

*IMPROVING SELF-EFFICACY AND ENCOURAGING A STRONG WORK ETHIC
PROMOTES AN IMPROVEMENT IN MATH SCORES*

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IMPROVING SELF-EFFICACY AND ENCOURAGING A STRONG WORK ETHIC
PROMOTES AN IMPROVEMENT IN MATH SCORES

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Abstract

IMPROVING SELF-EFFICACY AND ENCOURAGING a STRONG WORK ETHIC PROMOTES AN IMPROVEMENT IN MATH SCORES

Sally Sirianni

Under the Supervision of Joan E. Riedle, Ph. D.

The purpose of this research was to determine whether improving students' work-ethic and self-efficacy would improve their Measures of Academic Progress (MAP) scores. Due to unforeseen circumstances, posttest MAP scores were not available. Bandura (1997, as cited in Garcia and de Caso, 2006) explains that self-efficacy is dependent upon four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and positive physiological and affective state. It was discovered that, by implementing various strategies that fall in line with Bandura's four sources of self-efficacy during class and on assignments, work ethic scores improved at the very beginning and then remained consistent and self-efficacy scores improved. Further, the correlation between work ethic and self-efficacy was very significant. The sex of the student was then considered as another variable. Girls had a significantly stronger work ethic at the beginning, but once the strategies were in place for a time, the boys' work ethic scores improved.

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CHAPTER I: INTRODUCTION

If I implement strategies designed to enhance self-efficacy and work ethic, will students' self-efficacy and work ethic improve and, therefore, improve their math scores?

Self-efficacy has been shown to relate to achievement in many areas. For example, Gasco and Villarroel's (2014) research indicated that there is a positive correlation between a students' self-efficacy and their achievement in mathematics. Further, Yurt and Sünbül (2014) found that the individual's self-efficacy was the leading contributor to success. Students' work ethic can also influence how they perform. If students have a strong work ethic, they are more willing to challenge themselves or allow themselves to be challenged (e.g., Parkhurse, Fleisher, Skinner, Woehr, & Hawthorn-Embree, 2011).

Bandura (1997, as cited in Garcia & de Caso, 2006) explains that self-efficacy is dependent upon four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and positive physiological and affective state. Enactive mastery experiences are experiences in which individuals feel that they have the power to be successful. Vicarious experiences are experiences where an individual steps into someone else's position. For example, a student steps into the teacher's role and explains how to solve a problem. Verbal persuasion involves encouraging students and letting them know that their teacher has faith in their abilities. A positive physiological and affective state means that, if people feel comfortable in their environment, then they are more apt to feel as though they can succeed.

I introduced activities designed to enhance Bandura's four sources of self-efficacy (1997, as cited in Garcia & de Caso, 2006) into my classroom (e.g. exploring problems using nonsymbolic methods to gain an understanding of the problem before attempting to solve the problem symbolically, improved homework, and one-on-one attention). I encouraged my

students to work hard throughout the year and I acknowledged their efforts whenever possible. By improving students' self-efficacy and by encouraging a strong work ethic, students should improve their math scores.

Statement of the Problem

I explored whether improving students' self-efficacy and encouraging a strong work ethic, would improve scores.

Definition of Terms

Emotional and Physiological States: How an individual is feeling. Examples of these feelings are anxious, stressed, fatigued, or the individual's mood (Garcia & de Caso, 2006).

Enactive mastery experiences: Experiences in which individuals feel that they have the power to be successful (Garcia & de Caso, 2006).

MAP test: A computerized test in which the problems continually get harder until the student answers a question wrong. The test will go back to an easier problem and then start to progressively get more challenging again. This method of questioning allows the MAP testing program to identify the student's weaknesses and strengths (East Dubuque Elementary School District #119, n.d.).

Nonsymbolic: The use of diagrams, graphs, models formed by manipulatives, drawings, and tables (Yee & Bostic, 2014).

Self-Efficacy: This is "an individual's belief that s/he has the capacity to raise his or her learning levels and behaviors to the desired level" (Yurt & Sünbül, p. 1643).

Spatial ability: A cognitive "ability that requires one to manipulate visual forms on two and three dimensional space within his or her mind" (Yurt and Sünbül, p.1643).

Symbolic: Using algebraic expressions, equations, or inequalities (Yee & Bostic, 2014).

Positive physiological and affective state: If people feel comfortable in their environment, then they are more apt to feel as though they can succeed (Garcia & de Caso, 2006).

