Using Student Self-Reflections to Improve Student Study Habits

in the Mathematics Classroom

A Capstone Project
Submitted in Partial Fulfillment
of the Requirements for the Degree
of Master of Arts in Teaching: Mathematics

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Abstract

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Acknowledgements

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Chapter One

Introduction

I am in my fourth year of teaching mathematics in a mid-sized urban Midwestern town. During my four years, I have worked with a wide range of student abilities from struggling high school mathematics students to gifted and talented middle school mathematics students. Every group of students I taught included students who were not motivated to study and prepare for class. Last year, I introduced a student self-reflection guide after each test to help my students understand how prepared they were for the test. I received positive feedback from my students. After seeing the positive feedback, I want to determine whether adding pre-assessment reflections, along with the student post-assessment reflections, improves student preparation for a mathematics assessment through an increased awareness of their study habits and knowledge of mathematics.

Motivation for the Project

I started doing the post-assessment reflections with my students last year and had a great response from them. I heard many positive comments between students, which were not directed toward me. Other comments from students came after class. Students told me how much they liked reflecting on what they got wrong on an assessment and became aware of reoccurring problems.
Some of the best feedback, however, came from parents during conferences when I showed them their students’ reflections on how they prepared and thought they did on the assessment. The parents were overwhelmingly appreciative of seeing this information. Many parents commented that as their child grows, it is harder for them to get information from their child about concepts with which they struggle and need help. Their child’s reflections allowed the parents the opportunity to finally understand their child’s perceived strengths and weaknesses.

Hearing the positive feedback gave me the idea to build from the post-assessment reflections from last year and help my students reflect on their study habits all chapter long to better prepare for an assessment. I want to encourage my students to reflect on the math with which they struggle, and in turn, I hope these reflections will help show them how to prepare for a mathematics exam. Hopefully these skills can then be translated into other subject areas.

**Background on the Problem**

I choose to pursue the topic of student self-reflection to help my students grow and reflect on of their study habits. While working with students of different mathematical abilities and ages, I have realized that many students are not sure how much or what to study when they prepare for a mathematics assessment. In addition, these students do not understand the impact studying can have on their academic growth.
Most of my students, when they are not able to solve a problem, just move on to the next one with no regard as to why they were unable to solve the previous problem. They rarely take the time to think about why they could not solve the problem; I wonder, did they not understand the vocabulary; did they not know the formula needed to set up and solve; or did they not understand what they were being asked to solve? Can self-reflection enhance students’ abilities to identify inadequate knowledge of and understanding in mathematics, prompting them to seek appropriate assistance in their learning of mathematics?

I believe understanding and improving students’ study habits could allow them to grow and prepare for a successful post-secondary education. If this need is not addressed, the students could face a difficult, challenging, and in some cases, unsuccessful higher education. I hope student reflections will help my students to understand the benefits of studying and preparing for an exam and will motivate them to continue self-reflection and adapt it in other content areas to improve their study habits.

**Statement of the Problem**

Many students lack motivation or understanding of how to take control of their studying, which can result in lower achievement. I am concerned about these students’ study skills as related to their ability to successfully handle higher level courses and post-secondary education. I know that studying for a mathematics
assessment is different than preparation in other content areas and, and I believe that students do not know how to successfully study for mathematics.

**Statement of Purpose**

I want to determine whether adding student pre-assessment reflections, along with student post-assessment reflections, will improve student preparation for a mathematics assessment through an increased awareness of their study habits and knowledge of mathematics. I plan to use self-reflection with my students as a way to increase student awareness of how and what to study when they prepare for a mathematical assessment. I will use a series of short student reflection sheets to do this. Prior to assessments, I plan to have my students fill out homework reflection sheets. These reflections will encourage students to examine why they struggle with particular questions and concepts and what and how they should study for upcoming assessments.

After each assessment, the students will complete another reflection. This post-assessment reflection will have the students examine the questions they got wrong and reflect on what they believe their strengths and weaknesses are for the concepts studied.

**Research Questions**

Will student self-reflection increase and improve students’ study skills in preparation for a mathematics course? Scott G. Paris and Linda R. Ayres (1994) noted while observing a teacher’s class working with reflections that “when
children attend consciously to these characteristics, they are more likely to follow them” (p.77). Will this continuous reflection and awareness of their strengths and weaknesses help my students to be more responsive to what they need to study? I hope to help my students take control of their studying and reflect and grow to become effective and efficient studiers.

