Trouble in Math Paradise: It May Just Take a Flip

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Abstract

Because students struggle in the traditional classroom, there are many options to help them improve.  The use of a flipped classroom has many benefits.  While many of these benefits are obvious, such as more individualized attention, one that may easily be looked over is the strengthening of relationships.  When relationships are strengthened in the classroom, students feel more comfortable in the classroom to ask questions, and this could have the potential to lead to higher grades.  In order to discover how the flipped classroom worked with my students, I intended to answer the question, “How does relationship building in a flipped classroom affect student grades?”  To answer this question I used action research, with the data collection methods of semi-structured focus groups, surveys, observations, and student evaluations.  The results of this study encouraged further research in the area of relationship building in the flipped classroom, rather than the direct correlation between grades and relationships.   
*Keywords: Flipped Classroom, Relationships, Middle School Math, Action Research*

The Struggle is Real; Introduction

I turned around and there were looks of sheer terror on my student’s faces. It seemed as though what I had said made absolutely no sense, as well as what they were doing. As I talked a hundred miles per hour to try and get through teaching both 6th and 7th grade math classes, I knew something had to be done. A combination 6th and 7th math class leaves little time to build relationships with students. It seems as though every minute of classroom time is spent doing direct instruction. This leaves no time for answering questions, getting to know students, or encouragement. The flipped classroom allows for more time to work with students as it provides more time for teaching, rather than just lecture (Fulton, 2012). Students learn by hearing the lecture outside of school and doing their homework in the classroom with easy accessibility to their teacher (Fulton, 2012). Teachers can then use this time to make meaningful contact with each student as they work one-on-one with them throughout the class period (Roehl, Reddy & Shannon, 2013). In order to determine the outcome of grades based on relationships, action research fits nicely as a methodology. Action research is when a person looks at his or her own work in a practical way and then reviews it to make sure it is the way they think it should be (McNiff, 2002). Classroom inquiry/action research is the most beneficial way to collect data as this is taking place in my personal classroom.

Seventh grade is a pivotal year for students as they transition from elementary to junior high and have new teachers they have never worked with or met. Because this is the case, I have chosen my seventh grade math class as my population, as sixth grade continues status quo. As the year starts it is imperative to begin building relationships with these students. As a teacher, getting to know individual students allows for mutual respect to be built and helps the classroom become a safe environment. The combination of respect and safety allow for students to feel more comfortable with the teacher, giving them the freedom to express themselves and easily obtain help. If a student feels a strong bond with the teacher and can freely ask questions, this can help students become more successful in their classes. Although much research has been done about the flipped classroom, very little has been done concerning the correlation of relationships and the flipped classroom success. The purpose of this study is to investigate how positive relationship building in the flipped classroom can improve student grades. The study was guided by the following:

1. Do flipped classrooms offer the opportunity to build stronger relationships with students?
2. Does the flipped classroom allow for more one-on-one time with students?
3. Is the flipped classroom a comfortable learning environment for students to learn?

The success of students based on the teacher-student bond leads to the research question, “How does relationship building in a flipped classroom affect student grades?”

**Battle Documents; Literature Review**

I teach a combination 6th and 7th grade math class, and with the busyness there is little time to build relationships. A short teaching time makes it difficult to spend time getting to know students individually. If students are not learning they must be quiet so the other class can learn their lesson. After teaching for the majority of the class time it is difficult to see if students comprehend their assignments before heading home (Alvarez, 2011). This lack of time in class results in little time for relationships to be built.

Students have a hard time opening up, even to the point where they will not ask questions, but instead, ask each other. They have no confidence in the teacher-student relationship. Adler believed, as cited in Beck & Malley (1998), in relation to his theory of “belongingness” that failure in school was directly related to feeling unconnected with the teacher. My students seem to have a fear of me and are unwilling to communicate about their needs. A student’s feeling of belonging is viewed as a necessary precursor to a successful learning experience (Beck & Malley, 1998). Through the transition between elementary and middle school, there has been a decrease in the quality of teacher-student relationships (Davis, 2003). A study documented by Lynch & Cicchetti, as cited in Davis (2003), found that 60% of students felt no desire to be close to their teacher. There are at least four actions to establish a positive relationship with students: a high level of trust, students need to feel as though their teachers care about them as individuals, and teachers are willing to talk and build a supportive environment (Parsley & Corcoran, 2003). The most basic relationship in the classroom is the teacher-student bond (Cook-Sather, 2002).