Verbal persuasion: Involves encouraging individuals and letting them know that you have faith in their abilities (Garcia & de Caso, 2006).

Vicarious experiences: Experiences where individuals step into someone else's position. For example, a student steps into the teacher's role and explains how to solve a problem (Garcia & de Caso, 2006).

Delimitations and Limitations of the Research

Delimitations: This study was limited to my algebra classes, located in a small school in the north-west corner of Illinois, for the 2015-2016 school year. Skaalvik and Skaalvik (2004, as cited in Garcia & de Caso, 2006) demonstrated that students' self-efficacy beliefs in mathematics can be determined by the final grade of their math class taken their freshman year. By studying my algebra students, who are mostly freshman and sophomores, I was able to explore strategies with students who were starting to solve more abstract, complex problems and have a chance to improve their self-efficacy as close to the end of their freshman year as I could.

Limitations: This study could have been affected by several limitations. Here are a few:

- Being a small high school with only about 200, the number of students enrolled in algebra was limited.
- Even though the students agreed to participate, and despite all efforts on my part, they may not have put forth the effort that is asked of them.
- When filling out the survey, they may not have been completely honest in their answers.

- How do you determine if a student validly has high self-efficacy or has a false sense of self-efficacy?
- I performed a quasi-experiment and with this small group there could be internal factors that affected the outcome, such as a historical event.

Method of Approach

I gave students in my algebra classes a self-efficacy survey at the beginning of the year. Throughout the year, I used a variety of strategies designed to improve one's self-efficacy and continuously encouraged a strong work-ethic. After each chapter test, I administered a work ethic survey with the intention that the students would evaluate their own effort and that doing so would give them a push to do better. At the end of the year, I gave the students the self-efficacy survey again. The results from the self-efficacy survey and the work ethic surveys were evaluated to see any improvement. I also reviewed Measures of Academic Progress (MAP) scores from the 2014-2015 school year, which was a pre-intervention year, and from the 2015-2016 school year, which was the intervention year, to see if there was a greater increase in the scores during the year of intervention. Project data collection materials are attached as Appendix II.

CHAPTER II: REVIEW OF THE LITERATURE

Research Question

The goal of this research project was to improve students' math scores by working on improving the students' self-efficacy and encouraging a strong work ethic. Research has shown that strong self-efficacy and work ethic are key characteristics that individuals who are successful in the area of math possess. By evaluating self-efficacy both at the beginning and end of the school year, evaluating work-ethic periodically throughout the year, and implementing teaching strategies throughout the year, I hoped to increase my student test scores.

Discussion of Prior Research

Gasco and Villarreal (2014) conducted their research by having students solve word problems and then evaluating those problems on how each was solved. The researchers determined whether the students used arithmetical methods, algebraic methods, a combination of both arithmetical and algebraic, or left the problem incomplete. The researchers then administered a survey that considered one's self-efficacy and task value. Self-efficacy is how confident the students are in their ability to perform the task at hand. The task values are values of how important a task is to the individual and how their attitudes would affect how they perform the task at hand. Cost is determined by what the individual has to sacrifice; for example leisure time. The survey included three questions on self-efficacy, nine questions on task-value, and two questions on cost. The task-values included interest, importance, and utility. Their results indicated that, if individuals solved problems using more complex methods (algebraically), then they scored themselves higher in the survey for self-efficacy and value of math, but not for cost.

Yurt and Sünbül (2014) examined factors which might predict an individual's achievement in mathematics, such as the following: spatial ability, problem solving skills, reasoning skills, school type, learning style, motivation, self-efficacy, family income, duration of study, attitude and interest, anxiety, and the duration one had attended a university preparation course. All of these predictors could be grouped together into the subgroups of cognitive ability, motivation, familial, and socioeconomics. Factors that can be considered either cognitive or motivational factors can be redirected much more easily through education than the familial and socioeconomic factors (Yurt and Sünbül). Spatial ability is a cognitive "ability that requires one to manipulate visual forms on two and three dimensional space within his or her mind" (Yurt & Sünbül, p. 1643) and is a fundamental skill that is needed to succeed in mathematics. The skills of problem solving and reasoning are also considered to be important cognitive factors. While these cognitive factors should be considered, Yurt and Sünbül found that the individual's self-efficacy was the leading contributor for success. Self-efficacy allows the individual to obtain the skills needed for spatial ability, problem solving, and reasoning abilities, which leads to more success in mathematics. Yurt and Sünbül's results revealed that "mathematics self-efficacy sources positively and significantly affected reasoning and problem solving skills, spatial ability, and mathematics achievement" (Yurt & Sünbül, p. 1646). Bandura (1977, as cited in Yurt and Sünbül, 2014), "argued that self-efficacy belief is an important predictor of one's performance results in different academic tasks." Further, Shunk (2011, as cited in Yurt and Sünbül, 2014, p. 1646) expressed that "behind each successful behavior lies one's belief [of self-efficacy] that s/he would be able to perform that specific behavior successfully."