**Summary**

The focus of my research paper is to determine whether implementing pre- and post-assessment student self-reflections will improve student preparation for a mathematics assessment through an increased awareness of their study habits and knowledge of mathematics. I will implement pre-assessment reflections that focus on what concepts a student has struggled with as a way to increase student awareness on the topics that need extra practice. I will then implement post-assessment reflections to help the student understand their mistakes. In the next chapter I discuss research findings regarding student reflection and study skills, as well as the needs of the teacher and students for effective self-reflections.
Chapter Two

Review of Literature

Every year teachers receive a new set of students, each with varying levels of study habits and skills. As a mathematics teacher I want to determine whether student self-reflections, both before and after a formal assessment, improve student preparation for a mathematics assessment through an increased awareness of their study habits and knowledge of mathematics. In this chapter, I describe the current research with regard to students’ abilities to manage their study skills. I summarize the needs of both the student and the teacher when developing appropriate study skills. Finally, I present the benefits of teaching self-regulatory skills to students.

Current Research

Transitioning from an elementary school to a secondary school is a common topic of study in the educational system. Zimmerman and Cleary (2006) noted that students must transition from having one teacher watch over their educational progress and growth, to having a number of different teachers and classmates. They went on to point out that research illustrates students are often left on their own to manage their progress and request help when necessary, all while trying to handle more difficult content (Zimmerman & Cleary). Schunk and Meece (2005) found similar research noting that “self-perceptions of competence
begin to decline in Grade 7 or earlier” (p. 77) and are more evident in mathematics.

This ability to self-regulate and assess one’s own study habits and learning can have a huge impact on the student’s psyche. The lack of ability to self-regulate can cause grades to drop, which in turn can cause a huge loss in self-efficacy (Zimmerman & Cleary, 2006). Paris and Ayres (1994) made the important distinction that not all students have the natural ability to regulate and manage their studying. They noted that many students need help developing these skills. Without help, teenagers often end up unsuccessful at “employ[ing] task-specific strategies such as preparing for tests” (Zimmerman & Cleary, p. 47).

Prompted by these findings to conduct a research study, Zimmerman and Cleary (2006) found that middle and high school students’ self-efficacy was affected by how well they managed their studies, which included the ability of “setting optimal goals, implementing effective strategies, self-monitoring accurately, self-evaluating using appropriate criteria, and attributing causation to adaptable process” (p. 65). Their research study concluded with positive information; these skills are teachable, and if taught, “adolescents are significantly empowered to make this vital developmental transition” (p. 65). Masui and De Corte (2005) also found similar research results noting that study skills and meta-cognitive information, that is, understanding one’s own knowledge, are teachable.
A student’s ability to self-assess also plays an important role in developing these needed study skills. Paris and Ayres (1994) noted, research confirms that self-assessment increases students’ desire to monitor their learning and study habits. Studies suggest that because of their improved study habits, students’ ability in specific content areas will increase, which in turn improves the quality of goals students will set and allows for individual growth to be tracked (Zimmerman & Cleary, 2006).

With almost every practice in education, there are people who disagree with it. Marzano and Kendall (1998) noted that “some parents, and even some educators, question the validity of student self-assessment assuming that students will always provide inflated assessments of their own understanding and skill” (p. 42). Although this might be a valid question to explore, Marzano and Kendall disagreed with the statement and determined that “those who have made extensive use of student self-assessment do not support these fears” (p. 42). They noted research studies that concluded students “demonstrated a ‘clear-headed capacity’ to evaluate their own work” (p. 43) and others noted that parents felt their student’s self-assessment was a more accurate detail of their ability than their teacher would say (p. 43).

**Research on the Needs of Students**

Students are the backbone of the school system and thus, teachers, principals, and other school stakeholders must pay close attention to student
needs. This section reviews the research concerning students’ needs with regard to self-reflection and responsibility.

Stiggins (1998) stated that in most classrooms, grades are the only motivation for students. He went on to state that many students have no personal motivation for achieving high marks and therefore lose interest in content that they feel has no place in their personal lives. He stressed the importance for students “to take responsibility for their own academic success” (p. 14) which can help to promote motivation that might be lacking. Paris and Ayres (1994) agreed with this idea and emphasized that to succeed, students must “be active participants in assessment of their own learning rather than passive respondents to a series of tests” (p. 7).

