The Effects of Real Life Applications in an Algebra 1 Classroom

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I. Introduction

"When are we going to use this?" is a question I have been asked too many times throughout my minimal three years of teaching. It is a valid question but I get annoyed with it because after I give students real life examples I get the response "I don't want to build bridges when I grow up so I won't need to use this." This causes my frustration level to skyrocket and leaves students uninterested in the curriculum. This has lead to my overarching question; will incorporating real life examples of mathematics into daily lessons affect student interest and motivation? I am hoping by incorporating more real life examples of mathematics into daily lessons, it will prevent the question of "when are we going to use this" and will ease my own frustrations.

I have always had an interest in mathematics and did not worry about real life examples. I love the logic that goes into solving problems as well as being able to support the steps you took in solving a problem. You can show all of your work and explain your steps. This is what has made mathematics so appealing to me. Now that I am teaching mathematics at the high school level, I'm learning not only are there people who dislike math, but there are also people who do not understand why we need to learn it. I have tried to explain it as learning a logical way to solve problems that can be transferred over to real life problems. This does not seem to be a good enough answer to high school students. I have told my juniors they will need it for their SAT, still not a good enough response. I am hoping by implementing real life examples into daily lessons, students will start to make the connection that mathematics is more than just plugging into formulas and getting the answer. I find myself saying this year more than

others, “I don’t care about the answer, I care about how you got to your answer. It’s about the process.”

This year, I am teaching three sections of the advanced level of Algebra 1 to freshmen. This is my third year teaching this course so I am comfortable with the curriculum. I have very small classes, all less than 15 students. The students are doing well in class because they want to do well. I am not concerned with how my students are doing on tests and quizzes but more so about why they are interested in learning. At the moment, my students are taking notes, completing homework, and hoping to do well on tests and quizzes so that they can get that A. I am aware this could be a much worse situation. I am in no means complaining that I have students that are not motivated however; I think the implementation of these real life examples will make students more interested in the topic of mathematics and will allow them to start seeing how and when they use math in their daily lives.

In my past two years of teaching Algebra 1A, approximately half of my students stay in the A level and the other half drops down to the College Prep level. Geometry in itself requires more thinking and application than Algebra 1 does. There are proof problems and a substantial amount of word problems. In our high school, many students in Geometry A opt to drop down to Geometry CP because the CP course does not have proofs and the problems are not as challenging. Some of these students are capable of staying in the A level however; they are overwhelmed with the transition from Algebra 1 A, mainly drill problems, to Geometry A, mainly application problems. I am hoping by implementing real life application problems in Algebra 1A, more of my students will stay in the A level next year in their Geometry course.

I teach at Watchung Hills Regional High School. There are over 2,000 students currently enrolled in the high school, all coming from four different middle schools. It is an affluent area and parents are very involved in the school system. I have parents that email me on a regular basis to check in on how their son/daughter is doing in class. Students in our district are expected to do well by their teachers as well as their parents. There are 26 mathematics teachers in my department. We all tutor students in the district ranging from 2-8 students each. For the most part, parents are very supportive when I suggest their son/daughter needs to come in for extra help.

Last week, after deciding on my topic mainly because of the students I have had in the past two years, Billy, one of the freshmen in my advanced algebra class asked "When are we going to need to know this in real life? When will I need to know how to combine exponents?" My response, "Billy, I am so glad you asked that question! We are going to be seeing much more real life examples in this class." Although I am normally irritated by this question, this time, I was happy to know that my research topic is still applicable to my current students.

In addition to wanting to research this topic for my own interest, I think it will be beneficial in the upcoming years. I am hoping this is a successful research topic and that I see an increase in my students' interest in mathematics and their ability to make connections between mathematics and the real world. This year, the administration in my school is looking to have teachers make connections between what we are teaching in the classroom and why this will be beneficial for students. For each unit, we have to create essential questions that will make this connection between classroom context and real world application. We have to have these questions posted on the board daily to help

students see why they are learning this material. I understand the administration's goal in this however; my students could care less about the question on the board. Their main concern is whether or not they need to copy it into their notes. I do agree it will be important to have students make a connection between what they learn in the classroom and applying it in the real world, and I am thinking this may be one of the outcomes of my overall research topic.

II. Literature Review

Harvey (2010) wondered how will children respond to a mathematics lesson where they are asked to solve a real life problem before being taught the lesson? A teacher in New Zealand video tapes his lesson to a class of 22 average level female math students. The teacher begins by asking students why they need bridges in their area. After going over the relevance of bridges, he shows the students pictures of bridges. Students are asked to create a table and graph to represent the amount of triangles on a bridge's structure per km. The students are able to create graphs and tables but need the teacher to help them think further about their results.

Through the use of questioning, the teacher is able to get the students to bring the reality of bridges into their problem. Afterwards, the students complete another problem dealing with finding the area of a figure in room. They are given a visual and dimensions of the room. The students need to use reasoning skills to decide that the item in the room must be smaller than the size of the room. Through discussion and reasoning, the students are able to solve the problem logically.

