

Building Math Esteem in Fifth Grade Students

Karen Schur
Lincoln, Nebraska

Math in the Middle Institute Partnership
Action Research Project Report

In partial fulfillment of the MA Degree
Department of Teaching, Learning,
And Teacher Education
University of Nebraska-Lincoln
July 2007

Building Math Esteem in Fifth Grade Students

Abstract

In this action research study of my classroom of 5th grade mathematics, I investigate the levels of math esteem in each student and as a classroom. The definition of esteem on which I am basing my research is the judgment or estimation of the self-assurance of a student in math. I discovered that several of the students entered my classroom with a middle to low level of esteem in math, and about a third of the class already exhibited a positive, high esteem in math. After implementation of the research, and interpreting the data, I believe almost all the students achieved higher math esteem by the end of the school year. The surveys and interviews I performed with the parents and students lead me to believe the four components of my research had an affect on this outcome. As a result of this research, I plan to continue to facilitate a high level of math esteem in each one of my students.

Problem of Practice

As the 2006-07 school year began I heard groans about starting math again.

My fifth graders are making negative comments about reviewing the multiplication and division facts. The students are whining about having to do story problems and homework. I hear "Do we get to play math games?" and "Do we have a lot of homework each day?" The students ask rather negative questions. I begin my cheerleading tactics to pump them up about the new exciting year. This math class will be different, I tell them. "You will learn so much and have fun becoming incredible math students." I plead, "We will help each other and we will all share our unique ways of looking at math problems and solving them. You will love learning math in my classroom."

As the year proceeds there are fewer and fewer of the negative questions and comments. The curiosity of daily homework still looms in the air, but the students are starting to buy into my promise of liking and maybe loving our math class. I still want to know if the students' esteem level in math is increasing. The test and daily work scores looked good. But was each student feeling confident with his or her individual math skills? Was confidence improving due to the variety of activities I was incorporating into the daily lessons? Was the cooperative learning taking place driving esteem upwards? Was my positive attitude I model every day, affecting the students esteem? These are the questions I hoped to answer with my research project.

What I would hope to accomplish with this research was to find a way to measure a student's esteem in math, by documenting lesson plans centered on multiple learning

activities, and surveying my students and their parents about the students esteem levels in math. I wanted to provide several different kinds of math lessons, such as group projects, problem solving, computation drills, calculator activities, class discussions, student generated activities, and hands on projects. My goal was to vary my instruction presentation by using the overhead, whiteboard, worksheets, and hands on materials, posters and others. I sought to maintain a controlled environment with a feel of comfort and fun, while modeling a positive and enthusiastic feel about math. I wanted every student to feel successful, and valued as an individual in the class.

This research is important to me because a positive attitude and a high esteem level in anything increase the success rate. I want to show students that math is fun and interesting and when multiple activities and experiences are attached to learning, they can gain a better understanding of math. This also goes with any other subject as well. Gone should be the days when kids feel the need to hate a subject just because they feel they can't do it. My job is to encourage them to believe they can do anything they put their minds to. All they need is a good attitude, positive environment, patience and support. It is amazing what the power of positive thinking can do. One of the goals of many educators is to continuously build high self-esteem in our students, in all areas of learning. Because of my personal experience of low math esteem growing up, I made different choices in my life. I think it is crucial for all students to make life choices based on interests and strengths, and not based on what one cannot do. Schools, classrooms, and teachers should be the models of esteem building. This is an important goal for education.

LITERATURE REVIEW

As I set out to find how to alleviate distress, anxiety, and unpleasantness, and cultivate excitement in my math class, I have decided to focus on the self-esteem in math students. I believe that if the student is interested and feeling confident in math, the students won't express negative comments. If the students are ever to become excited about learning new mathematical ideas, they must feel good about engaging in the world of math ideas. It only seems logical that they will enjoy learning mathematics, and develop higher self-esteem in math.