To be successful in school, students need to be shown effective self-regulatory study skills (Schunk & Meece, 2005; Zimmerman & Cleary, 2006). Suskie (2004) stated that these study skills help to guide students toward achieving any goals that were set and teaches them the benefit of monitoring the progress of these goals. Black and Wiliam (2010) had similar advice for educators. They determined that learning these skills help students to “understand the main purposes of their learning and thereby grasp what they need to do to achieve” (p. 85).

Schunk and Meece (2005) stated that students need “learning environments that are intellectually challenging and supportive of individual
progress and mastery” (p. 89). Self-reflection is one method to promote the awareness of student progress in different topics. Suskie (2004) stated that having students complete before-and-after reflections provides students the opportunity to understand and appreciate their own “growth and development” (p. 173) in a wide range of topics.

**Research on the Needs of Teachers**

Teachers’ daily contact with their students is an important reason for teachers to take a vital role helping to monitor and encourage their students’ self-reflections. This section summarizes the research regarding a classroom and the teacher’s role in the student self-reflection process.

Zimmerman and Cleary (2006) stated that, although the primary goals of high schools are to ensure the students are learning the standards-based skills of each state, they believe that a “long-term goal of secondary education should involve empowering students to become independent, self-regulated learners” (p. 56). They went on to state that these skills, if successfully learned in high school, play a powerful role for those students when they enter a post-secondary school or the workforce.

Focused specifically in a mathematics classroom, Ramdass and Zimmerman (2008) stated that teachers play a vital role in showing students how these skills and self-efficacy connect to their abilities in mathematics. After completing a study with 21 fifth and 21 sixth grade students, they found that
“accurate self-reflection is important to students’ success in math” and that teachers help by providing “frequent opportunities to evaluate what they have learned or where they erred after completing a task” (Ramdass & Zimmerman, p. 19).

Schunk and Meece (2005) agreed; classrooms that focus on self-improvement are beneficial to students and help to maintain or improve individual self-efficacy. They stress to teachers that studies have shown that teenagers “need classroom environments that help them set goals for their learning, support their goal progress, and focus on improvement and mastery” (Schunk & Meece, p. 82).

Masui and De Corte (2005) stated that beneficial self-reflection can be broad or specific. In other words, teachers can have their students reflect on a whole unit or focus on how they did completing just one problem. They stressed the importance of teachers needing to spend time on the reflections they give their students, and students being able to interpret and understand what is being asked of them in order to give the most honest answers and get the most out of their self-reflections.

Ramdaas and Zimmerman’s (2008) study with 21 fifth and 21 sixth grade students suggested the need for teachers to supervise their students’ reflections. One way to easily monitor reflections is to have students set specific goals, which
Zimmerman and Cleary (2006) stated made it easy for teachers to check progress and observe growth being made.

Although these tasks can be accomplished with teacher and student investment, Schunk and Meece (2005) cautioned that a “challenge for educators is to facilitate optimism in students while ensuring that they have the skills to be successful” (p. 76).

**Benefits of Student Self-Reflection**

Self-reflection has been studied extensively over the years, and many benefits are being linked to this relatively simple exercise. This section reviews the current research with regard to the benefits to student self-reflection and monitoring.

Several studies have found that one of the best benefits from self-reflection relates to the way it encourages meta-cognition, that is the skill of learning how to learn (Masui & De Corte, 2005; Paris & Ayres, 1994; Suskie, 2004). Masui and De Corte found that research confirms that students gain powerful insight from “finding out which strategies, learning aids, allocation of time, and effort made a contribution to the learning outcomes” (p. 352).

Zimmerman and Cleary (2006) found similar results stating that self-reflection is important because “it helps learners discriminate between effective and ineffective performances and helps to isolate the source of error or confusion when one is performing poorly” (p. 60). They also state that students “can
increase their confidence levels to perform specific tasks in school” (p. 63) by being trained in self-regulating skills. With similar results, Schunk and Meece (2005) elegantly stated that those students “who feel self-efficacious about learning or performing a task competently are apt to participate more readily, work harder, persist longer when they encounter difficulties, and achieve at higher levels” (p. 73).