The most interesting aspect of this teacher research was that the teacher gave students problems with real life examples that did not directly correlate to what they were learning. In most math classes, students are taught a lesson, then given problems to complete that follow the same steps the problems taught in class did. The word problems in many textbooks relate back to a formula once the students separate the necessary information from unnecessary. I was impressed that at the end of the lesson in this article, the students showed they had the skills to solve problems through the use of formulas but more importantly, through their own knowledge of reality.

This research was based on only one lesson at an all girls school. I don't think using lessons based on all real life problems daily would be as effective to the student's learning as it would to use them to supplement the current curriculum. I also am interested in knowing how effective this would be in a group of freshmen students or in a classroom mixed of males and females. The teacher in this particular situation was happy with his results but I would like to know more about this idea outside of a classroom of all female junior students.

Md (2012) believes using real life example can make mathematics more interesting to students but questions if it truly is the best way to teach mathematics. "Are we sacrificing the essence of mathematics in order to motivate students to learn and appreciate mathematics?" The article focuses on high school students in Malaysia. Prior to this article, Malaysia had changed its secondary mathematics curriculum to focus on more real life problems and less on giving students formulas that worked then problems to solve by using those formulas.

One of the students said she preferred a more concrete way of learning because it was quicker to learn the material and get the work done. I understand why a student would feel this way, and anticipate that some of my own students feel this way, but I feel real life examples help students have a deeper understanding of the material. In life, students are not going to be given problems where they are given all of the information they need to solve a problem. They will need to differentiate the important information from the extra information and will need to apply mathematical skills to their situation; it will not always fit into a formula. I am becoming frustrated with one of my freshmen algebra 1 classes because many students just want to give the answer and do not see the importance in why I am so focused on the process.

This author of this article expresses that there are students that major in mathematics because they enjoy problem solving and the real life applications of math. The issue some of these students are facing is that when they get to the higher-level mathematics classes in college, they are proof based and students have not been prepared for this type of instruction. The author's main concern is whether or not it is worth it to use real life examples to make math more interesting at the more introductory courses in high school when the courses at the college level are not changing and therefore, the change in the high school curriculum is not preparing students for college level mathematics.

I loved math in high school, which is why I decided to major in mathematics in college. I do agree with some of what the author is saying in this article. The mathematics I was studying in high school, even calculus, was interesting to me because there was a clear method to solve it. I did enjoy many of my college mathematics classes

but the curriculum was much more rigorous at the college level. When I did take proof based courses such as Number Theory and Linear Algebra, I had difficulty and had to seek out extra help from my professors during their office hours. I had a tough time seeing the significance in why I was enrolled in such difficult math courses when all I wanted to do was teach mathematics at the high school level. As a mathematics major, I understand what the author of this article is saying and agree that a high school mathematics curriculum focused on real life examples is not enough preparation for those looking to major in mathematics. On the other hand, there are not a significant amount of math majors. I think it is beneficial to more students to make mathematics more relatable at the high school level through the use of real life examples. I do not think a curriculum should be solely based on this but I do think these examples should be used to supplement current lessons.

Curtis (2001) discusses the positives of project learning. Sylvia Chard, coauthor of Engaging Children's Minds: The Project Approach, defines project learning as ""in-depth investigation of a real-world topic worthy of children's attention and effort." She advocates a three-phased approach: Phase 1 involves an initial discussion of a project topic, including children's firsthand experiences related to the topic. Phase 2 involves fieldwork, sessions with experts, and various aspects of gathering information, reading, writing, drawing, and computing. Phase 3 is the presentation of the project to an audience."

Diane Curtis, the author of this piece, believes students are more interested and enthusiastic about their learning when you start with a real life problem, then have them use the curriculum to solve these problems. Curtis gives examples of projects that have

been successful in this such as having students learn about soil and bacteria by creating pamphlets. Students had to consult microbiologists, do research, then distribute their pamphlets.

I agree with Curtis that students will find material more interesting by seeing real life applications of the material they are learning. Curtis believes projects are a great way of having students complete the material in the curriculum. Projects are common in elementary and middle schools but once students are in high school, it becomes more about learning the material. I would love to have my students complete projects and research topics on their own but there is not enough time in the school year. We would not be able to finish the curriculum. With the implementation of standardized testing in high school mathematics classes next year, there will be more of a focus on the curriculum than on making the curriculum fun. While I do think it would be fun for students to create projects on every unit, it is not realistic for high school students.

Colvin (1999) explores the debate over whether a traditional classroom or a classroom that studies real-world applications is more beneficial to students. A high school in a suburban area in San Diego County had many parents concerned with the current mathematics curriculum, Interactive Math, which was based on real world problems where students perform week-long investigations with little emphasis on formulas or practice of formulas. A number of parents felt their children were not being prepared for standardized tests and wanted a more tradition mathematics curriculum in place. The superintendent gave parents the option to have their children enrolled in an Interactive Math curriculum or a tradition mathematics program with more time spent on formulas and problems using those formulas.

