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Correcting Student Motivation in a Mathematics Classroom

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ACTION Program

Bowling Green State University

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Abstract: The intentions of this action research study are to analyze the motivational components of students in a classroom and test which forms of encouragement will create the most motivation. Utilizing the Motivational Systems Theory of Martin E. Ford, students will be measured quantitatively and qualitatively for their classroom motivation and which component of the theory causes them to lack it. The results will reveal how each type of student responds to different teaching styles, and how they will be motivated as a result.

Introduction

As educators, there is a reality we must all face and accept in our schools: It is vital that we give purpose to what the students must learn. The time to be honest is now, and honesty means accepting that for students, learning something because it is on a test or in the textbook will not result in their growth. Teachers today exist in an academic culture which motivates students for all the wrong reasons. Instead of acquiring the passion for discovery and learning, students are resentfully being shoved towards memorizing content for the sake of high test scores and appearing more qualified for the university while students who protest otherwise are neglected. Teaching can present students with two different paths at an early age; curiosity "can either be and blossom in the school, or be blunted to the point of near extinction," (Fried 2001). In order to correct the path, teachers must work diligently to provide students with the ability to learn and learn with a desire beyond the grades. The question that should be proposed will require us to find the best way to motivate our students and give them a passion to learn. However, there are several key questions within that question, such as "Do we need to motivate different students differently?" There is also the question of "How can we distribute our abilities as educators to provide equity to the diversified types of students we see in our classrooms?" The challenge is much more than finding the nicest way to get students excited, but rather how to implement our teaching to reach all kinds of students. "There is no better way for teachers to overcome public skepticism about the effectiveness of what they do than to engage with one's students in passionate teaching and learning," (Fried 2001).

The intention behind this study is not to create a perfect solution for every single student in the world, as it would be impossible to motivate all of the millions of students; our world is just too diverse and different. With that being said, the intent should be to notice the various

types of students in the classroom, categorize them by levels of motivation they show quantitatively and qualitatively, and notice if there are any positive experiences for each set of students that push their desire to learn forward. To place this into a simple term, we are looking for "wide eye moments."

Literature Review

The intentions behind my action research are rooted in the link that connects students to their learning: motivation. It is significant for educators to understand this to the best of their ability, considering it is the cornerstone that student learning builds upon. Without even the smallest desire to learn, learning is not possible for a student to engage in. The different forms of motivation must also be addressed as no two minds are alike, and therefore motivation can originate from multiple locations. These unique origins will be categorized according to Martin E. Ford's Motivational Systems Theorem, which claims motivation can be inspired by goals, emotions or self-efficacy. If motivation is simply analyzed as one large topic, it will hinder the ability of teachers to diagnose why the students are lacking motivation. Therefore, the theory and its components must all be understood.

Understanding Motivational Systems Theory

In Motivational Systems Theory (MST), "motivation is defined as the organized patterning of three psychological functions that serve to direct, energize, and regulate goal-directed activity: personal goals, emotional arousal processes, and personal agency beliefs (self-efficacy)," (Ford 1992). All three aspects of this theory function together in a way where one can affect the others. If one collapses, it can hinder the entire motivation of an individual, even if the other two components are firmly in place.

In terms of researching the effectiveness of MST, little has been evaluated, but those that have taken on the challenge have concluded that there is use for the theory. One study utilized the theory to determine the correlation between all three variables, but also included the factors of biological levels of anxiety as well as the prior skills of the student. These were all included to determine how performance in the classroom would be affected. A function was even created to represent performance as the product of all the variables.

Performance/Achievement = (Motivation x Skill)/Biological Structure x Responsive Environment

However, when they focused on the individual variables and how the students represented them, they found that the sample of students were "most interested in their level of performance or getting good grades," their self-efficacy "displayed significant interaction with the students' academic performance," and "the results indicated that effort regulation was related to the academic performance of students," (Campbell 2007). These relationships all imply that goal orientation, self-efficacy and emotion (due to comparison) are all sensitive factors of student motivation that are also tremendously corrupt. Students need to focus less on how they perform in comparison to others and be mindful of how they growing in their personal understanding of the material. It is significant that teachers discover ways to place students into a healthier mindset in the classroom, and part of that requires taking time to understand what each of the variables means for students.