Paris and Ayres (1994) cautioned that self-regulation must be a continuing process. They worked with a classroom teacher who believed that “when children attend consciously to these characteristics, they are more likely to follow them” (p. 77). Stiggins (1998) agreed that students must be actively involved and become “partners in monitoring their own level of achievement” (p. 13). The National Council of Teachers of Mathematics (2005) had similar advice to teachers while updating their well known Principles and Standards for School Mathematics. They stated that “students learn more and learn better when they can take control of their learning by defining their goals and monitoring their progress” (p. 21).

**Summary**

The research indicates that self-regulating skills are an important, yet not always naturally occurring, skill that helps students transition to monitoring and being responsible for their learning. These skills, if taught, monitored and nurtured regularly, increase student persistence and help them achieve individual
goals. They also aid in students’ own abilities to monitor their learning as they transition from an elementary setting to adolescent and adult activities.

Although these skills are shown to be beneficial, students and teachers need to take an active role in the growth of students’ abilities. Self-reflection and student monitoring skills quickly diminish if not successfully monitored and encouraged by both the students and their teacher(s).
Chapter Three

Research Design and Method

This study will determine whether pre- and post-assessment student self-reflections improve student preparation for a mathematics assessment through an increased awareness of their study habits and knowledge of mathematics. During this study, geometry students will be asked to complete a series of self-reflection sheets that will help them determine the concepts with which they struggle and should therefore focus their practice while preparing for an upcoming assessment. After completing an assessment, they will then be asked to reflect on whether the reflections have helped them more effectively focus their mathematical studies.

Setting

This study will focus on four sections of high school geometry students that include 99 students. The students vary in grade levels from sophomore to senior, with the vast majority being sophomores. The school is located in a mid-sized urban Midwestern town with 1,545 students enrolled in 10th through 12th grades.

Circumstances that will affect the study include student attendance and meaningful participation. Student attendance for the study is important so students receive the reflection handouts in a timely manner to be able to prepare for upcoming assessments. Their participation is also vital to be sure the students are
honest with themselves and the areas they feel should be the focus of their attention while preparing for an assessment.

**Intervention/Innovation**

I think math students are used to receiving a review before an assessment that includes problems similar to those that have been covered in class and similar to those on the upcoming assessment. I often think these reviews are overwhelming to students, and as a result, students are unaware of where to focus their attention while preparing for the assessment. The series of self-reflections that I plan to give will help them to learn where to focus their attention.

Throughout the units, my students will be required to complete a simple homework reflection sheet. These sheets will include one question that asks students to reflect on which question they struggled the most and what made the question so difficult (e.g., they did not understand what they were being asked to find; they did not know the formula required to solve the problem). The students will keep this sheet to remind them of the types of problems with which they struggled while completing the homework.

When the class begins preparing for a unit assessment, students will be given a second reflection sheet that will allow them to go through a list of standards that they will be required to complete on the assessment. Research done by Stiggins and Chappuis (2005) stressed the importance of students receiving a copy of the learning standards because “student success hinges on the clarity of
Chappuis (2005) also noted the importance of providing students “clear and understandable” lists of the content expectations “in language your students understand” (p. 40). For this reason, the standards will be written in student friendly “I can” statements. The reflection sheet will include a checklist of topics. Students will indicate their level of comfort with each topic, whether they need to review the topic, or whether they need a lot of help to become proficient with the concept.

The final reflection sheet will come after an assessment while students review their work. The students will be asked to reflect on each question they got wrong and compare it to their pre-assessment reflections. They will reflect on whether they used the pre-assessment reflections to focus their studying on particular concepts and if they think this helped them prepare for the exam.

**Design**

This action research project on student self-reflections will be a qualitative method approach. The results will not be generalizable to other classes and only used to inform my teaching and my students’ learning. A journal will be kept to document changes in student questions in preparation for upcoming mathematics assessments. A student pre- and post-survey will be given to determine the students’ opinions of their ability to prepare for a mathematic assessment. I will use the results to learn more about how students prepare for a mathematics
assessment and the benefits of reflecting on their prior work while preparing for a mathematics assessment.

**Description of Methods**

All participants will be informed of the study and a letter preapproved by the Institution Review Board will be sent home to the participant’s parents/guardians asking permission for their student to take part in the study (see Appendix A). The student participants will also sign a student assent letter, similar to that of which the parents/guardians will sign (see Appendix B). Written consent will also be requested from school officials to allow the study to take place in my classroom. This consent form can be found in Appendix C. All participants and information about them will remain anonymous.