The interactive math class was very student centered and had students presenting their work, working together in groups, and going over homework with their peers. The traditional mathematics class was teacher-centered with the teacher in the front of the room, giving the answers to the homework and answering student questions.

According to the article, interactive math is used in more than 100 schools across the country with studies showing students in these classes have not done worse or better on college placement exams than students in traditional math courses. After implementing this course for a few years in their district, an over-whelming amount of parents were choosing to have their children in the traditional mathematics course. The issue was not that there weren't enough students to fill the interactive math course but that the students being placed in the traditional mathematics course were the higher-level students. The interactive mathematics course is successful and beneficial to students when there is a range of student levels in the course. Due to the higher-level students being placed in the traditional course, the interactive course was full of weaker students. The school decided to end the interactive mathematics course due to the demand by parents for students to be in the traditional course. The article stated some teachers who were proponents of the interactive math program were bitter that the parent influence in their district is what ended this course.

After reading this article, I see some positives to the interactive mathematics course but I don't know that I would want to teach that course or have my own children enrolled in that course. I like the idea of having the classroom be student-centered and having students work together to solve problems. I really like the idea of incorporating real life applications into problems and showing why these topics are important to the

real world. I have seen a version of this course, Connected Math, and I am not a fan of it. It has every lesson introduced through and investigation and ultimately, does not give students formulas to solve problems. I like using investigation for some math lessons in my classroom but I do not think it is the appropriate approach to all math lessons. I also do not agree with not giving students formulas for problems. They are going to be given these formulas when they take their SAT and if they go into any kind of an accounting position, they will be using formulas as a daily part of their jobs. My ideal classroom is a blend between the traditional and interactive math classes.

Portal (2001) is a high school mathematics teacher trying to get students more interested in mathematics. She uses cooperative learning, teaches to multiple intelligences, and uses real life examples in math class. She has students complete a pre-research survey to find their current attitudes towards mathematics in the classroom, their motivation for learning, mathematics in real life, and their confidence level in mathematics.

The teacher changed her current teaching strategies by creating application problems that relate to students' lies, using cooperative learning activities, incorporating multiple intelligences, using discovery learning tasks in the classroom, and implementing student-based project. While I think these are all great topics to focus on, I think it is a bit much for one research topic. My research question is most similar to this article, however; I am only focusing on real life examples and student-based projects/assignments.

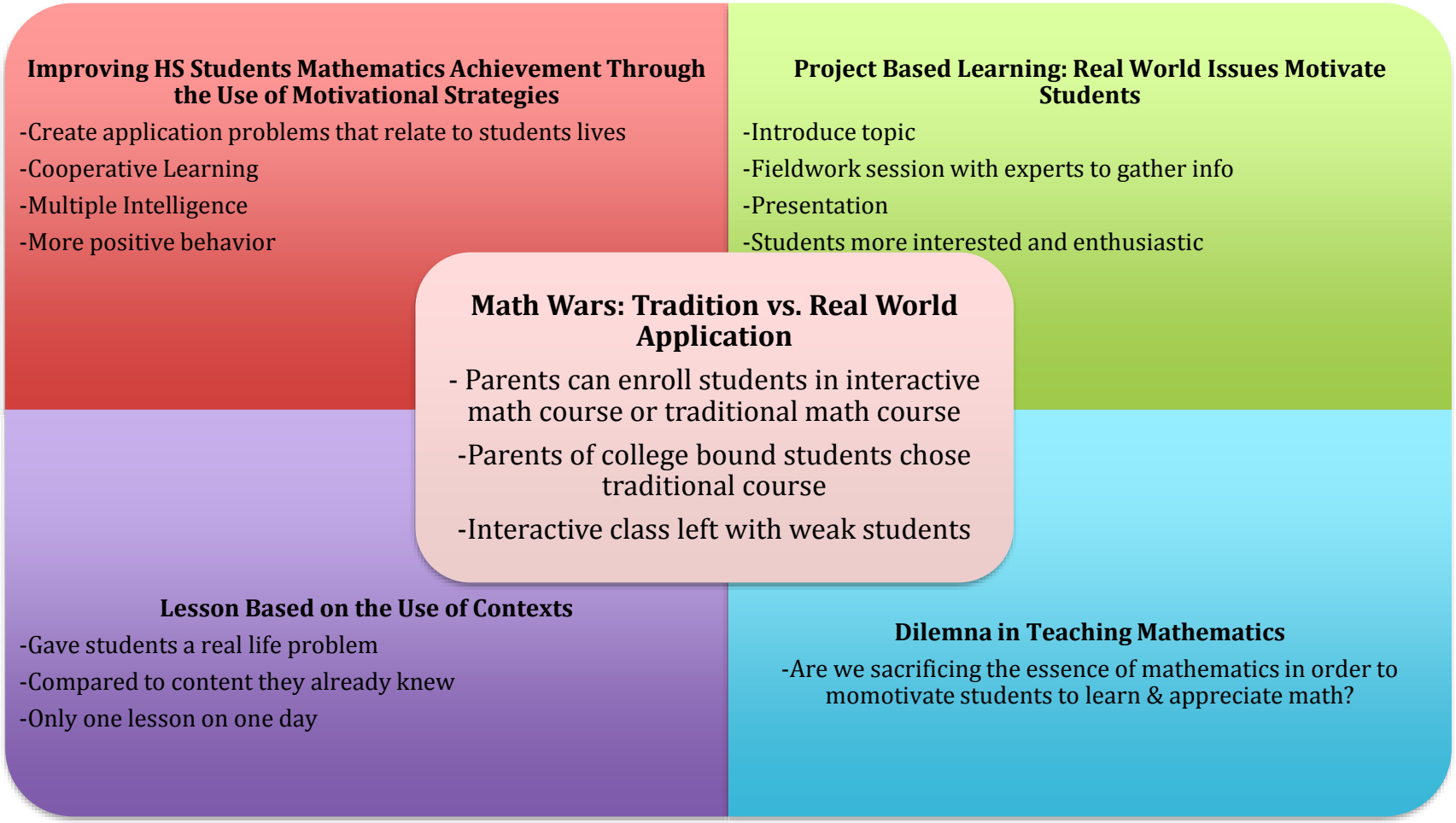
Over the course of five months, the teacher makes these changes in the classroom and gives them the same survey to complete. She finds that students were more

