A Study of Student Attitudes in the Mathematics Classroom

An Honors Thesis (HONRS 499)

by

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Abstract

With so much research on affect and mathematics it is hard to know what to start with. A variety of different situations and experiences influence what a student may feel and believe about math. Things such as anxiety, social norms, gender roles, teachers, and student confidence all play some part of student’s attitudes. There is still a lot of research to do in the area of affect and mathematics, but a lot can still be taken from what is known. By having a better understanding of what effects student’s attitudes, educators will be able to help students more. I have included several aspects of student attitudes by looking at research and my own study during my student teaching experience. Information and my own ideas about dealing with math anxiety are also included in this paper.
Acknowledgements

- I would like to thank Dr. Sheryl Stump for her help in finishing this project. She helped me to gather my ideas and pull everything together to finish this paper.

- I would also like to thank all of my seventh grade students at Anderson Eastside. They were my guinea pigs so that I could gather information and ideas for my final project.
In the NCTM Curriculum and Evaluation Standards there are five goals listed that all students should meet. These goals consist of being able to learn the value of mathematics, becoming confident in their ability to do mathematics, becoming mathematical problem solvers, learning to communicate mathematically, and learning to reason mathematically. Student attitudes are a central part in these five goals, especially in the students’ ability to learn the value of mathematics and being confident in that ability (Wilson 22). If these are main goals for mathematics students to meet, why is it that so many students will say “I hate math” or “I will never be good at it no matter how hard I try?” These phrases are all too common and are often met with the comment of, “Why does math matter anyway?” Anxiety, social beliefs, student motivation, gender roles, and teaching styles are just some of the things that can lead students to have negative attitudes in the mathematics classroom. Taking a deeper look into what causes students to form these negative attitudes and beliefs, a better understanding of how to deal with attitudes can be reached.

LITERATURE REVIEW

There is a lot of research that looks into students’ attitudes towards mathematics. This involves a variety of perspectives as well as a diverse range of how to define attitude. In many cases attitude is defined by looking into what views students have about mathematics as well as how students view themselves (Wilson 29). For this paper the term “affective domain” will be used for any positive or negative feelings students have towards mathematics or themselves that are stable. This could include anxiety, confidence, frustration, or satisfaction (McLeod 576). This will exclude any one moment when a student is frustrated and has a response of disliking mathematics and instead only
include an ongoing attitude or belief about the subject. There is still more work to be
done to come to an overall agreement of how researchers define attitude, but for this
paper the above definition will be used (McLeod 576).

There are two ways that students develop a like or dislike for mathematics. One
way is by having a repeated response. If every day a student has a negative reaction to
geometry then eventually a negative response will be automatic. The student will dislike
geometry because it is an immediate response that has been learned, not because there is
anything negative about geometry. A student may also associate a dislike of one area in
mathematics and transfer it to a similar topic. If a student has a negative reaction to
equations, then the same negative reaction may be assigned to functions (Wilson 29-30).

There are many different types of experiences that may lead to students having
negative reactions in the mathematics classroom. More research has been done on math
anxiety than any other area of the affective domain (Wilson 30). Sheila Tobias describes
this anxiety as a feeling of “sudden death” (Tobias 50). Anxiety produces a negative
response as a feeling of failure. This can be a challenge to deal with as a student of any
age. Other factors such as social beliefs, student confidence, and gender roles can play a
part in how a student views math.

Teaching style will also be included as a factor in forming student’s beliefs and
attitudes about mathematics. This is not something that is permanent throughout a
lifetime, but will be permanent throughout a year. Students all learn in different ways
and will often decide that they hate a certain class based on the teacher and not the
subject alone. As an educator this is where a difference can be made in students’
attitudes and beliefs.
ANXIETY

The most research has been done in the area of math anxiety (McLeod 584). Much progress has been made in learning about math anxiety, but there is still more work to be done. The definitions of the terms that are being researched are not agreed upon so this provides different situations to look into. Is anxiety a strong fear, an emotion brought on in a situation, or simply an attitude of dislike? Another question that is brought up is whether the student has an anxiety for mathematics or just an anxiety over taking tests in general (585). In general most research does focus on test anxiety in mathematics, but there is still work that has looked into what causes students to have such a strong passivity and anxiety towards mathematics.