Once all consent letters have been collected, students will take a pre-study survey (see Appendix D) to get an understanding of their study habits and practice regarding how to prepare for a mathematics assessment. This survey will ask students to rate each statement on a strongly agree to strongly disagree continuum, similar to a four point Likert scale. The questions used come from or have been adapted from “Math Study Skills Inventory” survey by Dr. Carolyn Hopper (2001). Along with those questions the students will respond to two open-response questions that ask students about their study habits. The students will then begin their first unit of study for the quarter.
Throughout the unit, as students complete their homework they will be required to keep a reflection journal (see Appendix E). A short reflection will be filled out for each homework assignment. This reflection will have students reflect on their hardest homework problem and why they think it was hard (e.g., they did not know the formula required; they did not understand the instructions; they did not know the vocabulary).

These reflections will continue throughout the chapter. Three days before an assessment, students will be given a pre-assessment reflection guide (see Appendix F). In student friendly “I can” statements, this guide will describe the concepts students must know on the upcoming assessment. This reflection will be set up to allow students to focus on concepts they think they need the most practice. I will encourage students to use this self-reflection, along with their homework reflections that describe topics or concepts on which they struggled throughout the chapter, to guide their studying for the next few days.

The day after the assessment is given, students will be required to reflect on their test results, specifically on the questions they got wrong. A post-assessment reflection guide (see Appendix G) will be given to each student. This reflection will be aligned with the assessment of the topic or concept each question addresses. While students look over the test, they will use the reflection sheet as a guide to reflect on why they think they missed the question. The post-assessment reflection will also have some open ended questions that will require
the students to reflect on their strengths and weaknesses in the chapter, to set a goal for the completion of the quarter, and to note their opinions regarding the pre-assessment reflection and the role it played in preparation for the assessment.

After going through each question, students will then have the chance to reflect on their achievement and effort throughout the unit. The goal of this part of the reflection is for the students to truthfully assess how well they think they prepared for the assessment.

This process will be completed for two additional chapters that we will cover during the third quarter. The homework reflection journals will not change from one chapter to the next, but the pre- and post-assessment reflections will be updated for the new topics/concepts that will be addressed in the new chapters.

In addition to the steps above, I will be keeping a journal throughout the study. This journal will help to monitor any changes in attitudes or habits that I notice with students. I will also keep students’ comments that are made regarding the reflections.

At the completion of the study, I will interpret the surveys, reflections, and journals to help determine any conclusions that can be made.

**Expected Results**

My expectation is that my students will gain a better understanding of how to prepare for a mathematics assessment through the use of the self-reflections. I
expect that the students will be better prepared for an assessment with the self-reflections acting as a guide to help determine what they should focus on.

Timeline for the Study

The research study will focus on an eight-week period of time during the third quarter of the academic school year, from the middle of January through the middle of March. There will be three units of study covered during this time in which students will be required to complete a formal assessment after each unit.

Summary

The action research study discussed in this chapter will be completed with my geometry students. This study involves students using a series of self-reflections to help prepare for upcoming mathematics assessments. I will use student reflections, student survey results, and my personal journal to analyze the use of student self-reflections as a guide to help students prepare for assessments. The results of my study will be discussed in the next chapter.
Chapter Four

Data Analysis and Interpretation of Results

Use an introductory paragraph to remind the reader of your purpose and to give them a brief description of what is included in this chapter.

Data Analysis

Address each data collection method separately (e.g., chapter test, survey, interview, etc.). Be sure to do the following:

- Describe how you analyzed the data.
- Display numerical or statistical results in tables or figures.
- Summarize the results of surveys or other instruments.
- Theme and summarize narrative data, including representative quotes when appropriate.

Interpretation of Results

Revisit each research question and present the data that answer that question. Include the following:

- Did you successfully answer your question?
- Did you get the results you expected.
- Discuss significance and rigor (i.e., quality, validity, accuracy, credibility, trustworthiness) as needed.
- Discuss unusual circumstances as needed

Summary
Briefly summarize what you wrote in Chapter Four, highlighting the key findings, and transition the reader to the next chapter.
Chapter Five

Conclusions, Action Plan, Reflections, and Recommendations

Conclusions

Draw conclusions about your research questions based on your results. Someone reading only this section should get a sense of your research purpose and findings.

Action Plan

Present a plan of action. What will you do now? Will you continue, modify, or throw out your innovation? Why? Speculate on your “next steps” in the action research cycle.