interested in math class but there was not a significant change in the amount of students who felt they used math everyday or that would use math in their future. There were less students failing but also some A students became B students.

Through observations, the teacher noticed more positive behavior, not necessarily a decrease in negative behavior (calling out, being off tasks, talking to other students). I am curious if the teacher would have seen more results regarding students' motivational strategies had she focused on three out of the five of her original topics.

All of these five articles were beneficial to me in one way or another. Some of the articles gave support for using real life examples in mathematics courses while others talked about the negatives of using real life examples in mathematics courses. The article that most relates to my questions was *Improving High School Students' Mathematics Achievement through the Use of Motivational Strategies***.** Although my research question is similar to the one in this article, the teacher in this article focused on many other topics as well. She had five topics she was focusing on, where I am only focusing on two of those topics. This teacher did not find any change in students' motivation in her classroom. It is possible, that had this teacher narrowed her focus onto three of these five topics, she could have seen more of a change in student motivation. I am focusing on two of her topics, real life applications of mathematics and student-based assignments. I am hoping by focusing on these two topics, I will see more students interested in mathematics and motivated to learn mathematics.

Q: How will incorporating real life examples into an Algebra 1 classroom effect student interest and motivation?



III. Methodology

This year, I am teaching SAT Prep, Advanced Algebra 1, and Advanced Pre-Calculus. The students in my SAT class know that they are in the course in preparation for the SAT exam. The seniors in my Advanced Pre-Calculus course are taking the course by choice either because they want to learn the material or it is required for the college they are applying to. The freshmen students I have in Advanced Algebra 1 do not realize the importance of the course they are in. It is the foundation of every math course they will be taking in the future. My students have accepted this response but they do not see the importance of mathematics as a subject matter they must learn. I am hoping to change my students' interest and motivation in learning mathematics by incorporating real life examples into daily lessons.

The Algebra 1 class I used for my research is composed to fourteen students, four males and ten females. All students are freshmen at Watchung Hills Regional High School. The high school is located in Warren, NJ, an affluent area with over 2,000 students enrolled in the high school.

Before I began this research topic in my Algebra 1 class, I collected preliminary data from my students through the use of an exit ticket. In December, before winter break, students completed the first exit ticket, which I used to collect preliminary data. This exit ticket had statements for students to respond to about their interest in mathematics where they had the option to strongly agree, agree, disagree, or strongly disagree with. There were also be statements focusing on seeing mathematics and using

mathematics in daily life. By gathering this preliminary data, I had the ability to show growth in student interest and motivation.

Once we returned back from winter break, we started a new unit on multiplying monomials, binomials, and trinomials. This concept was very different from what students were used to learning. Students had to think about the method needed to solve a problem as opposed to solving simple equations. In addition to the current problems I used to teach this material, I included more real life problems. For example, I instead of asking students to multiply two polynomials, I gave them a word problem where they need to draw a diagram of a garden and set up two polynomials, then multiply them. It covered the same material, but allowed students to see a real life application of the material. This is also a high-level thinking skill and ideally will help the students have a deeper understanding of the material.

I included more real-life application problems for the next two units, which took us through February. At the end of each unit between January and February, students completed an exit ticket similar to their initial exit ticket from December where they were given a range of statements and asked to agree/disagree. These exit tickets will became a valuable part of my data my data.