One thing that may lead to a student feeling some type of anxiety in mathematics is the fear of making mistakes in mathematics (Tobias 52). This can be brought on in several different situations in the classroom. The teacher may provide an atmosphere where students feel no mistakes can be made. Another reason could simply be the fear of looking bad in front of peers. Having a fear of being wrong is also related to the fact that many students believe that mathematics always has one right answer. If there is only one right answer students are unsure if what they think is actually the “right” one (66). Students then take this fear and avoid being called on at all so that no mistakes can be made.

The fear of a mistake can often be met with stories of successful people who have also failed. Examples that can be used are Babe Ruth was the leader of strikeouts in baseball or that Lincoln failed in his first four attempts to make it into office. Another
quote that presents the same idea is by Edison who said, "Genius is 1% inspiration, 99% perspiration" (Sembera 10).

The same as having a fear of making mistakes, some students have a fear of being too smart as well. This makes a very uncomfortable situation for the student and anxiety can result from it (Tobias 63). Unfortunately, this fear is more common for females than males. Many people, even teachers, believe that males will do better in mathematics than females. This will be discussed in more detail later. By failing mathematics girls resolve the common problem between being competent and being liked. This leads to an anxiety of mathematics, because as a female the student does not want to look smarter than she should be (64).

Another cause of students' feeling passive in math is the myth that being good at mathematics is something that is inborn. Students believe that no amount of hard work will help them learn mathematics if they are not born with a "mathematical mind" (Tobias 52). A survey given to both Asian and American teachers, children, and parents asked why some students do better in math than others. Asians responded that this was because of hard work while Americans answered with the cause being ability (52). This is a myth that is devastating to the students and is brought on by teachers, parents, students, and society.

The subject of mathematics can lead to its own confusion and anxiety. Often ideas are contradicted from previous teaching. For example students learn at a young age that multiplication means the answer will be larger, but when fractions are introduced this no longer happens. Students learn that in subtraction a minus sign is always used, but when negative numbers are introduced the sign no longer means to subtract, but takes on
a whole new meaning of its own. Teachers tell young students that eight can not be taken from five, but in later years students find out there is more to the number line than they thought and all of a sudden this is a computation that can be done.

Knowles Dougherty, a mathematics teacher adds:

It is no wonder that children have trouble learning arithmetic. If you ask an obedient child in first grade, “What is zero?” the child will call out loudly and with certainty, “Zero is nothing.” By third grade, he had better have memorized that “Zero is a place-holder.” And by fifth grade, if he believes that zero is a number that can be added, subtracted, multiplied by, and divided by, he is in for trouble.

All types of situations and experiences can lead to students having an anxiety of mathematics. There is no way that every possibility could be listed and researched. The ideas listed are just areas where research has been done or common situation that lead to students having anxiety in mathematics.

OVERCOMING ANXIETY

Lancelot Hogben has a great quote that can be used to help students deal with math anxiety:

The best therapy for emotional blocks to math is the realization that the human race took centuries or millennia to see through the mist of difficulties and paradoxes which instructors invite us to solve in a few minutes (Tobias 225).

This quote does give a certain type of realization even to a teacher. Students are often expected to learn material in a day that originally took much more time to work out. It is
easy to see from this perspective how students at times can feel overwhelmed and anxious in the face of mathematical problems.

There are many resources for students and adults who deal with math anxiety. There are books that are just for this purpose. One of these is called *Math a Four Letter Word*. This book is a math anxiety handbook that is meant for the student or adult dealing with math anxiety. This contains several different ideas on how to deal with math anxiety. The authors present different types of personalities that people have who hate mathematics and then walk through different steps that can be taken to help the individual personality type. This would be a resource that a student might want to use on his or her own time. A student having his or her own resources to turn to is a start to dealing with anxiety.