This may sound easy, but it's not. As a teacher I know it takes enthusiasm, confidence, great strategies, and a variety of math activities to keep students engaged in learning. Subsequently, I want to find out, if I provide these elements in my math class instruction, will the students' esteem levels increase to where they are learning and enjoying math at the same time?

While searching for research articles, I find some that related to my questions. Kloosterman and Cougan (1994) believe that through their research with first through sixth grade students, math confidence, math achievement, and interest in math is all related. The notion that beliefs influence action is consistent with research that indicates that actions are motivated by what an individual perceives is the outcomes of those actions (Bartsch & Wellman, 1989; Stipek, 1988; Wittrock, 1986). Specifically, students will not be highly motivated in school unless they believe that what they are learning will be of value to them and that effort will help them learn (Schunk, 1991; Stipek, 1988). We as teachers present new concepts with a purpose, and model self-esteem and enthusiasm; hopefully our students will digest this and grow in math esteem as well. I have observed that when I am excited about the lesson content and present it with pizzazz, my students are more eager to listen and try it. I also try to give a purpose for each lesson. I may ask the students if they know of a career in which this concept would be needed. I also explain the

importance of learning each step of math because what we do in fifth grade is the basis for future math lessons. This idea was important in another article written by Heaton (1994), where she did a case study of a fifth grade teacher and her class. In the case, the teacher has the same desire I have, to make learning math fun and exciting. She incorporates all types of lessons from cooperative group work to hands on activities. “Engaging students in real-life problem-solving situations that are fun is a primary goal for Sandra. Her goals of involvement, enjoyment, and fun within the context of practical mathematics problems emphasize the affective rather than the cognitive nature of mathematics” (Heaton, 1994, p.). Sandra’s enthusiasm for teaching math was present, however at times her content was unclear and concepts even taught inaccurately. The latter would not build math self-esteem.

At the beginning of my research endeavor I had wanted to focus on attitudes in math. I found three articles all bound by the idea of measuring attitude in math. After reading these articles, I soon came to the conclusion that the word attitude is very difficult to define. Hannula (2002) set out to define attitude, measure it in young teenage math students, and set up a framework for analyzing attitude and changes in attitude in mathematics. Hannula’s framework includes “four different evaluative processes are identified as aspects of attitude: emotions aroused in the situation, emotions associated with the stimuli, expected consequences, and relating the situation to personal values” (p. 26). This data would cause one to question the measurement of attitude. Attitude is a very abstract word, with several different meanings. Ruffell, Mason, and Allen (1998), stated that attitude is complex.

We now see attitude as at best a complex notion, and we conjecture that perhaps it is not a quality of an individual but rather a construct of an observer’s desire to formulate a story to account for observations. The difficulty in making attitudinal research precise, and in testing

the validity of attitudinally based conjectures, lies therefore in conceptual and hence methodological issues. (p. 1)

This makes sense to me. When we observe an attitude of a student, it may hold our own ideas of what a good attitude is. Our experiences and beliefs play a part of our judgment and observations. The teacher, student, observer, participant, and experiences (good and bad) all overlap to observe what we believe to be a good attitude. This realization prompted me to change my focus to math esteem instead of attitude.

In another article related to the measurement of attitude in math, which connects to the idea about the importance of the classroom environment. Haladyna, Shaughnessy, and Shaughnessy (1983), express the connection of teacher quality and the learning environment to attitudes towards mathematics. They feel it is important to measure the attitude at a class level, not just an individual level. They cite, Getzels (1969) who suggests, “the classroom environment and the group atmosphere may prove to be among the most powerful indicators of student outcomes” (p. 19). I believe this is a good measurement in student math esteem as well. To exude a high self-esteem in math, the environment where one learns must be a positive one.