In October, I had my Advanced Algebra 1 classes create their own equations. The only requirement was that when we solved their equation for x, we needed to come to the solution x=2. I wanted to show the students that they could create an endless amount of equations where x would equal two. My students struggled with this concept. They had no idea where to begin and showed frustration at this assignment. I gave students the advice to work backwards to solve the problem. This helped some students but others

still had no idea where to begin. I ended up putting an example on the board and going step-by-step through the assignment. This clarification was enough for most of the students to understand the general idea of the assignment but when students checked each other's work, there were multiple responses when after solving, x did not equal 2. Although I did not realize it at the time, this can serve as preliminary data for this research topic.

Creating is now at the top tier of Bloom's Taxonomy. I started my research with the goal of getting my students to the creating level by having them create their own real life problems in our Algebra 1 class. I started by showing having students solve real life world problems where they would need to apply knowledge from our current unit, multiplying binomials, in order to solve the problems. We spent one class period going through four of these word problems. For homework, the students had to create their own real life world problem. I wanted students to get creative with their word problems by creating original scenarios that could be applied to this unit.

The next day, I collected the assignments from the students and had them work in groups in class. Many of the students had trouble with the homework assignment and struggled to come up with original scenarios. I had students work in groups, mixed with males and females. They had to create one word problem as a group. They had to create their own idea for a word problem, write it out in words, translate it into an equation, solve the equation and create a diagram to represent their question. They put everything onto a poster paper and presented them at the end of class.

The second unit I used real life examples still involved the multiplication of monomials but took it a step further with students having to solve for a missing area. The

example we did in class together gave students a garden with a walkway of uniform width surrounding it. We knew the dimensions of the garden and the total area of the garden and walkway but needed to find the area of just the walkway without knowing its dimensions. This is a complex problem for Algebra 1 students to solve let alone create. We followed the same pattern as we did in the previous lesson where I spent a day going over these types of problems with the students then had them create their own problems in class the next day. Because this was a more difficult concept than before, I had the students work in groups of 2-3 as opposed to 4 so that every participant in the group would be forced to contribute.

I had students complete survey styled exit tickets prior to my research and at the conclusion of my research. Students were given statements regarding the importance of mathematics in high school, in daily life, as well as how often students make the connection between mathematics being learned in the classroom and real life scenarios.

Throughout my research, we completed two units both of which students had an assignment to create real life word problems. After the first unit, where students created problems that required multiplying monomials, I asked students for informal feedback and took notes on their responses. Many times, at the end of a lesson, a unit, or a new activity, I will ask the students for informal feedback. After the second unit, I had students fill out a separate exit ticket of open ended questions asking them what they thought of the activity and the importance of the unit in real life. I analyzed their feedback in the form of exit tickets and surveys in order to get to my findings.

IV. Findings

For my findings, I analyzed student responses to survey styled exit tickets given prior to my research and at the conclusion of my research. I also analyzed open-ended exit tickets given to students, verbal feedback, observation, and test scores. In the end, I came to three main findings.

- Students had a deeper understanding of the material we were learning in the classroom.
- There was more positive behavior in the classroom with less disciplinary interruptions or reminders to be on task.
- Student noticed the addition of real life examples into our curriculum and had an increased interest in the daily lessons.

a. Quality of work

Prior to implementing real life examples into my Algebra 1 classroom, I had my students try to create their own equation. We were working on a solving equations unit and students were doing well with solving basic equations but I wanted to deepen their understanding of the material. I had students create their own equations. They could include any type of mathematics functions they would like, but they needed to come to the solution of x equals two. This was a challenge for the students and they struggled severely with the assignment. That set the baseline for my research project. I am happy to say, at the end of my project, students were able to create and solve complex word problems.

The two units I used real life examples for in this study were the Multiplying Monomials unit (FOIL) and Solving Equations by Factoring. These two units relate to

one another. Multiplying monomials and factoring are opposite functions of each other much like addition and subtraction. This is my third year teaching this course and these two units are where students begin to struggle with the material.

The implementation of having students create and solve original word problems showed a much deeper level of comprehension of the material. Creating is the highest level on Bloom's Taxonomy and my students were successfully achieving at that level. The students' quality of work was significantly increased. They went from not being able to create a simple equation to creating complex word problems, showing all of their work, displaying all of their work on posters and presenting to the class. The growth in these students ability to create was significant.

b. Classroom Atmosphere

My high school mathematics classroom atmosphere tends to be a more traditional set up. Student desks are lined up in rows facing the front of the room. Most lessons, students start a do now upon entering the room, we go over homework, then we start the new lesson. I add activities into my lessons to switch up the routine but with the curriculum we have, I do not find it manageable to include activities into every lesson of every day. When I had students work together to create their own word problems and really push them to be creative, there was a complete shift in our classroom atmosphere.