Shiela Tobias gives a very clear way to begin overcoming math anxiety. She says the first thing to do, "is to take charge of our math learning, and to stop being intimidated by our own lack of confidence and by hallowed traditions in the math classroom that keep us from feeling good about ourselves" (Tobias 226). She then continues with several different approaches that can be taken to help deal with anxiety. This includes discussion about feelings related to mathematical problems, group work, programs for women, learning to read mathematics, approaching mathematics with a positive attitude, and how to deal with relapses of math anxiety.

The main point in all the areas that are discussed is being able to associate feelings with the mathematical thinking process. There are different ideas throughout the book *Overcoming Math Anxiety* to get students thinking about what feelings they have towards mathematics. One way has students actually work through a mathematics
problem and write down how they feel about every step. Here is the layout that was used:

Figure 1

The idea of this type of set up is that when students do not know what to write mathematically they can at least write about what they feel. As more confidence is built in the student, less will be written down in the column for feelings and more work will be shown to solve a problem.

Another idea that was presented to get students thinking about mathematical feelings and attitudes is to give students fill-in-the-blank exercises. Here are a few that can be used:

When I make a math mistake, I __________________

When I'm embarrassed about doing math, I _________________

When I see a problem I can't do, I _________________

If I could do math, I would _________________

One thing I like about doing math is _________________

Doing math makes me feel _________________

Source: Overcoming Math Anxiety 231
One more way that will help to get students to talk about feelings and attitudes in mathematics is to have students fill out a math autobiography.

1. My main goal in taking this course is ________________
2. The last math course I took was ________________
3. An early experience I remember in math class was ________________
4. One math teacher I remember is ________________
5. I feel _______ was the hardest for me to learn and ________
   was the easiest.
6. I think I learned my present attitude towards math when ________________
7. To improve my math attitude, I expect to do the following for myself ______
8. To improve my performance in math, I expect to do the following for myself__________

Source: Overcoming Math Anxiety 238

Some adjustments might need to be made to these different forms depending on the age and level of the students that are responding to the questions or statements.

Though math anxiety is something that students of all ages can deal with, it is often adults who are returning to school who will actually seek out help for math anxiety (Tobias 239). This is often met with anxiety courses run by teachers who are trained to deal with students who are trying to get over high levels of math anxiety. There is no definite cure or answer that will work for every student, but instead a process that must be worked through with the student's own initiative and the teacher's help. By having a clear understanding of what feelings and attitudes are already formed for the student the process of working through them can begin. Building up confidence and realizing that so
much anxiety is unneeded hopefully students can work through the mathematics problems without letting anxiety control them.

**MALE VS FEMALE**

A common reaction when comparing males and females in mathematics is simply that males are just better. It is no wonder that this has been a common belief. Twenty years ago textbooks always had Tom painting the room twice as fast as Sally, television shows rarely featured women in mathematics, and it was the joke that women could not make the simple mathematic calculations. Times have changed from this stereotype and view, yet the idea that men are better than women in mathematics has not faded away (Tobias 72-73). There are 4.6 million people employed in the field of science and engineering in the United State alone, of this population thirty percent are female. This does not sound all that bad. When you take a closer look these women are in the area of life science and psychology which involves the least math of them all (73). There are only 184,000 women in the area of engineering and the same amount in physics which are the most mathematical. Whether this is due to the idea that women feel that they can avoid the areas of mathematics or because they believe they are not smart in mathematics because they are women is not clear. The fact is that there is still a drastic difference in the population of men verses women in the field of mathematics and there is no clear explanation for this.

A study done by Mura found that among a group of college students women were less confident than men in mathematics. Women also did not plan on taking as many rigorous math classes as men did (McLeod 583). This is not something that is true across all age levels. Other studies have shown that at the elementary level girls are just as
confident as boys in mathematics (584). What causes this break to happen is not clear, nor is there a clear point of when this break begins to happen.