Reflections and Recommendations for Teachers

This section is all for you—your opinions, impressions, frustrations, and celebrations.

- What would you do differently?
- What were the highlights of your project?
- Advice to teachers about your intervention.
- Advice to teachers about action research.

Summary

This is the last paragraph of the paper. Briefly summarize what you wrote in Chapter Five and give any last comments that will help wrap up the paper.
References


doi:10.1348/000709905X25030


Ramdass, D., & Zimmerman, B. J. (2008). Effects of self-correction strategy training on middle school students’ self-efficacy, self-evaluation, and


Appendix A

Research Participant Consent Form

Using Student Self-Reflection to Improve Student Study Habits in the Mathematics Classroom

Nancy Daly

Purpose of the Research
I am currently completing work towards my Masters of Arts of Teaching: Mathematics degree through Minot State University. For my final degree requirement, I am conducting an action research project during quarter 3, January 19th through March 23rd, to determine if student self-reflection improves the mathematics study habits of geometry students through an increased awareness of their study habits and knowledge of mathematics.

Specific Procedures
Students in my four geometry classes will cover the normal geometry curriculum while completing self-reflections occasionally in class. At the beginning of the study, your student will complete a survey to assess his/her current study habits in preparation for a mathematics assessment. Throughout the quarter, students will complete self-reflections regarding homework problems that they struggled on and pre-assessment reflections that will focus on the concepts they must know for upcoming assessments. At the end of the quarter, students will complete the survey again to assess his/her current study habits in preparation for a mathematics assessment. Survey responses, student reflection sheets, and my observations will be analyzed to determine whether self-reflection improves the mathematics study habits of my geometry class. My results will be summarized and included in my research paper. None of the students in my class will be identified in my results. Mr. Bertsch, principle of Fargo South High School, and Dr. Buresh, superintendent of Fargo Public School District, have both approved this research study.
Duration of Participation
Your student will participate in self-reflections during quarter three of the academic school year. They will be expected to complete two surveys and student self-reflection sheets during the duration of the unit.

Benefits to the Individual
There are no direct benefits in participating in this study, but participation will give your student additional tools to help him/her prepare for math tests. The study may show the benefits of self-reflection to help students focus on specific math content for which they need more practice.

Risks to the Individual
The risks to your student are no more than he/she would encounter in a regular classroom setting.

Confidentiality
All data will be treated confidentially by the researcher. Names of participants and their data sets will be kept in a locked filing cabinet in the researcher’s office and will be destroyed once the paper has been defended and approved. The researcher agrees to maintain strict confidentiality which means your student’s name will not be discussed or divulged with anyone outside of this research project. The researcher will also make sure confidential information will not be discussed in an area that can be overheard that would allow an unauthorized person to associate or identify the student with such information.

Voluntary Nature of Participation
During this study, the survey responses and reflection sheets from your student do not have to be included. However, I hope you approve of your student being involved in this study because a large sample size improves the accuracy of the results of my study. If you decide to participate, you are free to withdraw your consent at any time. If you do not consent or withdraw your consent, your student’s data will not be included in my results and your student will not complete the surveys, but your student will still be asked to complete the self-reflections since these are a regular part of my course.

Human Subject Statement
The Institutional Review Board of Minot State University has given me permission to conduct this research. If you have questions regarding the right of
research subjects, please contact the Chairperson of the MSU Institutional Review Board (IRB), Brent Askvig at 701-858-3051 or Brent.Askvig@minotstateu.edu.

Offer to Answer Questions
If you have any questions or concerns now or during the study, feel free to contact me at 446-2135 or email me at nancy.daly@fargo.k12.nd.us, Mr. Todd Bertsch at 446-2004, or Dr. Rick Buresh at 446-1005. Thank you for your consideration.

Consent Statement
You are voluntarily making a decision whether or not to participate in this study. With your signature below, you are indicating that upon reading and understanding the above information, you agree to allow your student’s survey and reflection results to be used in this study. You will be given a copy of the consent form to keep.

___________________________________
Participant (Please Print Student’s Name)

___________________________________
Signature of Parent or Guardian                      Date

___________________________________
Signature of Researcher                               Date
Appendix B

Student Participant Assent Form

Using Student Self-Reflection to Improve Student Study Habits in the Mathematics Classroom

Nancy Daly
Appendix C

School Principal Consent Form

Dear Mr. Bertsch:

I am completing work toward the Master of Arts in Teaching: Mathematics degree through Minot State University. As a degree requirement, I am to conduct a research project in my classroom during the third quarter this year. I am planning to implement pre- and post-assessment student reflections to determine whether these reflections improve student preparation for mathematics assessments through an increased awareness of students’ study habits and knowledge of mathematics. To accomplish this, I would like to work with the students in my geometry classes.