School is supposed to have a social element to it. It should not always be serious, because that gets to be draining on both the student and the teacher. If there is no relationship in the classroom built on mutual respect and trust, which most students want (Whitney, 2005), school turns into just another dull chore to check off the list, not a day to day experience students enjoy. Findings suggest when students have a positive relationship with their teachers they benefit both socially and academically (Davis, 2006).

The solution to this problem is to create more time in the classroom in order to build the teacher-student relationship. In order for this to happen, there needs to be less formal instruction and more time for conversation. When using the flipped classroom model, only half of the period will be used for teaching, as 6th graders will still learn through direct instruction. Students in the flipped classroom will learn basic information through video lectures, reading, and other sources outside of the classroom environment allowing for more class time to do high-cognitive tasks (Talbert, 2012). The students can choose to watch the videos in class or at home prior to the homework. It is important to have time in class to allow students to watch videos as they already have enough to worry about after school (Finkel, 2012). Once students have viewed the videos, classroom time can be used to help improve their understanding in the subject matter (Roehl, Reddy & Shannon, 2013) and build individual relationships.

There will be a lot more time to answer questions, which will hopefully help build relationships with students and improve grades. Students who have positive relationships with teachers echo their support, motivation, and learning in the classroom (Davis, 2003). Even if more questions aren’t asked, I will have more time to walk around the classroom and watch students as they work on problems, see their struggles, and help them fix their mistakes (Fulton, 2012). In the end, the only time where I will be teaching is the first 15-20 minutes of class, which will leave at least a half hour to build relationships through individual conversations and one on one instruction. By emphasizing student-teacher relationships, schools can increase the sense of belonging for all students (Beck & Malley, 1998). The intention is to take the attention away from the teacher and focus it on the student (Siegle, 2013).

**How Do We Go Into Combat; Methodology**

This project was designed to use a combination of surveys, focus groups, observations, and exam scores to collect usable data (Merriam & Tisdell, 2016). A weekly survey was measured, using the Likert scale, on what is believed to show respect and relationship building qualities by the teacher (Appendix B). This was given to all middle school students in grade 7. Two semi-structured focus groups were conducted with the same students, the first one after two weeks, and the second after four weeks (Appendix A). Observations on grade 7 student-teacher interactions were made on a daily basis (Appendix C). Exam scores from the first seven tests were collected.

**Who Are Our Soldiers?; Setting and Participants**

The participants included the seven seventh grade students. These students attend a K-12 private school in the Pacific Northwest consisting of 110 students. In the seventh grade, there are five white American students, one Alaska Native student, and one Filipino student, all of which are boys. Most parents are actively involved in the school and highly interested in their child’s education. The math class uses the Saxon curriculum. The community which students live has a population of 4,163 persons that is predominantly white American. All students come from a conservative Christian family who would be considered middle to upper-middle class. 86% of the students in the seventh grade live with their natural parents, while 14% live with a parent and a step parent. The only teacher involved in this project was myself, the students’ math teacher.

**Plan of Attack; Data Collection Strategies**

The intent of this research project was to determine if the flipped classroom allowed for relationship building in the classroom and if this had an effect on grades when implemented on a day to day basis. To begin, I was interested in finding whether the flipped classroom would allow for students to feel more comfortable with me as their teacher, and in turn, begin to receive higher grades. As students open up and feel free to express themselves and ask more questions, they start to enjoy a subject more, and in turn seem to receive higher scores. If the test scores at the end did not show an increase in percentages, it can be suggested that the flipped classroom does not necessarily bring better test scores, but does not take away from the fact that this model could help build stronger teacher-student relationships.