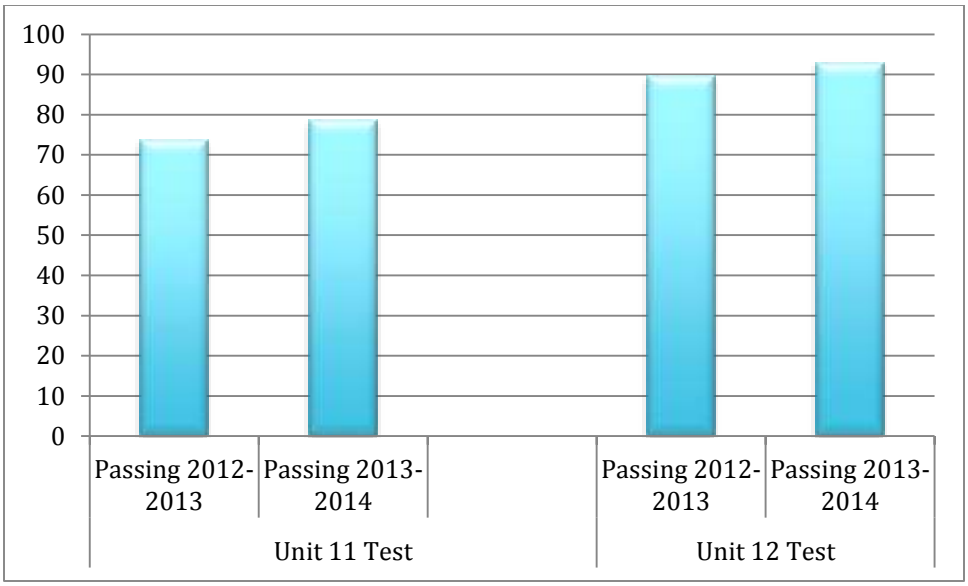
I found students to be completely engaged in the assignment. They were working together and sharing great, original, creative ideas with each other. They were all involved in the assignment and were so proud of their work. I had students present their word problems and posters at the end of class to share with their classmates. We did not finish two of the groups on the first day. The next day, Jack, who is never observably

excited for math class came into the room asking if his group could have five more minutes to put the final touches on their poster before they present because he had a great idea to add to it. It wasn't until after the student presentations that I noticed throughout the creation of these posters and their presentation, I did not have to remind anyone to be on task or take cell phones away from any student. They were all on task throughout the assignment and it truly shifted from our original classroom atmosphere.

c. Test Scores

I did not implement this research topic with the goal of raising my students test scores but afterwards, I was interested to see if there was a change. We completed two units throughout this research project, each with a unit test at the conclusion of it. My students this year have had comparable test scores to my Algebra 1 students from last year. I compared the test scores from last year to this year for these two units and found a higher percentage of my students this year passed the test in both units.

In the 2012-2013 school year, I had 73% of students pass the Multiplying Monomials unit test. This year, I had 78% of students pass the same test. When looking at the Solve by Factoring unit test, I had 89% of students pass the test in the 2012-2013 school year and 93% of students pass the same test this year. I gave students the same tests last year and this year. I spent the same amount of time teaching each unit. The only difference was the implementation of these real life word problems and having students create their own word problems.