Emotion is the trait humans possess that clouds what is factual in favor of one's personal feelings. As a result, students tend to allow their emotions to view reality in a way that either enhances or hinders their learning. It could be something as simple as how a student views themselves or how they view the teacher, but "it is the students' perceptions of the characteristics

of those attributions which actually influence motivation through emotions," or to place it into better terms, "attributions possess characteristics and those characteristics affect motivation," (Seifert 2004). A student may view themselves as a terrible learner and allow that to push them away from attempting to learn. The distinction that needs to be encouraged by students is being able to have them attribute success and failure to what is internal and controllable. Doing this will allow students to become "more likely to feel pride, satisfaction, confidence and have a higher sense of self-esteem," and "these students will choose to work on more difficult tasks, persist longer in the face of failure, display higher levels of cognitive engagement and produce work that is of higher quality," (Seifert 2004). However, students who point to the uncontrollable will experience the opposite: greater amounts of hopelessness and lower levels of self-esteem. If students are aware of what they can control, it will allow them to experience empowerment and a heightened sense of capability. A part of this can also be attributed to the temptation to compare ourselves to others that Western culture brings. Today, "the worth of the individual is connected to his or her ability to do something well. In the context of school, students who can get top grades (are smart) are deemed more worthy than those who do not do well," (Covington and Omelich 1984). It is common today for students to place their worth on their report cards, and when grades are not up to par, there is emotional turmoil that stirs up within the students. There is a clear motivational link between a student and his or her emotions, which can also connect to the other to components of Ford's Theory.

In any individual's pursuit of an achievement, creating goals is always heavily encouraged. However, there is a fine line that separates one's healthy goals from those that are unhealthy and create unnecessary pressure. According to the American Psychological Association, there are two different techniques for setting goals. Those that rely on the mastery

goal technique are “individuals oriented towards developing new skills, trying to understand their work, improving their level of competence, or achieving a sense of mastery based on self-referenced standards,” (Ames 1992). In comparison, the performance goal technique is directly linked to “one’s ability and sense of self-worth,” (Ames 1992). Based only on those two definitions, it should be clear as to which one is healthier to pursue. Allowing students to set performance-based goals will lure them into a place where they find their identity in how they perform and how they compare to others. This causes students to think less about what they are learning and more about how much they can memorize to score highly. Performance based students are not those who want to grow quietly, but rather those who want to be seen brightly.

The final of the three motivational components is related to the confidence that students feel, also referred to as self-efficacy. There is a difficult standard that needs to be met in order for students to feel confident yet challenged in the classroom. If the class is too simple, the students will not desire to learn because they know they will be able to fly through the class without effort, creating overconfidence. However, if the class is too challenging, it is going to result in a lack of confidence from the students as they believe they are not capable of engaging in mathematics. A study conducted in 1977 confirms these statements, where students who had a long history of school failure partook in the study. The results concluded that “the rate of on-task behavior was significantly improved when the curriculum was presented so that students were able to achieve a success ratio of 70%-80%,” (Dickinson and Butt 1989). Therefore, if that range is the magic number, it appears that teachers have to spend a significant amount of time planning out their curriculum to place students at a spot where they will be the most reasonably motivated.

It can be a valid thought to assume that since all three of these factors contribute to motivation, that dividing them up and analyzing them deeper could prove pointless. However,

the reasoning behind the separation is similar to an assembly line. For the whole to function, the parts must operate smoothly. If a student's motivation is hindered by either their emotions, goals or confidence, the teacher needs to strive to address that area so that the student is able to become motivated again.

Methodology

Participants

The participants of this study will be a part of one class from one grade level between grades 7 and 12. This class will also take place during the exact same time every day. The number of students as well as the class demographic will be determined upon the reveal of the placement. For this proposal, let there be 30 hypothetical students in the classroom. There will also be the instructor, who will guide the weeks, changing their teaching style every week, and recording and analyzing the data collected.

Procedure

The students will end their first semester of the 2019-2020 school year with a quantitative and qualitative survey to allow the teacher to gather ideas as to the pre-conceived notions of the students relating to mathematics. The quantitative questions will each require a rating from the students on a scale of one to ten, while the qualitative responses will be short answer questions on the same sheet. These questions will all pertain to how the students feel about mathematics, what their experiences in previous classes have been, and also addressing what they love and fear about math. After responding to the survey and having the teacher study the responses, the class will be divided into three distinct categories by the teacher but will not be made public in the classroom. The teacher will just be aware of who is a part of each group. The groups are inspired by Martin Ford's Motivational Systems Theory, where motivation is defined by one's emotions, goals and self-efficacy, and the groups will be divided as such. If students are showing that they are being motivated to meet some sort of standard, or fearing they will not reach it, they would be placed in the "goal" group. Students basing their desire to learn or lack thereof on whether

they believe they can learn (or belief in how they are viewed) can fall in line with the "self-efficacy" group. Lastly, those who tend to be motivated by the topics that interest them will fall in line with those in the "emotion" group. The key of this study is not to simply distinguish who is motivated the most by a specific feature, but rather taking advantage of those mental challenges in order to find the best teaching method that will motivate each group most effectively. The process of learning is "ubiquitous in the way humans constantly adapt to changing circumstances, internally and externally," (Kytle 2004). If the best way for each group of students to learn can be discovered, it will allow them to not only be encouraged, but to evolve into greater learners.