It is hard for researchers to actually get a good idea of what is really going on with gender roles. To this point there has been no part of the brain that has been identified as the mathematical portion. The next step would be to look at ability. Maybe it is the case that males have more ability in mathematics than women, but this is something that cannot be measured definitely. Ability is measured by tests and research has clearly shown that tests are affected by students’ beliefs and attitudes (Tobias 73). There is no true way of knowing whether the student did well because they have a high ability in mathematics or instead if they did well because they have a positive attitude about mathematics.

Though the subject of mathematics in general has no clear lines to define why it is that more men continue with mathematics than women, there is some research explaining why it is that men are more successful than women in the area of spatial visualization. Recent studies have lead researchers to believe that they can locate the area in the brain responsible for spatial visualization (Tobias 113). A person who can easily picture figures in their mind and manipulate the figure through rotations and translations has good spatial visualization. There are several types of problems that can test how well a person is at manipulating objects. Here are some examples:

![Turning the Square Test](image)

Figure 2
Different parts of the brain specialize in certain areas just as different hemispheres play different roles in how we function. It is often common to hear the claim that a person is not good in math because they are left brained. There is no research at this time that supports this theory, especially in the area of spatial visualization. There are still differences that have been noticed between the genders. Different types of brain damage to one hemisphere can have a lesser effect on adult women than on adult males. Research has not yet found why this is the case, but for someone reason this is a common difference (Tobias 117).

It seems to be the case that as young children both hemispheres of the brain are able to perform all functions. Children with brain damage are able to use different parts
of the brain to compensate for damage they may have as long as they are not older than seven or eight (Tobias 117). For some unknown reason after this age the brain no longer has the capability to perform all tasks in all areas. There is still research being done in this area so that more can be learned about how and why the brain works this way.

Some people now argue that the age at which the brain is set in its specialization is younger for girls than it is for boys. In some way this then affects the further development of spatial capabilities (Tobias 118). Researchers are not sure whether this is good or bad, but instead attribute this to be the case that girls tend to have a higher verbal aptitude and boys have stronger math and spatial skills. Sherman would then argue that girls will tend to be more verbal than spatial, but also prefer things that involve the left hemisphere of the brain over the right (119).

All of this leads to many more questions dealing with right and left brained. Whether or not a person can truly be left-brained has no answer at this point. If it is the case that females will tend to prefer things that deal with the left hemisphere than it seems reasonable to say that they would prefer more things dealing with verbal skills and not mathematical related skills. Females from a very young age are starting to want to do more things involving verbal skills and less time working on mathematical related items. There is no research to strongly support these ideas, but it does present an interesting view as to why females will be less interested in mathematics and may tend to have a more negative attitude on the subject as a whole.

Despite any research or what might be known about the brain there is still the underlying issue of “sexism” in mathematics. As an entire society gender roles have been created for both males and females. Often children growing up try to conform to
these preset standards. Research shows that by conforming to these standards the child is not benefited, but instead hurt. Studies show that when children pursue interests that would fall into the stereotype of the opposite gender they perform better on general-intelligence tests (Tobias 95). By raising children in a place where they don’t feel pressure to pursue gender appropriate areas who knows what affects this may have on females going into mathematics.

CONFIDENCE

Confidence is defined by the American Heritage dictionary as trust or faith in a person or thing. When talking about confidence in mathematics it is the same as talking about a person’s belief of their own competence in mathematics (McLeod, 583). Confidence in mathematics plays a strong role in doing well in mathematics. Brad Ponanski, a mathematics teacher at Comsewogue High School, said, “Equal doses of self-confidence building and math enable low achievers and students with special needs to thrive in this integrated math classroom” (Posnanski). In another article Douglas B. McLeod talks about how confidence correlates positively with achievement in mathematics. Research has shown that the correlation between confidence and success is very strong especially at the high school level (583).