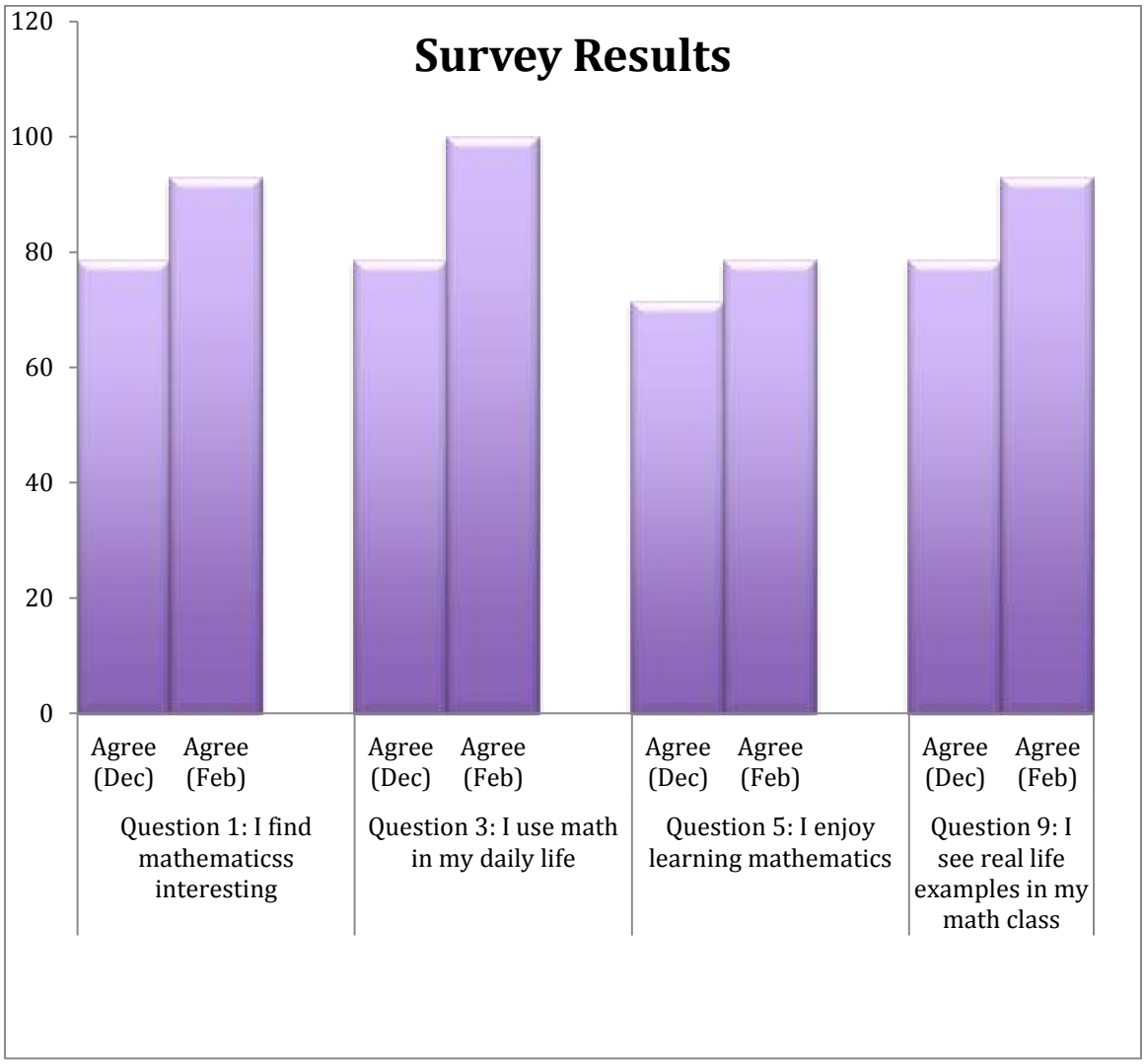
d. Student Interest

I measured student interest level through a survey styled exit ticket. Students were given ten statements about mathematics and were given the option to strongly agree, agree, disagree, or strongly disagree.

Mathematics Interest Inquiry
Please circle one of the following letters below.
SA = Strongly Agree, A= Agree, D = Disagree, SD = Strongly Disagree

1. I find mathematics interesting.	SA	A	D	SD
2. Learning mathematics will be beneficial to my future.	SA	A	D	SD
3. I use math in my daily life.	SA	A	D	SD
4. I see mathematics all around me.	SA	A	D	SD
5. I enjoy learning mathematics.	SA	A	D	SD
6. I am going to take four years of HS math because I want to.	SA	A	D	SD
7. I am going to take four years of HS math because I have to.	SA	A	D	SD
8. Given the option, I would not take another mathematics course.	SA	A	D	SD
9. I see real life examples in my math class.	SA	A	D	SD
10. I can relate mathematics to real life situations.	SA	A	D	SD

I compared student responses from December, prior to my research, to those from February, at the conclusion of my research. I decided to group together agree and strongly agree as well as disagree and strongly disagree. In questions 1, 3, 5, and 9, there was a clear change in students' opinions about their interest in mathematics in their own lives and in the classroom. The graph below shows the change in student responses to these questions.



Question 2 in the survey states, “Learning mathematics will be beneficial to my future”. All students agreed with this statement both times the survey was given. Question 6 in the survey relates to student motivation and states, “I am going to take four years of high school math because I want to”. In December, six out of fourteen students agreed with this statement. When the survey was given again in February, ten out of fourteen students agreed with the statement. This is a significant different in student motivation over just two months.

V. Implications

My research question is, how will incorporating real life examples into an Algebra 1 classroom effect student interest and motivation? By completing and analyzing my research, I have been able to answer my original question. In looking through my findings, there is a clear change in student interest in mathematics as a result of the real life examples. Student responses to the survey, their exit tickets, and through observation all show a higher level of interest in mathematics inside of the classroom. According to the survey, there is even a higher level of student awareness as to how often they use mathematics in their daily lives.

Additionally, it was shown through the survey that student motivation has also increased in regards to why students are taking mathematics courses. Although all students agreed that mathematics was important to their daily lives, many of them felt, in December that they were going to take four years of mathematics because they had to, not because they wanted to. In February, there were four students who shifted their

opinion and decided they would take four years of high school mathematics because they wanted to.