During this time, students will take pre- and post-study surveys regarding their beliefs about preparing for mathematics assessments. They will complete homework self-reflections during each chapter and will reflect on their study progress through pre- and post-assessment reflections. I will also be taking notes on my own observations.

At the completion of the study, I will analyze the data from the surveys and my personal journal of student comments and progress to determine the results. Classroom and student confidentiality will be observed regarding all data collected and no individual will be identified by name.

Before the study begins, I will send home consent forms for parents/guardians to notify them of this project and request their permission allowing their student to participate in the research study. A copy of this letter is attached for your inspection.

I am requesting that you permit me to carry out this research in my classroom. Please contact me if you have any questions. Thank you for your consideration.

_______ I grant permission for Nancy Daly to conduct the above mentioned research in her classroom.
I DO NOT grant permission for Nancy Daly to conduct the above mentioned research in her classroom.

Signature of Mr. Todd Bertsch, Principal at Fargo South High School

________________________________________
Date
Appendix D

Research Student Survey

Study and Preparation for Mathematics Assessment Survey:

SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

<table>
<thead>
<tr>
<th>Question</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I don’t understand something, I get help from a classmate, parent, math resource center or teacher.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I can easily identify what I have learned and what I have not yet learned before I take a test.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I start studying for quizzes and tests at least several days before I take them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I try to determine exactly when I got confused and exactly what confused me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I work problems until I understand them, not just until I get the answers listed in the back of the book.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. When I get my tests back, I note the types of mistakes I made.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. When I prepare for a math test, I look over the problems I originally struggled with while completing the homework.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please write your thoughts about the questions below.

8. Do you think you know how to prepare for a mathematics assessment? Why?

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
9. Do you think you are better at preparing for an assessment in a content area other than math? Why?
Appendix E

Student Homework Reflection Guide

For each assignment this chapter, you will be keeping a homework reflection that keeps track of the topics that you have struggled with. For each section be honest with which problems you have struggled with and the reason why you think they were hard.

Section 7.1:
The problem I struggled with most with was # ________ which asked me to

__________________________________________________________________

Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

Section 7.2:
The problem I struggled with most with was # ________ which asked me to

__________________________________________________________________

Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________
Section 7.3:
The problem I struggled with most with was # ________ which asked me to

__________________________________________________________________

Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

Section 7.4:
The problem I struggled with most with was # ________ which asked me to

__________________________________________________________________

Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

Section 7.5:
The problem I struggled with most with was # ________ which asked me to

__________________________________________________________________
Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Section 7.6:
The problem I struggled with most was # ________ which asked me to

__________________________________________________________________

Write 2-4 sentences about which part of the problem made it difficult for you.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
## Appendix F

### Pre-Assessment Reflection Guide

**Chapter 1 Test Concepts**

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>GOT IT!</th>
<th>NEEDS PRACTICE OR REVIEW BEFORE TEST!</th>
<th>I NEED TO GET HELP ON THIS TOPIC!</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can find a pattern in a sequence. Section 1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can sketch a diagram given geometric terms. Section 1.2 (and throughout)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use a protractor to measure an angle. Section 1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use a compass to find a segment bisector and an angle bisector. Section 1.5-Page 34 and 36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I know how to use the segment addition postulate to set up and solve an equation. Section 1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I know how to use the angle addition postulate to set up and solve an equation. Section 1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can find the perimeter and area of a square, rectangle, and triangle. Section 1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can find the circumference and area of a circle. Section 1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can find the exact distance between two coordinate points using the distance formula. Section 1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can find the midpoint between two coordinate points using the midpoint formula. Section 1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPIC</td>
<td>GOT IT!</td>
<td>NEEDS PRACTICE OR REVIEW BEFORE TEST!</td>
<td>I NEED TO GET HELP ON THIS TOPIC!</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>-------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>I can find the missing end point of a segment if the midpoint and other end point are given. Section 1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*** I know the vocabulary for chapter 1. ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can &quot;dissect&quot; a geometric diagram. (ex: given a diagram can you pick out lines, rays, collinear points, coplanar points, etc.) - All Chapter</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix G

Post-Assessment Reflection Guide

GEOMETRY CHAPTER 2 SELF-REFLECTION

TO IDENTIFY STRENGTHS AND AREAS FOR IMPROVEMENT

Name: ________________________________  Period: _____________

Please look at your corrected test and mark whether each problem is right or wrong. Then look at the problems you got wrong and decide if you made a algebra or arithmetic mistake (ex: did you add 5 to both sides of an equation, but you meant to subtract 5 from both sides), you didn’t know the vocabulary for the question, or you didn’t study/prepare for that concept.