Parkhurse, Fleisher, Skinner, Woehr, and Hawthorn-Embree (2011) asked students to participate in a study; for participating, they received extra course credit for their current upper-

level business class. In the first step of the study, students registered on line, but within this registration they also completed a work ethic survey. Participants were not told that the registration process technically involved this survey. In the second step, participants attended a session that was to last about 20-50 minutes, and they could leave whenever they were finished with the task at hand. During this 20-50-minute session, participants were given some general instructions which included the instruction of not opening the folder that they were given until they were told to do so. Once all of the folders were handed out and the participants were told to start, participants had a 20-question math work sheet to complete. They were not allowed to skip any problems; they were instructed to go on to the next, and they had to work the problems in order. When participants reached question 10 and answered the question, they were told to stop working on their assignment and to turn it in. Back at their seat, they continued on to the third step, which was to choose between finishing the worksheet that they had just turned in or to start a new worksheet that was conceived as being a lower effort worksheet, mainly because it only had nine questions on it, while the assignment that needed to be finished still had 10 more question to go. There were eight participants who were eliminated from the study because they did not do well on the actual math problems; their answers were either incorrect or incomplete. There were 98 participants remaining in the study. Seventy-six (77.6%) of these remaining participants chose the new lower-effort assignment, while 22 (22.4%) of the remaining participants chose to finish the assignment that they had already started. Parkhurse et al. found that those who chose to finish the incomplete, higher effort assignment scored higher on the work ethic survey. Parkhurse et al. concluded that students who have a higher work ethic are more likely to choose course work that would be more challenging for them and have the

willingness to complete all the work that is required. The general terminology used for this notion was higher effort behaviors.

Research studies, such as these three, demonstrate that the math curriculum alone may not cause math scores to improve. Rather, it may be necessary for teachers to implement specific strategies that target improving students' self-efficacy and work ethic.

Bandura (1997, as cited in Garcia and de Caso, 2006) explains that self-efficacy is dependent upon four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and positive physiological and affective state. Enactive mastery experiences are experiences in which individuals feel that they have the power to be successful. Vicarious experiences are experiences where an individual steps into someone else's position. For example, a student steps into the teacher's role and explains how to solve a problem. Verbal persuasion involves encouraging individuals and letting them know that teachers have faith in their abilities. A positive physiological and affective state means that, if people feel comfortable in their environment, then they are more apt to feel as though they can succeed.

Usher and Pajares (2009), knowing that one's self-efficacy was crucial to how well the individual would perform in mathematics, wanted to develop a self-efficacy survey that would accurately evaluate an individual's self-efficacy. Survey questions were developed and then tested. The test results indicated which questions needed to be eliminated or reworded. The survey questions went through three different test cycles. The third test cycle indicated that the survey questions correlated with the four mathematics self-efficacy measures (i.e., mastery experience, vicarious experience, social persuasions, and emotional and physiological states) and with motivation-related constructs (i.e., engagement, mathematics self-concept, invitational messages, achievement goal orientations, and optimism). The final survey questions also

“displayed strong psychometric properties and invariance across gender, ethnicity, and mathematics ability level” (Usher & Pajares, p. 99).

Now that we have learned that in order to improve test scores in mathematics we need to improve one’s self-efficacy and encourage a strong work ethic, these last studies are important because they have provided us with ways to strengthen one’s self-efficacy and work ethic.

Summary

It has been proven that self-efficacy and a strong work ethic are critical concepts that need to be developed in order for individuals to be successful with their math test scores. By using various strategies that strengthened self-efficacy in the classroom and the encouragement of a strong work ethic, I hoped that test scores would improve by the end of the year.

Hypotheses

I hypothesized that self-efficacy scores would improve from pretest to post test, that work ethic scores would improve throughout the year, and that the improvement in math exam scores would be greater in 2015-2016 (intervention) than in 2014-2015 (pre-intervention).

CHAPTER III: METHOD

Participants

The setting for this research was my two algebra classes. Thirty-nine students (19 males and 20 females) participated in the study, aging from 14 to 17 years old. The study was conducted in a small northwestern Illinois school where 97.5% of the students are Caucasian.