More research needs to be done to look into all the effects that confidence has on learning mathematics. There are so many variables to take into account when dealing with a belief a student has. How each individual student perceives mathematics as a subject plays a part in how they may view their own confidence. If they think that mathematics is just being able to do multiplication then they may feel very confident
while students who believe mathematics is being able to problem solve may take a
different viewpoint. With more research and knowledge, more of these questions will be
answered.

TEACHING

Little research has been done in the area of teaching style and student attitudes in
the classroom (McLeod 581). This is still a very important area in how students view
mathematics in the classroom. Teachers play a direct role in how students learn and
understand a subject. With so much contact with the students about a certain subject it
makes sense that students are then influenced by whatever views a teacher has.

A study that was done with future mathematics teachers found that forty percent
had a less than positive attitude about mathematics and expected male students to
perform better than female students (Sembera 58). There are over three hundred
thousand middle school and high school math teachers (NCTM). This means that one
hundred and twenty thousand teachers are going out into the field with a negative view to
begin with.

Not only are teachers going out into the field with negative attitudes, but they are
also going into mathematics classrooms unprepared to teach. A study that was done in
1999 showed that thirty percent of mathematics teachers neither majored nor minored in
mathematics (NCTM). It does not seem surprising that students are walking away from
mathematics class with a dislike for it when teachers are not prepared to teach the best
that they can.

Though there is not a lot of research showing any direct link from a teacher’s
attitude to a student’s attitude it does seem clear that a teacher’s belief of a student is a
self-fulfilling prophecy (Sembera 58). With all the different reasons that students dislike mathematics it seems that the least an educator can do is help the student learn as much as possible. Studies have shown that students learn more from a teacher who has a mathematics degree than from teachers without any mathematical qualifications (NCTM). By giving students the best education possible, some of the negative views could be wiped away.

**MY OWN INVESTIGATION**

Based on all the research that I have done I wanted to be able to apply this into my own classroom. I wanted to see if there were actually things that I could do to help improve my students' attitudes and beliefs about mathematics. I completed my student teaching at Anderson Eastside Middle School in a 7th grade mathematics class. Over fifty percent of my students were on the free lunch program and many came from lower income status homes. This presented a unique challenge, but this was also the best time to work with them. The students were still young enough for me to be able to sway their beliefs, but they also were old enough to have positive or negative views of mathematics.

First I wanted to get a good perspective of what the students believed to begin with. I gave surveys to all my students asking them to respond to forty different statements on a scale of strongly agree to strongly disagree. The students completed the survey anonymously in hopes that I could get the most realistic viewpoints of the students. I wanted to make sure that no one felt that they were pressured to answer in any way and I made it clear that this survey would in no way affect their grade.

I created the survey not only wanting to find out what the students' attitudes were towards mathematics, but also what types of things might be influencing the students'
attitudes. I used statements from different surveys assessing students’ attitudes including Fennema-Sherman Mathematics Attitude Scales and a survey assessing students’ attitudes of mathematics and science. I used the statements that I felt were at the appropriate age level for my students and also would help me to decide how my own students really felt about mathematics.

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<tbody>
<tr>
<td>1</td>
<td>I am sure that I can learn math.</td>
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<td>2</td>
<td>Knowing mathematics will help me earn a living.</td>
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<td>3</td>
<td>I don't think I could do advanced math.</td>
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<td>4</td>
<td>Math will not be important to me in my life's work.</td>
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<td>5</td>
<td>Males are not naturally better than females in math.</td>
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<td>6</td>
<td>Math is hard for me.</td>
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<td>7</td>
<td>I'll need mathematics for my future work.</td>
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<td>8</td>
<td>I am sure of myself when I do math.</td>
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<td>9</td>
<td>I don't expect to use much math when I get out of school.</td>
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<td>10</td>
<td>Women can do just as well as men in math.</td>
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<td>11</td>
<td>Math is a worthwhile, necessary subject.</td>
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<td>23</td>
<td>Math is not important for my life.</td>
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<td>24</td>
<td>I'm no good in math.</td>
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<td>25</td>
<td>I study math because I know how useful it is.</td>
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<tr>
<td>26</td>
<td>Math is mostly facts and procedures that have to be memorized</td>
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<tr>
<td>27</td>
<td>Math is thought provoking</td>
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</tbody>
</table>
There are many possible right answers to math problems

If I understand a math problem it will only take me a few seconds to get the right answer

Some people are just good at math and some are not

I get a sinking feeling when I think of trying a hard math problem

My mind goes blank when I am taking a math test.