Once the information is recorded and the students are classified, there will be three weeks of teaching with a teacher emphasis on goals, self-efficacy and emotions respectively, which will take place during the spring semester. Prior to this, a control week will have occurred just before those three weeks. For the three different weeks, the goal-based week will have the teacher encourage the students to learn for the sake of learning, the self-efficacy week will be taught with the intention to progressively challenge the students more and more throughout the week, and the emotion-based week will emphasize getting the students interested in the topic at hand. The students will be assessed twice each week so that the teacher can track their learning and record it to compare their performance each week. Once the four weeks conclude, the teacher will also have the students take a post-survey to allow them to reflect on their experiences, concluding roughly a month of differing teaching styles. A conclusion will have the teacher notice if the week which emphasized helping a specific group of students in a specific way was effective, and which week was the most beneficial for all students. The teacher should be able to

leave this study with an understanding of how they can adjust their teaching style to accommodate their students in the classroom.

Timeline

This study will be conducted in the spring semester, with survey being taken prior in the fall semester. The initial pre-survey, containing the quantitative and qualitative questions will be administered to the students, asking them about what drives them in their mathematics classes as well as what fears they tend to contain. The teacher will then work to categorize the students into the three different categories of students, whose personal thoughts concerning their education will relate them to a specific way they are motivated. Once the groups are created, the teacher will develop a series of personal techniques that they have learned to assist those in each group. However, an emphasis on different techniques will be conducted over different weeks. Since Ford's model consists of three different forms of motivation, there will be four weeks including the control week, and three weeks of three different teaching goals, so all three groups will be accounted for. Regardless of the number of each group of students, the amount of time the study takes can be adapted. In addition, if the class only has two different motivational mindsets and another is not present, this project can be adjusted to be two weeks instead, if the teacher deems it necessary. This will allow adequate time for the whole class of students to experience the different teaching attitudes and see how they all respond to each. Throughout each week, the students will be assigned two sets of formative assessments, which will complement the teaching style with an emphasis on encouraging the students with the same motivational component. These assessments will take place on Tuesday and Thursday so that they are equally and fairly spread out, and they will focus only on the content that will be taught each week. The assessments will not be graded but will still be encouraged to be completed with the utmost care.

These are simply to measure how much the students have learned throughout the week. As the series of weeks concludes, the students will all be required to take a post survey that is similar to the initial, with slightly modified questions to accommodate for the number of weeks it has been. The students will leave their feedback for how they feel about mathematics now and also which week was the most encouraging for them.

Analysis

The initial pre-surveys will be analyzed before the first week of the study, allowing the instructor time to classify the students according to their most attested motivational category. Going into the spring, the four weeks of studying students will occur. After the control week, the teacher will begin to analyze the responses to the assessments to understand how well the students are currently learning. These can be documented in a Google Spreadsheet or Microsoft Excel, with two columns for the first week's assessments, and then six more for the other three weeks taking place in the spring semester. The rows can be grouped separately into the three groups of students so the rates of change among the motivational groups can be distinguished clearly. It will also make it easier to graph should the teacher choose to create a visual to represent the change in assessment scores throughout the weeks. As the weeks progress, the instructor will begin to see if there is any change throughout the weeks. If there is little improvement or regression, the techniques will appear to have no effect. However, if there are changes in the slope of the data, the teacher will be able to see which form of encouragement will have been the most effective. As the post-survey has been completed, the teacher will also take the time to compare student feelings and motivation to where they were before. They may notice that the qualitative short answer responses will change while also looking at the different ratings the students left on the quantitative questions. This will allow the instructor to not only

compare the learning of the students, but also the different emotions they experience over the couple of weeks. If the teacher notices an improvement during a specific week, while also noticing positive responses about that week, the teacher may have uncovered the best way to reach their students and motivate them in the most effective way.

Data and Analysis

Prior to when the study was going to take place in the Spring of 2020, I had my selected class of 18 students participate in a survey (see next two pages) to help me evaluate how I was to group each set of students, based on the three categories of possible motivators. Every one of them completed the survey and gave excellent responses. The survey contained questions that could be measured quantitatively as well as qualitatively. The first question was for each student to rate their current confidence level in their mathematical capabilities on a scale of 1 to 5, with 1 being no confidence whatsoever, and 5 representing complete confidence in them. The second question contained a series of true or false questions that included whether they believed the math they were learning was useful, their feelings towards mathematics, and thoughts about their personal independence. Lastly, Questions 3 to 8 were about personal thoughts concerning mathematics, and themselves that they could express. I was able to measure responses to Questions 1 and 2 using a table to measure the amount of each response that occurred within the classroom. Concerning Questions 3 to 8, I recorded brief notes on my takeaway from each response, typically in the form of a word or two. However, Question 5 was the primary question I had used to group the students into the goal-motivated group, the self-efficacy-motivated group, and the emotion-motivated group.