A survey, using the Likert scale, was given at the end of each week and was used to measure the three sub-questions of the research (Appendix B). The scale was given to the students using a grading scale and these scores were translated into numbers (A=5, B=4, C=3, D=2, and F=1). I then averaged all the scores each week and compared the previous week to the current week. After the final survey, I was able to look at all averages to determine if there was an upward or downward trend. In order to measure if the flipped classroom allows for more one-on-one time, I observed on a daily basis the number of times a student asked a peer for help and how many times they would ask me for help (Appendix C). In order to determine if the flipped classroom allowed for more opportunities to build stronger relationships with students, I tallied the number of times each student talked to me in general (not relating to math) each class period. These observations allowed me to analyze if students asked me more questions and talked to me in general over the course of the data collection period. A semi-structured focus group was conducted at the end of weeks two and four (Appendix A). Students were asked a variety of questions in order to get their point of view on whether the flipped classroom allowed for more opportunities to build relationships, allowed for more one-on-one time with students, and was a comfortable environment to learn. Finally, I recorded percentages of the first seven tests students had taken over the course of the year. I averaged these scores to get a class average which allowed me to see how and if grades were influenced. The first four tests were before the flipped classroom model, the last three were after the students started learning in this way.

**What We Hoped to Gain in Battle; Data Analysis**

As I looked at the flipped classroom model, I was interested in finding out if it allowed for more one-on-one time which would strengthen individual teacher-student relationships, resulting in higher grades. Do flipped classrooms offer the opportunity to build stronger relationships with students? In order to determine this a weekly survey was given (Appendix B). The first twelve statements related to the teacher-student relationship. When I averaged these scores over the four weeks, if the last week’s score was higher than the first, I knew there was an improvement. If the last week’s score was lower than the first week’s, I knew what I had hoped to accomplish had not been done. A focus group was also held the second and fourth Friday during the data collection period. Question one related to the opportunity for the strengthening of the teacher-student relationship (Appendix A). Through conversing with students, I hoped to learn whether or not students felt as though they were able to get to know me better as their teacher. If their comments were positive I could conclude relationships were strengthening. If negative comments were given, I could determine what needed to change in the next weeks to help students become more comfortable with me.

The next part of the project I hoped to gain information about what if the classroom allowed for more one-on-one time with the students. In order to determine this, a portion of the survey, statements thirteen through fifteen, related to the one-on-one time students had with me (Appendix B). If the trend of averages went up, I knew that the flipped classroom was meeting the goals I had created. If the averages did not go up, I would know that these areas still needed work. I also observed students’ interactions with me versus the interactions with their peers regarding who they chose to approach with their questions (Appendix C). If there were more questions asked to me than to peers, I could see that there was more time to spend one-on-one than before the flipped classroom model. Questions two and three of our bi-weekly focus groups were meant to discuss the amount of one-on-one time students had with me (Appendix A). If students discussed the fact that they felt there was more time since the transition to the flipped classroom, I could conclude that this method of teaching allowed more time for students to get their questions answered.

The final part of the project was to analyze whether the flipped classroom was a comfortable learning environment. The final portion of the survey, statements sixteen through twenty two, related to the learning environment (Appendix B). An upward trend in the averages over the four weeks would tell me the students were becoming more comfortable in the classroom, a downward trend would allow me to see there should be changes in the classroom to allow for a better learning environment. I observed my students and the conversations they had with me that did not relate to math, this would allow me to see whether their comfort of talking to me increased, stayed the same, or increased (Appendix C). The last three questions of the focus group were to help me determine whether the learning environment of the classroom was positive (Appendix A). If students expressed the environment of the classroom was friendly and uplifting, I could conclude that it was a comfortable place to learn. If students expressed negative feelings, I could be sure to make some changes in the following days.

**How Long was the Battle?; Time Table**

This study took place during the last two weeks of October and the first two weeks of November of 2015. Students filled out Likert scale surveys during the last fifteen minutes of class each Friday during the project. The semi-structured focus groups were held with students on the Friday of the second and fourth week during class time. Observations were made on a daily basis (except for test days and when we met for focus groups), which made for a total of fifteen daily observations. There were a total of three tests given during the four weeks that each student completed during class. Upon completing my data collection, I took time to analyze all data in order to be ready to share in December of 2015.

