the data from the assessments, homework, and reflective journaling, I was able to address the primary question, “How does the use of reflective journaling impact fourth grade students’ performance on weekly math assessments?” By the end of the study, it was discovered that reflective journaling impacted my students’ performance on their weekly math assessments by increasing scores. The reflective journaling also was able to increase my students’ use of academic language. Furthermore, the findings also coincided with findings from studies conducted by Baxter et al (2005) and Kostos and Shin (2010), who also found a positive outcome by incorporated journaling with mathematics.

Recommendations

While the present action research study revealed a positive outcome of the use of reflective journaling to impact fourth grade students’ performance on weekly math
assessments, the study had limitations and weaknesses. There were three primary limitations to the study. The first limitation of this study was the sample size from which the data was collected. As previously stated, the research took place within one fourth grade classroom during the mathematical period, which consists of seventy five minutes. The number of students that participated in the study consisted of was 11. The low number of students equated to the reclassification of students after each trimester’s assessment. After each trimester’s assessment, students were reclassified by their performance on the assessment and their abilities in class. Depending on their progress, a student during my math class could be moved to another math class and another student could be moved into my classroom. The 11 students in the study remained in my math class for the entire study.

The next limitation of this study was the time frame for data collection. The time in which the data was collected was from the beginning of the second trimester to the ending of the third trimester. Each trimester was three months. The justification for the short amount of time for data collection was that the students had the possibility to be reclassified to a different classroom for the math period after every trimester’s testing, meaning data collection on those students would be lost.

The final limitation of the study was the decrease in assessments in the third trimester. The decrease of assessments from the second trimester to the third trimester was due to weeks that students did not have assessments, spring break and intersession weeks (no school for one week), review weeks, state testing, trimester testing, and end of the year activities (school Olympics and parties).
There were two weaknesses in the study as well. The first weakness in the study was the student absences. As the data collection progressed, students were more frequently absent throughout the week. In the second trimester, one or two students were absent throughout the trimester, which had an affected their assessment and homework scores. By the third trimester, several students were absent throughout the trimester. Some students were absent multiple days during a week. This affected not only their assessments and homework scores but also the journaling itself. By the middle of the trimester, I created prompts that I would give once a week that asked students to reflect on one item they learned that week.

The second weakness of the study was the homework turn-in rate. Throughout both trimesters, some students had trouble completing and turning in their homework. My mentor teacher and I tried numerous methods to increase the homework submission rate, including creating a rewards system and having students complete homework in class. These methods impacted an increase in homework turn in rate for some students; however, with the absent rate also increasing during the data collection period, the homework rate did not increase overall.

The study presented involved one classroom that was classified as a learning center. In the classroom students performed in the lowest 10% in math. The recommendation for further research is to include multiple classrooms with different ability levels. The rational for the recommendation is to see if there is an impact when administering reflective journaling to different ability levels. Since this study involved the students performing in the lowest 10%, a further research can compare to the data from this population to a population that performs at a higher ability level. By having
multiple classrooms in the study can also reveal if the teacher’s teaching style and the curriculum he or she uses further that impact.
REFERENCES
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APPENDIX A