ACTION Research Survey

Name: _____

Grade Level: _____

Class Subject and Grade: _____

1. Rate your current confidence in your mathematical capabilities with 1 representing having no confidence whatsoever, and 5 representing having complete confidence in your mathematical capabilities.

1 2 3 4 5

2. Respond to the following statements with either a true or false response, with "true" indicating you agree with the statement, while "false" indicates that you disagree with the statement.

True	False	I believe the math that I am learning will be useful after school.
True	False	Math is my favorite subject.
True	False	Math frustrates me often.
True	False	I believe that I am a person who sets good goals for themselves.

3. What do you like/love about math?

_____

_____

_____

4. What do you fear/dislike about math?

_____

_____

_____

5. What do you believe you are motivated best by? (keep it realistic. I will not be giving you money)

_____

_____

_____

6. What are your interests and hobbies?

_____

_____

_____

7. How do you wish to be perceived by others?

_____

_____

_____

8. Describe who you think you are in a sentence:

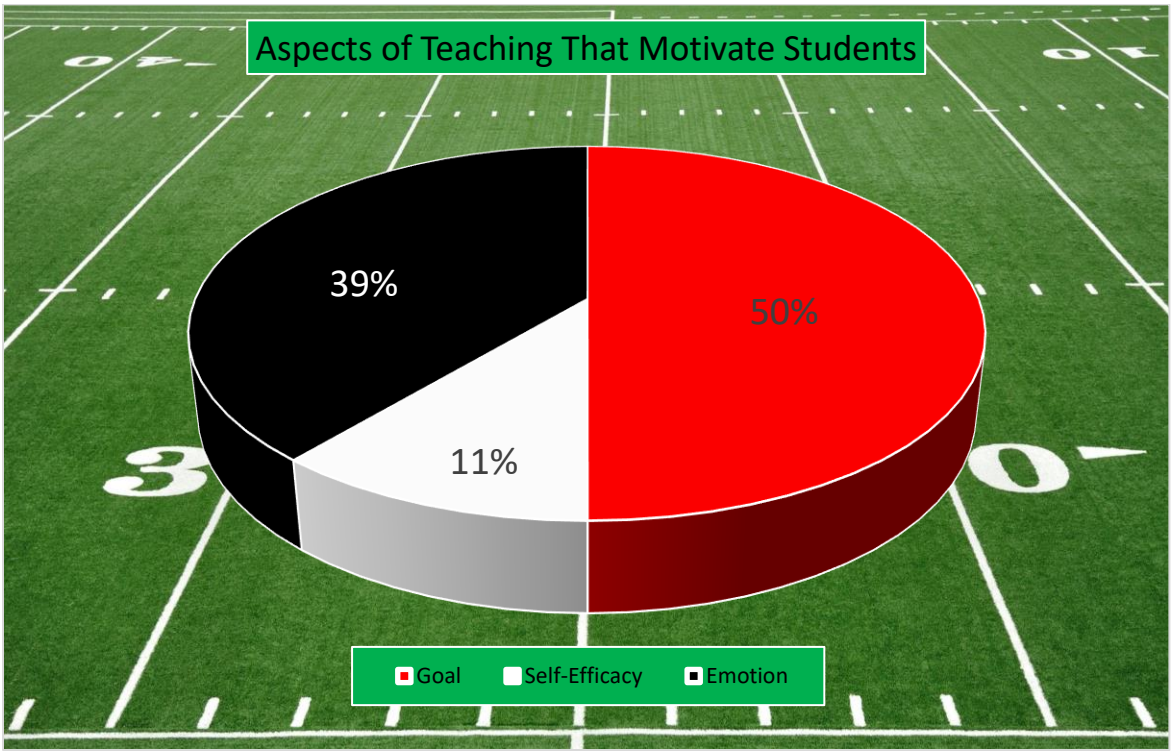
_____

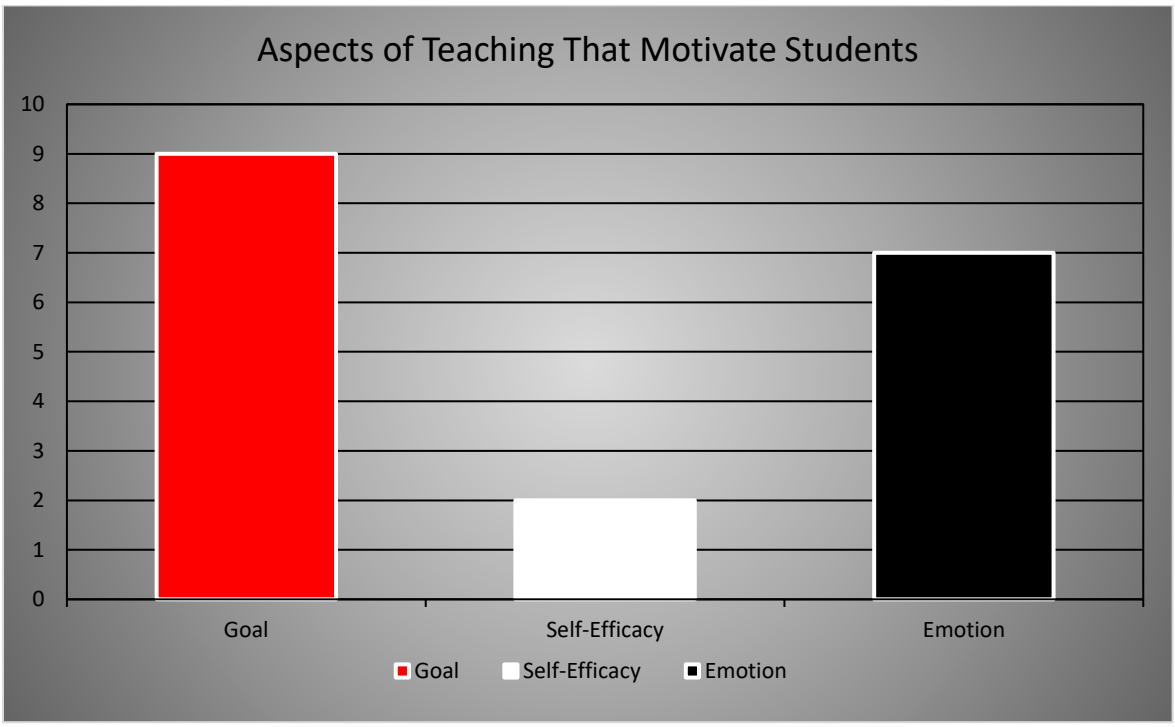
_____

_____

While other questions were taken into account, Question 5 clearly showed for me how I could categorize the students. However, I did look to other questions to observe current student motivation and confidence levels in themselves, just as a way to know who especially needs help turning their classroom mentality around. In addition, I studied some questions just for personal rapport building, so that way I could see student interests (Questions 7 and 8); so while I was collecting data on their classroom mindsets, I was also seeing how I could appeal to them to increase their likelihood of becoming more motivated.

Utilizing Question 5, I grouped the students into the three groups, and these two charts revealed to me how the classroom was made up in terms of motivation:





Concerning the majority of students in the presurvey, there were definitely two different groups that could have been classified. Most students either described themselves as goal-oriented or emotion-oriented, with only 2 of the 18 students being classified as those motivated by self-efficacy. I initially intended to graph this in terms of the percentages of students, but with a smaller sample size, I felt it necessary to graph this in terms of the number of students, as I