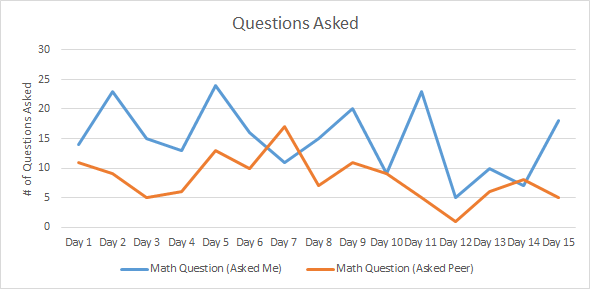
**Lessons from the Commander; Results**

The statements from the survey (Appendix B), observations (Appendix C), and focus groups (Appendix A) were used to obtain a better understanding as to whether the use of a flipped classroom strengthened the teacher-student relationship, allowed for more one-on-one time, and created a positive learning environment. In order to get a numerical value from the surveys, I assigned a value to each letter, A (5), B (4), C (3), D (2), and F (1). I then added the scores from my individual students and divided by seven (for the seven students). This gave me a weekly value. Once I had a weekly value, I added the four weeks and divided by 4 to find a final average of each statement. I could then look at each week’s final averages side by side and see if there was an upward or downward trend.

Statements one through twelve related to the teacher-student relationship. The results of the survey showed an increase or no change in the trend for 85 % of the statements, with a downward trend for only 15%. This shows that the relationship I have with my students improved over the course of time using the flipped classroom. Statements thirteen through fifteen related to the amount of one-on-one time students had in my classroom. The results of the survey showed an upward trend or no change for 66% of the statements, and a downward trend for 33% of the statements. Although this section only had three statements, this helped show the flipped classroom allowed for more one-on-one time with individual students. The final seven statements related to the learning environment of the classroom. The results showed an upward trend or no change for 86% of the statements, and a downward trend for only 14% of the statements. With the large difference between the two numbers, I could determine the students feel as though they have a safe and comfortable learning environment. This survey proved while using the flipped classroom in my classroom, the teacher-student relationship was strengthened, the amount of one-on-one time students had with me increased, and the learning environment for my students is positive.

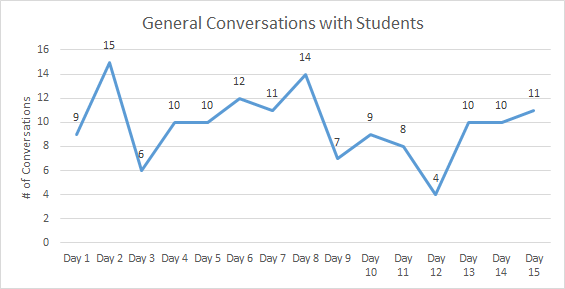
Tables 2-3.

Results from Appendix C.



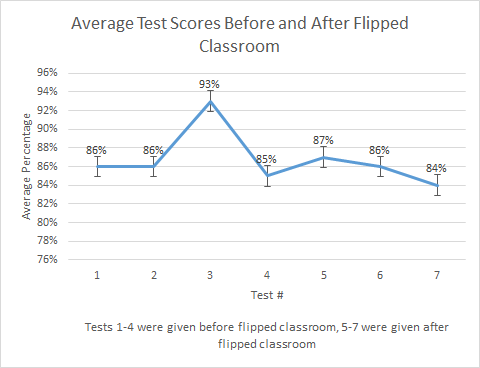
This chart compares the number of times students asked me a question versus the number of times they chose to ask their peer a question. When looking at the results of day fourteen, I saw the number of questions students asked me and asked peers was about the same, so the only day there was vast difference in who was asked was on day seven. This revealed on 86% of the days of this project, when given the choice, my students asked me more questions than they did their peers, with the exception of days seven and fourteen. Since there were only three statements in the survey related to the one-on-one time I have with students, this chart helped solidify my findings that the flipped classroom does in fact allow for more one-on-one time with my students.

Table 3.



This chart shows the number of conversations not related to math that we had each day of class. These conversations allowed me to get to know students better and build relationships with them because the flipped classroom allowed for more interaction. The results from this chart show a pretty even trend, with the day two high and the day twelve low averaging each other out. Having a 55 minute class period each day, this chart showed that students are quite comfortable having conversations with me about their everyday “happenings.”

Table 4.



This table shows the average scores on the first seven tests of the year. The first four tests were taken before the transition to the flipped classroom, the last three were taken after students were learning with this model. The results of the averages of the seven tests showed me there was a downward trend in scores once the flipped classroom was incorporated. While the average scores didn’t greatly decline, they still went down, which shows while I wished the flipped classroom would allow for an increase in scores because students had more time to work with me one-on-one this didn’t prove to be true. The decrease in scores does not take away from the fact that the survey students took showed an increase in relationship building as well as the time they got to spend getting help from me, and the positive environment of the classroom. The research didn’t answer the question exactly as I hoping, but while scores are important, I think the three areas that showed an increase in the survey are just as critical for the overall well-being of my students.