Materials and Procedures

At the beginning and end of the second semester, students completed a self-efficacy survey (Usher & Pajares, 2008). This survey had a six point Likert-type scale, ranging from 1(*strongly disagree*) to 6 (*strongly agree*). The student's responses to items 3, 19-24 were reverse scored and then all 24 response items were summed. Higher scores indicate greater feelings of self-efficacy.

After each mathematics chapter test, the students completed a work ethic survey that asked them to evaluate their own progress and efforts. This survey had a six point Likert-type scale, ranging from 1(*strongly disagree*) to 6 (*strongly agree*). This survey helped the students evaluate their own work ethic within the class. The work ethic survey questions, written by myself, related to issues that I emphasized throughout the year. Higher scores indicate greater feelings of work ethic.

Bandura (1997, as cited in Garcia and de Caso, 2006) explains that self-efficacy is dependent upon four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and a positive physiological and affective state. Various strategies that fall in line with Bandura's four sources of self-efficacy were implemented during class and on assignments. See Table 1.

Table 1

Classroom Strategies Employed in the Present Study

Bandura's Self-Efficacy Source	Related Classroom Strategies
Enactive Master	<p>Homework help:</p> <p>I will start with discussion homework tips, which will also be on a poster and hanging in my room.</p> <p>I will explain to the students that, if there is a problem that they do not understand, they should complete as much as they do understand and then explain where they feel they are confused as well as what they feel is causing them to not be able to solve the problem.</p> <p>I will ask students to write down steps for solving the math problems that we are working with at the time. The students will be able to edit those steps as they work through their assignment.</p> <p>Once we reach a problem that is causing confusion, the class as a whole will be asked to discuss the problem and try to represent the problem through nonsymbolic methods, such as diagrams, graphs, models formed by manipulatives, drawings, and tables. This idea comes from Yee and Bostic, 2014.</p>
Vicarious Experiences (and Enactive Mastery)	<p>During class time, I will ask students to come up to the board to do a problem; if the students get stuck on the problem, we will talk through their process as a class and allow other students to help them out. Often I have students put their assignment problems on the board. If students struggle, I will encourage other students to help them with the problem.</p>
Verbal Persuasion	<p>I will try to consistently give students specific praise for even the smallest accomplishment, and let them know that I appreciate the effort they have shown me.</p>
Positive Physiological and Affective State	<p>Make sure that the classroom feels inviting to the students.</p>

At the end of the year, I wanted to use the students' Measures of Academic Progress (MAP) scores to determine how much improvement was made in the area of math. While the MAP test was administered at the beginning of the year, due to unforeseen circumstances the MAP test was not administered the second time. MAP tests are computerized tests in which the

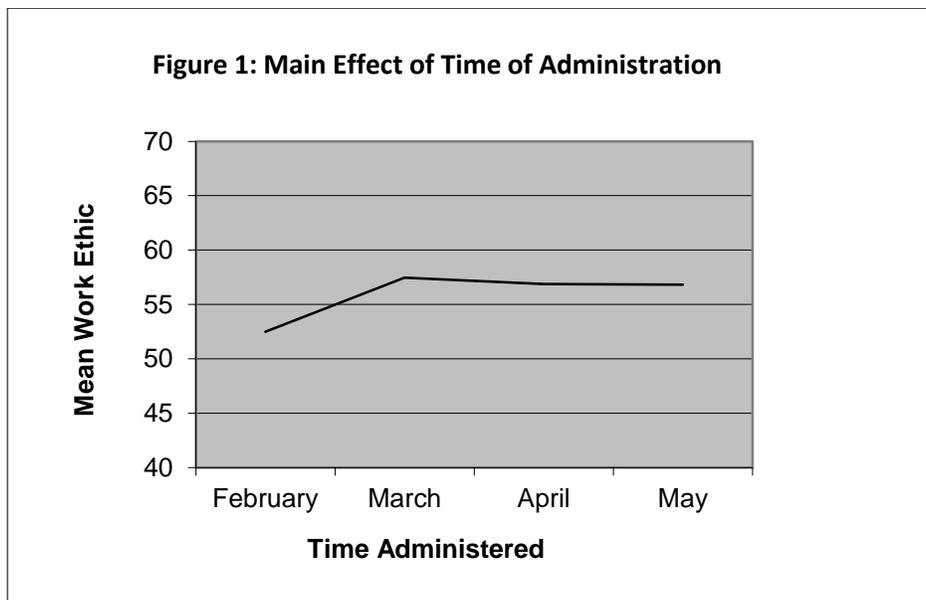
problems continually get harder until the student answers a question wrong. The test will go back to an easier problem and then start to progressively get more challenging again. This method of questioning allows the MAP testing program to identify the students' weaknesses and strengths (East Dubuque Elementary School District #119, n.d.). It is recommended that the test be given multiple times a year. The students who were involved in this study had taken the MAP test twice in the 2014-2015 school year and should have taken it twice in the 2015-2016 school year.