wanted to make others aware that the sample size I am selecting from is quite small. Despite this, it was the largest class I could possibly study. The students who were classified as goal-oriented were those that claimed that the best form of motivation they could be offered was better grades or additional bonus points, due to the fact that the students were chasing a particular goal (a high grade). Ideally, the goal-oriented teaching would have taught them about the importance of setting healthy goals, where grades are used to show how much they know, rather than making the grade a priority above the learning. The two students who were classified as being self-efficacy-oriented were those that gave responses such as being motivated to be viewed well or

make others proud of them. Ideally, self-efficacy-oriented teaching would have challenged them in a way to provide them with more confidence in their abilities, rather than feeling they had something to prove to others. Lastly, the group of students who was classified as emotion-oriented were those that were motivated by their personal interests. Food was a common response, and while I did not intend on providing food, I knew that these were students who could be appealed to by their interests. The other answer that was given concerned various hobbies, including one as specific as dirt bikes. Using emotion-oriented teaching, I could have utilized student interests (found in Question 6), in order to help them see the value of the mathematics in real-world scenarios connected to their hobbies. With my groups created, all that was left was to enter into the study.

Complications

Unfortunately, this is the point where problems arose in the study. Due to complications with the COVID-19 incident, I was no longer able to enter into Arlington High School to begin the experiment. As a result, no data could be measured, and while I may be able to examine assessments virtually, there would be no way to teach in various manners that would appeal to each of the individual motivation groups. In addition, I would not be able to observe the emotions and expressions of students as they experienced various teaching approaches. With classroom engagement being directly tied to how I would attempt to motivate my students, there was no room to progress in this area. I can only respond about the remainder of this data from a purely theoretical approach. With that being clarified, I will express my hypothesis on how the study would have went.