I chose this research topic because I was frustrated with students asking "When are we going to use this?" and having my response of when it could be applied to real life not be a satisfying answer to students. By implementing these real life examples and having students create their own real life examples and create their own problems, it put an end to the question "When are we going to use this?" I had not even noticed students had stopped asking this question until March at which point I had stopped implementing the real life examples into the classroom because my research was over when one of my students asked, "When are we going to use this?" This time, the question made me smile because I had not realized by having the students make their own real life applications of mathematics that it was satisfying their need to know when they would use this.

VI. Limitations/Subjectivity

I was able to complete all of my research in the set amount of time. There were a significant amount of snow days during my study however; I do not feel that it had a significant impact on what I was researching. This research assignment took place during two very difficult units in our Algebra 1 curriculum. It was a struggle to create real life examples that students would be able to understand that was also relevant to the curriculum. It required me to add in extra days to our unit because on top of giving the students time to create their own problems, we had to spend one day for each unit going through word problems and determining how we would solve them. I think I would have

been able to incorporate more real life examples had we been in different units at the time of this study.

The student responses to the survey may be subjective. I told students every math student had to take this survey and did not make it seem like it was specific to our class. I did not want students to know that the survey was actually just for their class. I do think students were honest throughout the survey because their answers changed from December to February however; I cannot know for sure. I also did not want to be influenced in my teaching methods as a result of their preliminary survey results so I did not look at their initial surveys until after my study was completed. I then looked at both sets of surveys and compared the similarities and differences between the two. Regardless, there was still and increase in the quality of student work, their test scores, and a positive change in the classroom atmosphere.

VII. Emerging Questions

After completing my study I do have some further questions I would like to investigate. I wonder what the effect would be if I were to implement these real life problems into the Algebra 1 course for the entire year. I think it would be interesting to see how the students would respond to real life problems being included in every unit. I also think it would shift my classroom atmosphere. The days where I had students working in groups and creating their own problems, the students were all on task and contributing to their group. By doing this throughout the year, I would be able to include all units, many of which may be more relevant and interesting to students than the units I included were.

I think real life examples could also be used in other mathematics courses such as Geometry and Algebra 2. I also wonder if it would be more beneficial to a lower level class where students struggle with mathematics. Seeing my students who are not always motivated to learn excel in these projects makes me want to include more projects into my other classes. After seeing my students' test scores improve, I also wonder if there would be fewer failing students in mathematics if using these real life examples was a part of the curriculum.

VIII. Conclusion

After analyzing my data, I was satisfied with my findings. I was impressed that student test scores improved. It was something I had not thought of when deciding what my research topic would be but it was interesting to see that it was affected in such a positive way. I put a lot of work into creating real life problems for my students and creating ways to make the problems relevant and interesting to them. It is a rewarding feeling to see my hard work paid off. I am impressed with the deeper level of understanding my students now possess as well as their improved quality of work.

I did not anticipate have my classroom atmosphere be affected by my research plan however; it was and in a positive way. Students had to work together and in doing so, they all were on task and working towards a common goal. I did not have to discipline any students or refocus any students on days they were working on their projects. This research project showed me what I am capable of as well as what my students are capable of.

This study could be useful to other high school mathematics teachers who are looking to have more students interested in the course material. It could also benefit other Algebra 1 teachers since that is the course I focused on. I think just seeing the positive results of this study would make other mathematics teachers interested in what could happen if they were to do the same in their own classrooms.

IX. Implementation Plan

This study showed me that student interest and motivation can be positively affected by making the material more relevant to students and by getting students to a higher level on Bloom's Taxonomy. I think showing the students real life problems made them more interested in the material. I feel students impressed themselves with the quality of work they were able to create. This is what affected their motivation levels.

Next year, we are rewriting the curriculum for Algebra 1 so it meets the Common Core Standards. After seeing how successful this study was, I am going to create real life problems for each unit of Algebra 1 next year. I would like to add in a project or group activity in each unit where students have to collaborate to create their own problem relevant to what we are learning. I think by doing this in the beginning of the year, students will become less dependent on me for guidance and will get a deeper understanding of every topic in the Algebra 1 curriculum. I will share my findings and my project ideas for next year with the other Algebra 1 teachers.

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Appendix A – Survey

Mathematics Interest Inquiry

Please circle one of the following letters below.
SA = Strongly Agree, A= Agree, D = Disagree, SD = Strongly Disagree

1. I find mathematics interesting.	SA	A	D	SD
2. Learning mathematics will be beneficial to my future.	SA	A	D	SD
3. I use math in my daily life.	SA	A	D	SD
4. I see mathematics all around me.	SA	A	D	SD
5. I enjoy learning mathematics.	SA	A	D	SD
6. I am going to take four years of HS math because I want to.	SA	A	D	SD
7. I am going to take four years of HS math because I have to.	SA	A	D	SD
8. Given the option, I would not take another mathematics course.	SA	A	D	SD
9. I see real life examples in my math class.	SA	A	D	SD
10. I can relate mathematics to real life situations.	SA	A	D	SD

Appendix B – Student Work