The data was recorded using code numbers which were linked to students' names; the key to those code numbers was kept separate from the data and in a secure location and was shredded once data collection was complete.

CHAPTER IV: RESULTS

To determine if the self-efficacy of students changed from pretest to posttest a T-Test for paired samples was conducted. Posttest scores ($M = 91.26, SD = 25.26$) were higher than pretest scores ($M = 86.91, SD = 20.97$), and that difference approached significance, $t(38) = -1.93, p = .06$.

A repeated measures analysis of variance was conducted comparing the four work ethic administrations. That test was significant, $F(3, 105) = 8.21, p < .001, \eta^2_{\text{partial}} = .19$.



As you can see in Figure 1, work ethic was significantly lower in February than in the other months ($p < .01$).

The bivariate correlations between sex of student, self-efficacy, and work ethic were explored. Self-efficacy and work ethic scores were highly correlated. See Table 2. Sex of student correlated with the February assessment of work ethic, $r(36) = .40, p = .01$, with girls having a higher score of self-efficacy.

Table 2

Bivariate Correlations of Self-Efficacy and Work Ethic

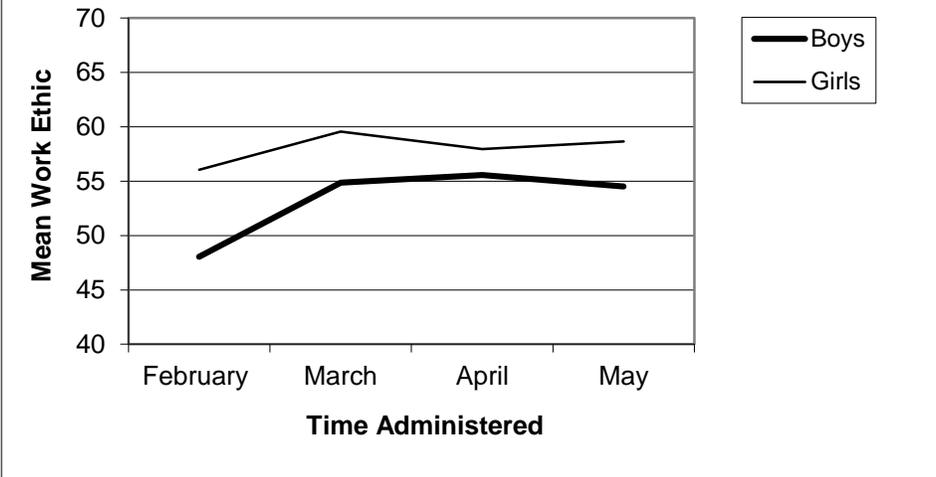
Subscale	1	2	3	4	5	6
1. Self-efficacy Pretest	1.0					
2. Self-efficacy Posttest	.83	1.0				
3. Work ethic Chapter 1	.55	.56	1.0			
4. Work ethic Chapter 2	.64	.67	.87	1.0		
5. Work ethic Chapter 3	.52	.65	.67	.79	1.0	
6. Work ethic Chapter 4	.53	.63	.73	.78	.92	1.0

Notes: $p \leq .001$

Given the correlation between the sex of student and work ethic, a repeated measures analysis of variance was conducted including sex of student as an independent variable. The main effect of work ethic was significant, $F(3, 102) = 9.24$, $p < .001$, $\eta^2_{\text{partial}} = .21$. The interaction of work ethic and sex of student approached significance, $F(3, 102) = 2.17$, $p = .10$, $\eta^2_{\text{partial}} = .06$.

As you can see in Figure 2, the increase in work ethic score from February to March is much more pronounced for the boys. The main effect of the sex of the student was not significant, $F(1, 34) = 2.21$, $p = .15$, $\eta^2_{\text{partial}} = .06$.