Questions 3 and 4 provided a perfect look at the student perception of a mathematics classroom as well as their current understandings of mathematics. The data for Question 3 was shocking as when students were asked to describe what they enjoyed about the math classroom, all but three responses were the following: It was easy for them, it is a class where there is always one answer, or they had nothing they enjoyed about mathematics. What this clearly demonstrated within this particular class was that if a student was not able to get an answer easily, they were to have troubles finding motivation within the classroom and enter into a place of despair. Question 4 built off of this and revealed to me that all but one student in the classroom was afraid of (or disliked) something in a mathematics classroom. The responses can be best explained as mathematics being too difficult, moving too fast, being incorrect, or receiving "bad" grades. Based on these two questions and their responses, there was a significant lack of confidence within the classroom and their abilities. The data showed that the students were expressing mindsets that were not growth-based but performance-based instead. They were confident when they would do well and they were fearful of failure. These are common emotions to express, but when a classroom is full of opportunities to be tempted to focus on performance, it can be paralyzing. In addition, there was a significant misconception that many of these students believe about mathematics: The idea that there is only one solution. When a student expresses this, I cannot help but think that they do not think about the value in their own problem-solving process. It is all about getting to the answer, and not taking time to reflect on why they thought about the problem in the way they did. To make this simple, the students did not value their own minds. The students needed to develop greater confidence in their mathematical abilities, instead of finding their worth in point totals. While each of the three ways

a student can be motivated could contribute to this, one would help in a way the other two could not.

Self-efficacy is described as one's belief in how they view themselves and their potential. With this being a theoretical component of motivation, it creates a direct link between student confidence and motivation. Therefore, if students could develop greater confidence in their mathematical abilities, it would be important for the teacher to appeal to them in a way that builds them up. From there perhaps the other two approaches of appealing to goals and emotions could have taken root. However, if someone was to set goals, but had little confidence in themselves, it would only make sense that there would be less of a desire to persevere. In addition, while emotions can be appealed to by making connections to aspects of student lives, if students were not confident in their mathematical abilities, then even their interests likely would not motivate them as much since the mathematics they still fear would still be present. I believe that while the data I collected pointed to a small group who were classified as being self-efficacy-motivated, there may still be some of those feelings within each of the other two groups. Goal-setting as well as putting effort into something you are emotionally connected to can require a fair amount of confidence, so perhaps the key to being motivated in any aspect of learning has to be the confidence in oneself, and from there everything else will come.

Conclusion

In order to adequately respond to the data, I have collected, and the data I would have collected, I have organized my thoughts on the entirety of this assessment into a series of responses to various questions about the study. With the implications of what this study could have yielded, it is important to ponder these questions and think deeply about the application of the study into the preparation and differentiation that teachers implement into their classroom. Despite the lack of data, there are still many conclusions that I was able to reach regarding student motivation. In addition, reflecting back on how I prepared for this research, there were certainly approaches taken that likely could be improved upon for the next attempt. The following questions will dive into my current thinking:

What were some of the main messages that emerged from my research?

In terms of what messages, I hoped would arise from this experiment, I wanted to see the best approaches that teachers could take in order to motivate students. Too often, students are only basing their desire to learn on a performance-based mindset, where their only goal at the end of the day is to excel in their grades. If this is true, then what does this day about the valuable information that we claim to care so much about? As much as teachers should care about how each of their students grows, they should also care about showing why the material they are attempting to teach matters. In my case, math should not be something that needs to be overcome, but something that must be cherished and applied. Theoretically, I would like to have seen which approach led to an increase in conceptual understanding, but also intrigue and possibly joy in what is being learned. It all comes down to the culture that is being established within the classroom. Perhaps a goal-oriented classroom could have offered a competitive (but

healthy) drive in each of the students to persevere in their problem solving, and hunger for solutions. In the scenario that a self-efficacy-based class turned out the most effective for the class as a whole, it may have shown that students developed greater confidence in their mathematical abilities than before, which gave them the drive to speak up and engage, so that they can ask questions and justify their mathematical reasoning. If the class as a whole was found to be more invested when topics they cared about were introduced, then perhaps the message there would have been that more relevant scenarios would need to be provided for introducing various mathematical concepts; either that, or better reasoning would need to be provided to justify why they should care about real-world scenarios they are not as interested in. If all three types of classroom cultures worked, but each for the respected group of students they were a part of, then the message may have been to value differentiation as more than something for the few students in a classroom that have various learning needs.

What did I learn about my students and/or myself through this study?

There was not much to report about any findings in relation to myself. However, when recording the survey data, I was definitely intrigued by the many responses to Questions 3 and 4 which revealed various negative feelings towards math. It is not that this surprised me in the slightest, as I believe most can agree that math is not a popular subject in our culture. However, I did not expect as many as there were stating they had nothing they enjoyed about math, and that the majority of the fears that students experienced concerning math were not about math itself but rather the classes they had been a part of. It made me realize how intensely education is viewed as “grade-getting” rather than having opportunities to learn and grow. Data like this certainly confirms that there has been a disconnect between the purpose of school, and how the

students are currently learning. It is more about self-worth coming from scores than anything else.