Math makes me feel uncomfortable and nervous

SURVEY RESULTS

I gave the survey to 116 students. This included students who were in my honors class, my regular class, and my basic class. The most shocking part of the survey results were the drastic difference between my honors and basic mathematics class responses. Every student in my honors class disagreed or strongly disagreed with statements 35, 36, 37, 38. These statements all deal with students feeling anxious when taking mathematics test. It was the exact opposite for my basic class. Every student reported that they agreed or strongly agreed with any statements that dealt with having anxiety while taking a test. Over all the classes together there were about twenty five percent of the students who felt that they had some type of anxiety when taking a mathematics test.

Overall, almost every single student agreed with the statement that they can learn mathematics, but about 40% felt that they could not do advanced mathematics. About ninety five percent of the students felt that women could do just as well in mathematics as men, but it was mostly females who responded that they could not do advanced math.

WHAT IS MATHEMATICS?

Though I really wanted to take a look at what students’ attitudes of mathematics were, I also wanted to get a good idea of what students think that mathematics is. I mentioned before students who think that mathematics is just multiplication may have a different attitude towards mathematics then students who think that mathematics is
problem solving. Statement numbers 26, 28, 29, 31, and 32 were aimed to find out what the students’ perspective of mathematics was. In response to the statement, “Math is mostly facts and procedures that have to be memorized,” seventy percent of students answered that they agreed or strongly agreed, twenty percent had no opinion and only ten percent disagreed or strongly disagreed. Students felt the same about mathematics being either right or wrong.

Very few students felt that mathematics was something that could involve creativity and discovery. There were also very few students who felt that in mathematical problems there could be many possible right answers. This was the biggest eye opener for me. I realized that most of my students were sitting in my classroom wanting me to give them a procedure that they could memorize so that they could use it to give me one correct answer.

The most positive outcome of the survey was that students throughout all of my levels of classes felt that mathematics would be important in their future. Though students in my basic classes did not feel as strongly as my honors students on the issue, the majority agreed that mathematics would be something they would need to earn a living, use in their adult life, or something that is more than a waste of their time. This told me that the students were not just in mathematics because they had to have it to get to High School and graduate. Even though they may not have the most positive attitude about mathematics they knew they would have to learn it for the rest of their lives.

IMPORTANCE OF MATHEMATICS

I was glad that students could at least see that learning mathematics now would have an affect on their future. Research supports this in showing that students who take
more mathematics in high school are more likely to go on to some type of post secondary education. It is also clear in research that students who have a post secondary education will be paid more in the long run (Math matters I). Not only does post secondary education have a link to pay, but also students who take calculus are predicted to make twenty one percent more than they would have had they not taken calculus (40).

**FOCUS FOR STUDENT TEACHING**

After I had gathered information about how my own classes viewed mathematics I had a lot better perspective of things I wanted to accomplish throughout my student teaching. I knew that I could not just focus on the mathematics, but I would also have to focus on how mathematics can be creative, discovery oriented, and not just based on rules and procedures. The students had a good basis that mathematics would be important, but I also wanted to show them that there was more than just importance, it could also be enjoyable. This would mean I would have to work with students who were dealing with anxiety especially in my basic class as well as students who were just computing and not understanding what they were doing.