Figure 2: Interaction of Sex of Student and Time of Administration



CHAPTER V: DISCUSSION

As a teacher of some great students, I want my students to leave my class mastering the material covered in class each day. Unfortunately, that does not always happen so I wanted to explore ways to help achieve this goal. Whenever I researched improving math scores, the connection between students' work ethic and their self-efficacy appeared repeatedly (e.g., Gasco & Villarroel, 2014; Parkhurse et al., 2011; Usher & Pajares, 2009). Then I started exploring what could be done to improve these two areas.

According to Bandura (1997, as cited in Garcia & de Caso, 2006) self-efficacy is dependent upon four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and positive physiological and affective state. With that information I designed ways to support those four areas.

During the second semester, the students completed the first of two self-efficacy surveys developed by Usher and Pajares (2009), and I started to implement my strategies, constantly reminding them to use the suggestions while working on their assignments. After each chapter test the students completed a work ethic survey that I developed, which coincided with those work habits that I suggested they do with their homework. Each time the students took the work ethic survey, I encouraged them to answer it honestly and to take some time to reflect on their answers. At the end of the second semester, the students repeated the self-efficacy survey. Again I encouraged them to answer the questions honestly and to take a moment to reflect on their accomplishments.

Over the second semester time period, students completed a total of four work ethic surveys. The data analysis showed a significant increase between the first and second survey, but thereafter those scores were maintained. This indicates that students started to do the things that

I was asking them to do while completing their homework and then continued to do those things. The self-efficacy data showed improvement; although the improvement was not significant, it was very close to being significant.

Research conducted by Tariq, Qualter, Roberts, Appleby, and Barnes (2013) involved participants taking a mathematics literacy test and then an online questionnaire. They analyzed emotional self-efficacy, emotional intelligence, and mathematics self-efficacy along with how well the participants did on the mathematic literacy test. The results showed that for both male and female undergraduates, there was a significant positive correlation between scores on the math literacy test, higher mathematics qualifications, and mathematics self-efficacy. Even though the scores from the MAP test were not able to be analyzed in the present study, I was pleased to see the positive change in the area of self-efficacy.

Hill and Rojewski (1999) noticed that the more students were considered at risk, the lower their work ethic scores. Further, girls have a higher work ethic than do boys. My data show that girls had a higher work ethic at the beginning of the study, and then once the strategies for homework were emphasized more, there was not a significance difference with work ethic between boys and girls. The strategies used in the present research may have encouraged the boys to improve their work ethic. Given that work ethic positively relates to performance (Tariq et al.), one could speculate that continuing with the implemented strategies, the student math score would improve. Regretfully, due to the end of the year testing not being conducted, this prediction could not be tested. Future researchers are encouraged to test this hypothesis.

Hill and Rojewski (1999) also discussed that counselors have contact with students who are considered to be at risk. Since they have opportunities to be in contact with these students, counselors would be a good resource for teachers to contact and brain storm ways to help

improve these students' work ethic. The strategies that were implemented in the classroom during this research were constant reminders to the students of the things that they should be incorporating into their work. The work ethic survey given after each test was an opportunity for the student to reflect on how well they implemented the strategies into their everyday work. The survey also gave the students the opportunity to decide to make these changes. When students used the survey to their advantage, they are taking ownership in their learning. "Adolescents who reported higher levels of perceived control of success in mathematics tended to perform significantly better on the mathematics assessment than did their peers who reported lower levels of perceived control of success in mathematics." (Areepattamannil, et al., p. 9) Perceived control is taking ownership in how well one does in a particular area.

Even though the connection between my interventions (based on Bandura, 1997, as cited in Garcia & de Caso, 2006) and mathematics performance still needs to be documented, I was pleased to see the positive change in the area of self-efficacy after trying to improve the students' work ethic. Because of this, I plan to continue to use the implemented strategies and the work ethic surveys.

Limitations of the study

My research was intended to cover a full school year, however, I missed a lot of school during the months of September through November due to my father's health, and I missed school in December for surgery. During the first semester, I was able to collect all of the permission slips, but I did not start with surveys until second semester.

In addition, the school did not administer the second MAP test for this school year. The reason the test was not administered began on Monday, March 28th, when one of our students passed away. This was the week that the school was supposed to be administering the state tests,

so those tests were put on hold for a little bit. The state tests were eventually administered, and the state decided that a science portion of this test needed to be administered as well. While working on the preparation work to administer the science portion, our school experienced another tragedy when we lost another student on May 5th. By the time we got through that shock, it was final exam time.