Despite this, I was also able to learn about various hobbies and interests of my students in Questions 6, 7 and 8. I learned a little bit more about each of the personalities of my students, and also how diverse their hobbies are. Some students expressed interests in dirt biking, snorkeling, and even grilling (which I was impressed this particular student knew how to grill at such a young age). This did not contribute as much as I would have hoped to the study, but it did help me to have better conversations with my students as a result, and develop greater rapport with them. These were also helpful for making me aware of students who needed additional encouragement in the classroom, as some students were a bit harder on themselves than they should be at their age. In Question 8, where students are prompted to describe themselves in a sentence, some described themselves as caring or funny, while others felt like they were unheard or unimportant. These were heartbreaking to read, and made me quickly realize how some students need hope and encouragement in their lives. It definitely pushed me to reach out to them and make sure they were considered valuable in the class this semester. I just wish I could have had more time with them to continue to check in on how they are currently feeling.

How will the results of my research influence my teaching in the future?

Considering how this could have helped my teaching in the future, I definitely could have seen this research leading to determining how I would establish my classroom culture. The difficulty with student teaching is that it is much harder to establish a healthy classroom culture early on in the school year. When I was finally in a position where I was taking over classes, it was towards the end of the first semester. By then, a culture was established with the teacher

who I was working with and the students; any approach I took that was different to their norm was not met with great enthusiasm. This was an issue that this research could have helped me to prepare for whenever I would take the reins of a classroom from the very beginning. Student teaching is a great tool for preparing aspiring educators, but does not provide much of a chance for students to work consistently with students from the start (except for the one day per week that we were permitted to come in). By gathering an idea of how I can best motivate my students, I can add this component to the initial standards and guidelines I expect my students to follow.

What would have been some of the limitations of this study?

While my research may have offered to me what the best approach to motivating a student may be, it likely would have only done so for students within my specific school setting. The reason I propose this is because the demographic at the school I was placed at was almost entirely from the same upbringing. Most students come from middle to low-class families that live within the rural areas of Northwest Ohio. In addition, the racial diversity within the school is next to none, as all but three students are Caucasian. This research may have showed how to push students within this demographic, but it has not been tested on students who come from different city types and school districts. Just because an approach is effective for a student at a small, rural school, that does not imply the same approach will work for a student at a large wealthy school, or a student at an inner-city school. Various upbringings may yield different expectations and different ways to meet the current needs of each student. To generalize this data for all students would be to force one idea on various groups of students, which essentially goes against everything educators that differentiate their lessons stand for.

Another element of my research to note is that the selected sample class was primarily composed of some of the best students I teach. There is a total of one IEP student in the entire class, while the rest are composed of above-average learners all the way to gifted. To see which teaching approach yields greater motivation and educational growth, I would need a sample of students which are diverse in their current ability to persevere in the classroom. The two classes I could have chosen between for this experiment were a class with less students but more diversity in current student standings, or the class of primarily above average students with a larger class size. I went with the latter because there was a much larger sample size and it was also the largest class size of any of my supervising teacher's classes. Perhaps I should have sought more diversity than a larger quantity, but it was a situation where I would have picked poison either way.

Are there things I could have done in this study that, in hindsight, might have made it stronger if I was given the chance?

The selection of a different class could have quite possibly made a difference in terms of how various students at different places in their learning respond. The other class I could have chosen was a class primarily containing more rebellious students with less mathematical motivation, but with 3 other students who were invested in their learning. This may not seem like a great difference, especially when compared to the one IEP student in the class I chose (as both classes lacked some diversity), but with 11 students in this class that was not chosen, that accounted for almost one-third of the demographic. There was more diversity in that classroom, although the sample size was smaller. Perhaps if I chose this class instead I could have at least observed how different types of learners could become motivated, even if I could not obtain a large enough sample.

Another possible approach could have been to simply collect data from both classes, since they were learning the same material at the same time. This would have given me a sample of 30 students with a much greater amount of diversity. I was hesitant to approach it this way as if students were in separate classes, I would not be able to see them all collaborate together. However, it could have made a lot more sense than choosing the class of 18 students that I ended up choosing.

If I could continue this study with other students, in another classroom, what would my next step be?