**Who was the Victor?; Conclusion**

As students struggle with grades and teachers try their best to discover solutions, relationship building between teachers and students is a possible solution to the struggles students face in the classroom. One method of building relationships, and thus help students to succeed is the flipped classroom. The flipped classrooms allows students to view lessons or do research at home, then come to class the next day and receive more individualized help as the teacher no longer has to provide direct instruction. The purpose of this research was answer the question, “How does relationship building in a flipped classroom affect student grades?” In order to gather data for this project I used action research which allowed me to use my own students. The research question did not answer exactly what I was hoping since the grades did not improve, but it did show the flipped classroom can help improve relationships; which, if done over a longer period of time could show an improvement in grades. If focusing on building relationships would have been the main perspective with students in the flipped classroom, then, it is believed the research would have shown the flipped classroom improves relationships between the teacher and student, possibly improving grades because of these relationships.

If I were to do this research project again or incorporate the flipped classroom fully, I would not do it in a combination class that had direct instruction for one grade and a flipped classroom method for the other. This leads to excessive talking by the grade that has the whole period to work on their homework and can turn classroom management into a nightmare. I would also choose a class that had more students and was more diverse in its population. I believe this would give me different results as this project showed results from just males in the seventh grade.

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**Maps; Appendices**

Appendix A

Focus Group Questions

1. How does the opportunity to work with teachers help you feel more comfortable in the classroom?
2. Why does getting to have more time to work one-on-one with the teacher help you learn the information better?
3. What suggestions do you have that could allow there to be more time to work one-on-one with the teacher?
4. How has watching the videos helped you learn?
5. How has watching the videos hindered your learning?
6. Is the environment of the classroom a comfortable place to learn?

Appendix B

Survey

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 5 | 4 | 3 | 2 | 1 |  |
|  |  |  |  |  | 1. I can tell my teacher likes me outside of the classroom. |
|  |  |  |  |  | 2. I know my teacher cares about my life outside of class. |
|  |  |  |  |  | 3. My teacher is considerate when assigning homework based on my activities outside of school. |
|  |  |  |  |  | 4. My teacher allows me to leave the room to use the restroom or get a drink of water if I don’t abuse the privilege. |
|  |  |  |  |  | 5. I feel comfortable asking my teacher for help. |
|  |  |  |  |  | 6. I think my teacher disciplines students in the right way if a behavior problem arises. |
|  |  |  |  |  | 7. My teacher teaches about “life,” not just about math. |
|  |  |  |  |  | 8. My teacher is generally friendly and shows she enjoys her students. |
|  |  |  |  |  | 9. My teacher has a good sense of humor. |
|  |  |  |  |  | 10. I feel my teacher trusts me. |
|  |  |  |  |  | 11. My teacher listens to the students. |
|  |  |  |  |  | \*\*12. My teacher includes me in the learning time. |
|  |  |  |  |  | 13. My teacher is available outside of class time for help if I need it. |
|  |  |  |  |  | 14. I feel like my teacher respects me. |
|  |  |  |  |  | 15. I feel as though if I have a question, there is enough time to ask it. |
|  |  |  |  |  | \*\*\*16. My teacher has a classroom that allows me to learn. |
|  |  |  |  |  | 17. My teacher makes sure I understand what we are learning before moving onto the next lesson. |
|  |  |  |  |  | 18. My teacher never embarrasses me in front of class. |
|  |  |  |  |  | 19. My teacher never embarrasses me individually. |
|  |  |  |  |  | 20. My teacher rarely gets angry with the class. |
|  |  |  |  |  | 21. My teacher makes math interesting. |
|  |  |  |  |  | 22. I feel safe being in the classroom. |

Appendix C

Observations

|  |  |  |  |
| --- | --- | --- | --- |
| Date: | (Math) | (Math) | (General) |
|  | Asked Teacher Question | Asked Peer Question | Talked to Me |
| Student A |  |  |  |
| Student B |  |  |  |
| Student C |  |  |  |
| Student D |  |  |  |
| Student E |  |  |  |
| Student F |  |  |  |
| Student G |  |  |  |