For the questions you got wrong, choose a reason you got the question wrong; then mark if this question makes sense after we went over the test or if you still don’t understand the concept.

<table>
<thead>
<tr>
<th>#</th>
<th>Learning Target</th>
<th>Choose One</th>
<th>Choose One</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Algebra or Arithmetic Mistake</td>
<td>Vocab Mistake</td>
</tr>
<tr>
<td>1</td>
<td>Properties of Linear Pairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Disprove a Conditional Statement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hypothesis and Conclusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Properties of Vertical Angles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5A</td>
<td>Biconditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5B</td>
<td>Properties of Biconditionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Symbolic form of Conditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Symbolic form of Converse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Learning Target</td>
<td>Wrong</td>
<td>Choose One</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------</td>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Algebra or Arithmetic Mistake</td>
</tr>
<tr>
<td>8</td>
<td>Symbolic form of Inverse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Symbolic form of Contrapositive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Equivalent Statements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Multiplication Property of Equality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Finding a Counterexample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Finding a Counterexample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Law of Syllogism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15A</td>
<td>Law of Detachment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15B</td>
<td>Law of Detachment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16A</td>
<td>Proof: Given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16B</td>
<td>Proof: Def. of Congruence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16C</td>
<td>Proof: Segment Addition Postulate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16D</td>
<td>Proof: Given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16E</td>
<td>Proof: Subtraction Property of Equality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16F</td>
<td>Proof: Def. of Congruence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17A</td>
<td>Algebra Proof: Addition Property =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Learning Target</td>
<td>Wrong</td>
<td>Choose One</td>
</tr>
<tr>
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<td>----------------</td>
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<td>------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Algebra or Arithmetic Mistake</td>
</tr>
<tr>
<td>17B</td>
<td>Algebra Proof: Subtraction Property =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17C</td>
<td>Algebra Proof: Division Property =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18A</td>
<td>Proof: Given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18B</td>
<td>Proof: Def. of Congruence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18C</td>
<td>Proof: Segment Addition Postulate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18D</td>
<td>Proof: Segment Addition Postulate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18E</td>
<td>Proof: Substitution Property</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18F</td>
<td>Proof: Substitution Property</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18G</td>
<td>Proof: Transitive Property = (or Subst.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18H</td>
<td>Proof: Def. of Congruence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please rate your effort and achievement this chapter using the scale below. Circle (or highlight) the number corresponding to the statement that best describes your effort and achievement.

**EFFORT RUBRIC**

4  I worked on all assignments/vocabulary in the chapter until they were completed. I pushed myself to continue working on the material even when difficulties arose or a solution was not immediately evident. I viewed difficulties that arose as opportunities to strengthen my understanding.

3  I worked on the assignments/vocabulary until they were completed. I pushed myself to continue working on the material even when difficulties arose or a solution was not immediately evident.

2  I put some effort into the chapter, but I stopped working when difficulties arose.

1  I put very little effort into the chapter.

Comment on your scoring of your EFFORT RUBRIC.

I am most proud of: ........................................................................................................................
........................................................................................................................

I want to improve on: ...................................................................................................................
........................................................................................................................

My goal for the end of the quarter is: ............................................................................................
........................................................................................................................
ACHIEVEMENT RUBRIC

4 I exceeded the objectives within each lesson the chapter.
3 I met the objectives within each lesson in the chapter.
2 I met a few of the objectives of the lessons, but I did not meet others.
1 I did not meet the objectives of the lessons in the chapter.

Comment on the scoring of your ACHIEVEMENT RUBRIC.

Are you happy with your test? Why or why not? __________________________________________

Did the pre-assessment reflection guide help you focus in on what to prepare for? Why or why not? __________________________________________

My strengths in this chapter are: __________________________________________

My weaknesses in this chapter are: __________________________________________