Ruffell, Mason, and Allen (1998) assert “a teachers attitude to mathematics is increasingly put forward as a dominant factor in children’s attitudes to mathematics” (p. 1). I believe this is a large part of a student’s attitude, and self-esteem in math. As I stated before, the teacher must model a positive attitude and desire to achieve high esteem in her/his students. Otherwise, the students desire to succeed would fall solely on their shoulders. This article also presents, as a conclusion, how one bad experience in learning mathematics may be the entire reason a student may dislike math, or even feel they can’t do math. When students were interviewed and asked what they remembered about math classes, good and bad, the students were more apt to recall the

bad experience or a bad teacher. I can personally relate to this. Not only did “New Math” in my elementary education leave a bitter feeling in math for me, but also a bad teacher in eighth grade convinced me I wasn’t capable of learning challenging math. It took fifteen years, a bookkeeping career, and Math in The Middle, to raise my self-esteem in math. This is where the passion for this research is stemming from.

I then came across an article with a refreshing goal. Its title is “What’s Funny about Statistics? A Technique for Reducing Student Anxiety,” by Schacht and Stewart (1990). As college level statistics instructors, they notice a high level of anxiety among the students. They decided to do a study on incorporating humor and cartoons in their daily lectures and labs. They believe this anxiety often leads to a less than optimum learning environment in statistics classes. Recent research on humor and its pedagogical utility shows that humor can help to reduce several types of anxiety in the classroom (Powell & Andresen, 1985). Powell and Andresen say, “Consequently we decided to integrate humorous cartoon examples into the course materials... If humor is to have a positive pedagogical effect, it must relate to the topic at hand, it should not mock or make fun of anyone in the classroom, and there should not be too much of it” (Schacht & Stewart, p. 53). Their results show a decrease in anxiety when humor was added to the lessons. I appreciate good humor in learning, and believe it would aid in building self-esteem in mathematics.

The final two articles have a close association with measuring self-esteem in mathematics. Okazaki and Koyama (2005), discussed gaps between mathematics at the primary and secondary levels. The authors feel it is “necessary to encourage children to develop their logical reasoning which is required in upper grades while still at elementary school” (p. 217). Their study looked at different methods to teach the concept of division with decimals. The last article I read was

written by Ruthven (2005). He elaborated on the usage of calculators in the classroom. The only relation my goal has with this study, is that I believe we should teach all levels of math students to become familiar with using a calculator. Being confident with how to use a calculator can only increase your self-esteem in math.

The research has opened my eyes to what I will focus on as I delve into my own research. I find that attitude has a very broad definition. This gave me the insight to measure self-esteem in mathematics rather than measuring attitude. If I incorporate related math activities in my lessons, present the information with a high level of enthusiasm and esteem, incorporate a variety of lessons, and present new information in a variety of ways, then my students' self-esteem in math will increase. There will always be other external factors in a student's math esteem in which I have no control, but I believe by controlling the above variables I can affect math esteem in my students positively.

Purpose Statement / Research Questions

The purpose of this research is to examine my efforts in developing higher math esteem in my fifth grade students, analyze them, and make sense of them so I may use the data and analysis to improve my teaching.

I used these questions to guide my research:

What are the effects on my students' math esteem when I encourage open dialogue, support, teamwork, and positive reinforcement in the math classroom?

If I incorporate diverse, fun, competitive games, in small groups, partners, and whole class situations, to practice the daily instruction, will my student's math esteem increase?

Do my students' interest and enjoyment in learning math increase when I vary the ways I present the daily instruction, on the overhead, whiteboard, oversized paper, and hands on

materials?

If I model an enthusiastic, fun, passionate approach to teaching and learning math, and make statements like “You will love this lesson,” will my student’s absorb this passion and will it increase their esteem in math?

Method

One of the first things I do at the beginning of each school year is to ask my math students to write about their experiences in math. I invite them to tell me about their history of learning math, what they like best about math, what they like least about math, and how they perceive their abilities in math. I want to know everything from how they feel about computation, basic math facts, to problem solving, working in groups and partnerships, and participating in class activities. I also ask them to rate their self-esteem in math. I encourage them to write as much as they can. This gives me some background to the students I will be teaching for the year (See Appendix A).