While I was not able to collect the core of my data (only the pre-experiment data), I have pondered several possible next steps that could be taken if this study was to continue into another class. I believe the first step that would have to be taken would to be to take time to invest in the students for who they are, and not for the sake of study. If I was to attempt this study during the next school year, I may not know much about the students, and therefore I would need to take time to get to know them personally first. After spending time getting to know their mannerisms, their desires, and how they are motivated (directly with the survey and indirectly through teaching), I could group them again and continue the study from there. The class I began this study with was one which I already knew a decent amount about and had developed solid rapport with. Future classes will not have that luxury, and therefore I would have to start from the ground up with developing new connections with the students. Hypothetically, if this all occurred, I will be able to move into a later phase of this research. After this would occur, I would likely want to attempt this study in class with a different classroom culture. With only one student in this previous class being on an IEP, I believe it would make sense to look for classes where students on IEP or 504 plans are the majority. In addition, there is an Intervention

Specialist who I closely work with already in my other Algebra I class, and he knows many of the IEP students I teach well. If my research was to continue on, I would like to pick another class which contains a majority of IEP students so I can record their views on mathematics as well as how they are motivated. From there, we can continue with the same experiment as before, seeing if there is a significant difference in students on IEP and 504 plans as opposed to students who are not. To take it one step further, another valuable question that could be added would concern how much of a role does the intervention specialist have in motivating these students. Intervention Specialists are utilized to help meet student learning needs, but does this motivate students more, or give a possible other response. Perhaps it could tempt the students to rely less on their abilities and more on how the Intervention Specialist helps them, making them less independently motivated and more dependent. To summarize, these new steps would be to study if the motivation of students with more learning needs would be different, and how does their specialist contribute to their current motivation. Since these students are the ones who often need additional assistance in their learning, if there can be data collected that can equip them as greater learners, it is absolutely worth studying in detail. If these students were motivated differently from a class with less IEP students, then a new form of differentiation in the classroom may have been discovered, helping all learners to find greater passion for what they are learning and being able to apply it throughout what lies beyond.

Annotated Bibliography

Ames, Carol. 1992. "Classrooms: Goals, Structures and Student Motivation." *Journal of Educational Psychology* 84 (3): 261-271.

This journal is centered around contrasting between performance goal setting and goal setting with a mastery mindset. Students who are seeking to grow in their learning will choose a mastery mindset because they are focused on mastering the material rather than scoring highly on tests. This is the type of motivation that students must possess if they are to learn proplerly.

Campbell, Michael M. 2007. "Motivational Systems Theory and The Academic Performance of College Students." *Journal of College Teaching & Learning* 4 (7): 11-24.

It is common for students to believe that the reason they are in school is to obtain good grades. However, their intentions should be on learning rather than scoring well because that hinders their abilities to retain information and instead memorize to the test. This journal taught me where students are truly finding their identity in the classroom, and it is not in how they are learning.

Covington, M. V., and C. L. Omelich. 1984. "Ability and Effort Evaluation Among Failure-Avoiding and Failure-Accepting Students." *Journal of Educational Psychology* 76: 1038-1050.

Students often struggle to find their identity while in the school setting. This is most prominent in the classroom, where students who perform well think higher of themselves that students who are struggling. This conflict can cause students who are struggling to lose the motivation to continue on as learners, choosing to instead believe they are incapable of learning.

Dickinson, Donald J, and Joseph A Butt. 1989. "The Effects of Success and Failure on the On-Task Behavior of High Achieving Students." *Education and Treatment of Children* 12 (3): 243-252.

This journal article is focused on how students respond to different difficulties in the curriculum they study. Making the class too challenging or simple will result in students losing the desire to learn. However, hitting a spot where students are feeling somewhere in between allows the students to be challenged, but not to the point where they struggle to believe in themselves as learners.

Ford, Martin E. 1992. *Motivating Humans.* Newbury Park: Sage Publications.

This book is the center of how I intend on measuring motivation in the classroom. Students contain three different motivational components and need to be able to have all of them functioning properly so that the students are able to be motivated to learn. They need to have self-efficacy, goal setting capabilities, and a growth mindset that are all healthy.

Fried, Robert. 2001. *The Passionate Learner.* Boston: Beacon Press.

This book is less concerned with how to have students excited in the classroom, and more on how to reach them. A teacher must be passionate about the material, otherwise the students will not be interested in the slightest. The key to developing a learner who is passionate, is to have a passionate person sharing with them. It does not require students to jump out of their seats, but rather to listen intently.

Kytle, Jackson. 2004. *To Want To Learn.* New York: Palgrave Macmillan.

It is easy to believe that students will always contain the exact same mindset when learning. However, this book suggests that like any other human, students adapt in their thinking constantly. Circumstances change, mentalities change, and conclusions to experiences change as well. To guide students into a mindset where they are motivated, it might require that the circumstances around them change, starting with how the teacher teaches.

Seifert, Timothy. 2004. "Understanding Student Motivation." *Educational Research* 46 (2): 137-149.

Whether we wish to admit it or not, feelings have a tendency to triumph over facts in our minds on occasion. In a classroom, students often believe certain factors about the environment around them and that impacts their desire to learn. This journal article shows that for students to learn, their perceptions of their classroom reality need to change.