

Encouraging Arithmetic: A Classroom Experiment

Honors Project

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By

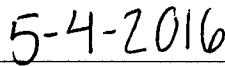
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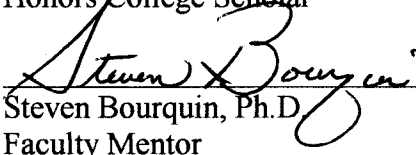
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ABSTRACT

Mathematics is a major part of today's society and is used in nearly everyone's day to day life. Despite the importance of mathematics many students avoid this subject and only do the bare minimum to pass classes. Recent studies have concluded that the environment of the classroom and the attitude of the teacher can affect students' attitude and successfulness in mathematics. In an attempt to find activities that would change the classroom environment in a positive way I developed a three day program that I implemented with a classroom of middle grade students. In the following paper I have recorded the experience and my thoughts on the program.

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Purpose

Many students have a negative outlook on mathematics which is created early in life; my goal was to create a workshop that would help students see the fun and intriguing side of mathematics. Being a tutor in mathematics I have seen several students give up on math problems before they have even started because they have a predetermined idea that they are not good at math. However, once the problems and techniques are explained in a way that is easy to understand these same students that would not attempt an algebra problem are now passing calculus classes.

For this project I coordinated a program after school in which middle grade students attended. This program consisted of a number of games revolving around mathematics. Not only did the students learn about mathematics but they also learned communication and problem solving skills.

Activity Log

Day One. The first day of interacting with the children involved activities about tessellation and symmetry. The items needed for day one included: graph paper, plain paper, pencils, colored pencils, tape, notecards and scissors. I began the day by explaining what a tessellation is and how they can be created using a note card. Once the explanation of

tessellations was complete I used graph paper to briefly review symmetry. Most students already had some understanding of both of these topics so we were able to quickly move on.

The students were able to choose between creating their own tessellation or symmetric figure which they would then color to make it look like some type of animal. Majority students chose to create tessellations and created fish, alligators and various other animals. Throughout the activity most of the students seemed to be focused on the task at hand and were invested into the project but there were a few who did not seem to want to participate. Overall I feel that the first day was successful because the students furthered their skills with tessellations and symmetry all while being able to add a creative touch.

Day Two. The second day of interacting with the students involved activities graphing. The items needed for day one included: graph paper, pencils, and colored pencils. At the beginning of the day I briefly reminded the students about how to graph a coordinate pair and how to properly name the coordinates of a point on the graph. Graphs were reviewed on day one but some students were still perplexed by the method of graphing points. Once the students felt that they had a good understanding of graphing they were able to choose between two different activities; the first activity was coordinate graphing pictures and the second was battleship on graph paper.

For those who chose the coordinate graphing pictures they each received a piece of paper with a list of coordinate points; these papers were all different so that no student would have the same outcome of another. The students graphed the coordinates and connected one point to the other until that line of points ended and then they would start on a new string of points. Once the students had graphed and connected all of the points they were left with a picture that they were then able to color with their colored pencils.

The students that chose battleship were each given a two pieces of graph paper. One the first paper they were instructed to make the coordinates where their ships would lie; one with two, three, four, five and six points. The ships orientation could be slanted, vertical or horizontal but they had to be in a straight line. Once the students had marked their ships location with a green colored pencil they took turns guessing the location of the other player's ships. They recorded there guesses on the second sheet of paper. If they hit the ship they would make a red dot on the coordinate and if they missed they would make a blue dot.

All of the students looked as if to enjoy these activities and those who were bored on day one seemed to enjoy the competitive nature of the battleship game. I feel that both of these activities helped the student improve their understanding of how the coordinate plane was laid out and how to properly graph points. The only down side to the battleship game is that some students claimed that the other was cheating but that is to be expected to a certain extent when competitive games are played.

Day Three. The third day of interacting with the children involved activities about integers. The items needed for day one included: pencils, notecards and scissors. To start off the third and final day I demonstrated a few problems adding positive and negative integers. All of the students had a good understanding of this topic so we were quickly able to begin the activity. On this day there was only one activity to participate in and it was called 'integer war.' Each student was given ten note cards and instructed to cut them in half. Once the note cards were halved the students wrote the integers -10 through 10 on each note card, with the exception of zero. Students then paired up and began the game. In this version of war each student would draw two cards and add the numbers that appeared, the student with the highest value won all

four cards. If there was a tie each student would flip over an additional card and add it to the previous value until the tie was broken.

The objective was to play the game in a tournament style where if a student won they moved on to play against another student that had won and those that had not won played against others that had not won; each time resetting their deck to 20 cards. With the cards being shown to both players there was no possibility of cheating in this game which was an improvement from the previous day. There was to be a prize in the form of candy to the student that was the overall winner but unfortunately time ran out before all of the games were completed so each student was given an equal amount of candy. Even though the students were motivated by the promise of treats they all seemed to enjoy the game and they all stayed interested in it until the end of the program. There was a few times that the students miss calculated the amount that they had drawn but as the time period went on I noticed that they called the youth coordinator and myself to come and check their calculations less and less.

Conclusion

Toward the beginning of the program the students were hesitant about the activities and were reluctant to participate. Many of them stated that they did not like math and could not see how the activities would be enjoyable. During the program I noticed the student's attitudes changing and instead of looking at the activities as busy work or something difficult they began treating the activities like games and challenged each other to do better. I feel that there is a major correlation between the teacher's attitude, classroom environment and student's perception on mathematics. It would be beneficial if all teachers were to create activities such as these to help the students become more interested in each subject.