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APPENDIX A: IRB APPROVAL LETTER



UNIVERSITY OF WISCONSIN
PLATTEVILLE
INSTITUTIONAL REVIEW BOARD

8/29/2015

Sally Sirianni
Sponsor: Dr. Joan E. Riedle
Department of Masters of Science - Education
University of Wisconsin-Platteville

RE: IRB Protocol #2015-16-07

Project Title: Improving Mathematics Performance by Improving One's Self-Efficacy

Approval Date: 8/29/2015
Expiration Date: 8/28/2016

Your project has been approved by the University of Wisconsin-Platteville IRB via a Full Board Review. This approval is subject to the following conditions, otherwise approval may be suspended:

1. No participants may be involved in the study prior to the IRB approval date listed above or after the expiration date.
2. All unanticipated or serious adverse events must be reported to the IRB.
3. All modifications to procedures, participant selection, and instruments used (surveys, consent forms, etc) must be reported to the IRB chair prior to their use. Extensive modifications may require full board approval.
4. If the project will continue beyond the expiration date, then the researcher must file for a continuation with the IRB at least 14 days prior to the expiration date. If the IRB approval for this project expires before approval for continuation is given, then a new protocol must be filled out and submitted. Federal guidelines allow for no exceptions to this rule. Any data collected after the expiration date cannot be used in the study.

If you have any questions, please contact the IRB chair at the address below. Include your protocol # on all correspondence.

Sincerely,

A handwritten signature in cursive script that reads 'Dr. Barb Bamet'.

Dr. Barb Bamet
Institutional Review Board Chair
Professor, Mathematics Department
Gardner 451
University of Wisconsin-Platteville
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APPENDIX B: PROJECT MATERIALS



July 21, 2015

Board of Education

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President
Mr. Terry Schulting
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Mrs. JoAnne Loeffelholz
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Mr. Ben Andersen
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District Office

100 School Road
P: 815.747.2111
F: 815.747.3201

Mr. Greg Herbst
Superintendent

High School and Junior High School

200 Parklane Drive
P: 815.747.3188
F: 815.747.3516

Mr. Darren Sirianni
Principal

Elementary School

100 School Road
P: 815.747.3117
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Mrs. Michelle J. Tili
Principal

Transportation and Maintenance

200 Parklane Drive
P: 815.747.3188
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Mr. Don Loeffelholz
Director

I give Sally Sirianni permission to complete her research project during the 2015-2016 school year. She will be working on improving student MAP (Measure of Academic Performance) scores in the math curriculum. She will be working on improving student efficacy within her Algebra 1 classroom.

I hope that the results of this effort provide the desired results, which would then lead to incorporating this in classrooms of all curriculums.

If you have any questions, feel free to contact me.

Thank you,

Darren Sirianni
East Dubuque HS/JH Principal
(815) 747-3188 x1103
dsirianni@edbqhs.org

PARENT CONSENT FORM FOR PARTICIPATION OF HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF WISCONSIN-PLATTEVILLE AND EAST DUBUQUE HIGH SCHOOL

1. Purpose: The purpose of this research is to improve students' self-efficacy and work ethic in hopes to improve their achievement in mathematics.
2. Procedure: Your child will be given a survey that measures their self-efficacy and work ethic at the beginning and again at the end of the year. After each chapter test, your child will take a survey to help them evaluate their work ethic and progress. During the year, I will implement various strategies to help them improve upon their self-efficacy and continuously encourage the students to maintain a strong work ethic. I will then evaluate their MAP score and relate their scores to their self-efficacy and work ethic responses. PARTICIPATION IS VOLUNTARY AND HE/SHE WILL BE ASKED TO GIVE HIS/HER ASSENT. YOUR CHILD'S NAME WILL NOT BE RECORDED ON THE RESEARCH MATHERIALS NOR WILL IT BE INCLUDED IN OUR DATA SET OR IN ANY REPORTS ABOUT THE PROJECT.
3. Time Required: 2015-2016 school year.
4. Risks: No short-term or long-term risks are foreseen.
Benefits: Having students improve their self-efficacy and maintain a strong work ethic will aid them in achieving high scores in mathematics as well as other courses.
5. Your Rights as a Parent of a Student Participant: The information gathered in this study will be confidential. Data or summarized results will not be released in any way that could identify you or your child. If your child would like to withdraw from the study at any time, he/she may do so without penalty or repercussions. The information collected from your child up to that point would be eliminated from the data set. If you have any questions, please ask:

Sally Sirianni		Joan Riedle
Math Teacher, East Dubuque High School	or	Research Advisor
Graduate Student, Educational Administration, UW- Platteville		riedlej@uwplatt.edu
(815)747-3188		
ssirianni@edbqhs.org		

Once the study is completed, you may request a summary of the results by contacting the above researcher or Principal Darren Sirianni.