I had gathered several different ideas from all of the research that I had done. Many things I knew that I could never change so I tried to focus on things that I could work with. Since math anxiety had the most research I focused mostly on this area, but I also worked with other areas that I felt could help students get a better perspective on mathematics. This also opened space for student confidence and motivation. As I read through different studies and books I started listing different ideas that I could try. I also placed them under what they would be helping the students deal with. This is the list that I came up with.
Anxiety
- encourage a cooperative and comfortable atmosphere
- play music during quiz and tests
- day before make sure students know exactly what to be prepared for
- work with really anxious students one on one
- give a few minutes before class to students who may be feeling really anxious
- give students more time on a test if they need it

Confidence/ Motivation
- tell a student not to give up
- give students encouragement
- allow students to come in during lunch for one on one work
  (feel less pressure of making mistake and then understand with confidence)

Student Perspective of math
- have an activity for every topic that is studied if possible
- use group work
- classroom discussion

STUDENT IDEAS

After I had a list I wanted to be able to find out if what I was actually doing was helping anyone or if maybe the students had ideas I had not thought of. I spent some time talking one-on-one to students who I knew would have different perspectives and anxiety levels in mathematics. Among the students I talked to I had an autistic boy who was dealing with extremely high levels of anxiety even though he did very well in the
class. I had discussions with a girl in one of my regular classes who always did well and was a typical good student. I also talked to a student from my basic class who really struggled and who was always behind since he struggled with his multiplication tables. At the start of talking with them they all felt that the ideas I had included would work, but I left it open for them to add anything later if they thought of something new.

RESULTS

At the end of my student teaching at some point I tried all of the things on my list. I am not sure that they all worked, but there were some that I really thought had a huge impact on some students. I continually talked with my classes through the semester making sure that nothing seemed to be having a negative affect, but wished I could have spent more time finding out how positive the results were. There would never be enough time to talk to each student individually, but I strongly feel after all the research and work with my own classes this is the way to make the most progress with each student.

By far the most noticeable change was playing music when taking a quiz. The class as a whole was always more relaxed and the environment was much more welcoming. If I did not start the music students would begin to ask if they could have it turned on. I also noticed nervous habits stopped. Less people tapped their pencils, looked around, or were antsy. Students who normally would struggle to stay focused found that they could focus better when the music was playing. Even my autistic boy told me he enjoyed having the music on when taking a quiz. Overall it just seemed to reduce the pressure and made the students feel much more comfortable.
Though it required a lot of planning and time I stuck to my list and made sure that there was an activity every week. The activities ranged from group work, stations, a shopping center, to creating their own nets and decorating them. Overall, this was the most rewarding part of my whole study. I am not sure if it changed students' attitudes or if it made any type of lasting affect, but I know it changed their attitudes and perspectives at least one day. Students who never participated became involved and asked questions. I heard students talking during activities about how they were having fun in mathematics class and they could not believe it. Many students would look forward to being able to come to class on days when we would be doing an activity. Overall students were able to see how the information we talked about earlier in the week was not just a procedure to memorize, but something they could apply. As an entire class we were able to come to the understanding that some days would be fun and other days would not be. This had nothing to do with it just being mathematics, but just part of learning. It did not mean that we should all hate mathematics on a day that was not fun, but just accept that it was part of the deal. This provided motivation and a clear perspective for not only the students, but also for me.

The small things such as saying encouraging words or reminding students not to give up was a hit and miss experience. I could not tell if it really worked or not or if it just depended on the mood of the student. Many of the things that affect students come down to the small things that there may be no way to control. I do know that none of these things had a negative affect and that they were always something worth trying.

CONCLUSION
In the end there is still so much research to be done in the area of affect and mathematics. With so many variables and so many different types of people it is hard to be able to come to any final conclusion about what causes different attitudes in mathematics and how attitudes are affected. I found working with my students that simply trying to help might be one of the best things a teacher can do to keep students from having negative attitudes. Many situations in the classroom can not be controlled, but by working with the students, having a positive attitude, and being aware of what the facts are, the most beneficial results can be reached.
Works Cited

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