6. If you have any questions about your child's treatment as a participant in this study, please call or write:

Barb Barnett		Darren Sirianni
Chair of the UW-Platteville IRB		East Dubuque High School & Junior High School Principal
(608) 342-1942	or	(815)747-3188 ext. 1103
barnetb@uwplatt.edu		dsirianni@edbqhs.org

I have read the attached information and (check one):

- _____ DO give consent for my child to participate in the research.
_____ DO NOT give consent for my child to participate in the research.

Please print your child's name (First, MI, Last) _____

Please print your full name (First, MI, Last) _____

Signature _____ Date _____

Please return this completed form to Mrs. Sirianni by _____.

STUDENT ASSENT FORM FOR PARTICIPATION IN RESEARCH
UNIVERSITY OF WISCONSIN-PLATTEVILLE AND EAST DUBUQUE HIGH SCHOOL

Dear Student,

We want to provide the best education possible to you and future students. Therefore, we are conducting this research project. You are invited to participate in this research project which consists of various strategies used in the classroom lessons and on homework. You will be asked to complete a survey periodically throughout the year and I will implement your MAP scores in my research.

The purpose of this research is to improve your self-efficacy and work ethic in hopes to improve your achievement in mathematics.

You are asked to participate in this study because I am investigating ways that will help you better understand and enjoy your math classes. It is my hope that you will benefit from this study and be able to extend it through all of your courses.

Participation in this study will have absolutely no impact on your grades. The information gathered in this study will be used to assess whether or not the strategies that I am going to implement into our classroom will help you improve your math scores.

YOUR NAME WILL NOT BE RECORDED ON THE RESEARCH MATERIALS NOR WILL IT BE INCLUDED IN OUR DATA SET OR IN ANY REPORTS ABOUT THE PROJECT.

Your parents have already given permission for you to participate in our research project, and we are hoping that you will agree to participate. Your voluntary completion of the study constitutes your agreement (assent) to participate. Thank you for helping us to better help you.

Sincerely,
Sally Sirianni
Math Teacher, East Dubuque High School
Graduate Student, Educational Administration, University of Wisconsin - Platteville
(815)747-3188
ssirianni@edbqhs.org

Darren Sirianni
East Dubuque High School & Junior High School Principal
(815)747-3188 ext. 1103
dsirianni@edbqhs.org

Bandura's Self-Efficacy Source	Related Classroom Strategies
Enactive Master	<p>Homework help: I will start with discussion homework tips, which will also be on a poster and hanging in my room.</p> <p>I will explain to the students that, if there is a problem that they do not understand, they should complete as much as they do understand and then explain where they feel they are confused as well as what they feel is causing them to not be able to solve the problem.</p> <p>I will ask students to write down steps for solving the math problems that we are working with at the time. The students will be able to edit those steps as they work through their assignment.</p> <p>Once we reach a problem that is causing confusion, the class as a whole will be asked to discuss the problem and try to represent the problem through nonsymbolic methods, such as diagrams, graphs, models formed by manipulatives, drawings, and tables. This idea comes from Yee and Bostic, 2014.</p>
Vicarious Experiences (and Enactive Mastery)	During class time, I will ask students to come up to the board to do a problem; if the students get stuck on the problem, we will talk through their process as a class and allow other students to help them out. Often I have students put their assignment problems on the board. If students struggle, I will encourage other students to help them with the problem.
Verbal Persuasion	I will try to consistently give students specific praise for even the smallest accomplishment, and let them know that I appreciate the effort they have shown me.
Positive Physiological and Affective State	Make sure that the classroom feels inviting to the students.

Data Sheets:

Scores from the self-efficacy survey:

Student	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
A1																								
A2																								
A3																								
A4																								
A5																								
A6																								
A7																								
A8																								
A9																								
A10																								
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B26																								

Scores from the work ethic survey:

Student	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
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A2												
A3												
A4												
A5												
A6												
A7												
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B25												
B26												

MAP scores:

Student	Spring 2014 MAP Score	Projected Growth	Spring 2015 MAP Score	Growth	Meet Projected Growth?	Fall 2015 MAP Score	Projected Growth	Spring 2016 MAP Score	Growth	Meet Projected Growth?
A1										
A2										
A3										
A4										
A5										
A6										
A7										
A8										
A9										
A10										
A11										
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