I examined the data by looking for key words and phrases that I believed were components of esteem. I define esteem as the judgment or estimation of self-assurance in math. I looked to categorize phrases such as: I like math, don’t like math, hate or love math, activities are fun and helpful or boring, I have had teachers who made me like or dislike math, rewards help me learn math, and my math abilities are good or bad. I read each individual essay, looked for what esteem related phrases were used, and incorporated my personal intuition to assign an esteem level to each essay. I interpreted that the majority of the class had a medium math esteem, and naturally there were a few higher and a lower. This gave me a starting point that I could compare other data with as I implemented my research.

The second form of data I collected is a Daily Esteem Survey (See Appendix B). I handed this survey to the 23 students (I gained a student in my class) on seven different days. I spread these surveys out over a two-month block of time (March 1st, March 20th, April 5th, April 12th, April 19th, April 26th, and May 2nd of 2007). For some consistency, I chose Thursdays to survey my students. All but one of these dates is a Thursday. The Daily Esteem Survey was a simple half sheet of paper with colored face icons. One face had a smile, another a straight mouth, and the third icon had a frown. The directions simply asked; “How do you feel about math today?” At the bottom it said: circle the face that best describes how you feel about math today.

I collected the surveys and kept a log of how many of each icon was circled. I totaled each number for that icon at the end of the seven survey days, and came up with the percent of students who felt “good”, “OK,” or “sad” about math those days. This data wasn’t the most important data I gathered, but it provided me some feedback on the lesson or environment for the day. These surveys were anonymous, so I feel they were very honest about their feelings.

The third source is titled “5th Grade Student Math Survey” (See Appendix C). I administered this on March 22, 2007 and it includes the definition of esteem that I have referred to throughout this research, a numeric code (1=low esteem, 5=high esteem), and five questions about the students esteem in math, in which they would answer by circling the corresponding number to how they felt. I tallied the numeric answers for each question, for all 23 students surveyed. I calculated the percent of students who responded with a “5” to give the percent of students who had high math esteem.

I also distributed the same survey to each of the student’s parents, asking how they perceived their child’s esteem. This was titled, “Parent Math Survey” (April 16th, 2007). (See

Appendix D). The questions, definition of esteem, and numeric code were the same as on the 5th grade student survey. I tallied up the scores the same way, and assigned a percentage to the 5's through 1. The percentages were very close to the student survey percentages, which makes me believe the students and parents share their perceptions on math esteem. I was interested to see if the parents' perceptions matched their students' or if there were any parent perceptions that were totally different than that of their students. One parent chose not to respond to two questions, because she didn't feel one could measure esteem with math facts or problem solving. However, I don't believe it skewed my results at all.

Another piece of data I gathered were two different surveys, which were randomly distributed on May 7, 2007. I chose two different survey formats to see if the students would provide more information when they had the choice to answer questions with short replies or tell me more in a narrative form. I collected more detailed factual data from the question form, and more emotional based data from the narratives. Both formats gave me important data. Ten students filled out the narrative survey (See Appendix E), which asked the students to write me a letter telling me what teachers could do to help students learn math. I received comments like "I like being able to share my solutions with the class and not worry about being wrong," "teachers should have more hands-on activities to help us learn math," "Posters with visuals and graphs help me understand concepts better," and "I like hearing my teacher say math is fun." The other thirteen surveys consisted of twelve questions asking what they liked least and most about math, what makes math easy or difficult, when your teacher is excited about math does it make you excited too, and more (See Appendix F). I had a multitude of answers such as, "I like it when the teacher rewards us for our hard work," "I like when we review and the teacher makes you feel comfortable," "I like activities in math but not the competition ones," "I enjoy the group

activities,” and more. To evaluate this data, I matched the student’s answers to each of my four research questions. Each survey had an average of three quotes that I felt correlated to my questions. It is apparent throughout these two surveys that the teaching strategies I am focusing on to increase math esteem in my students are present. I am encouraged by this data.

An additional piece to my data was another writing piece (April 27th, 2007). This was similar to the first example of data I gathered, in that I asked the students to write me a letter telling me what they thought about our math class this year (See Appendix G). I asked them to include likes, dislikes, and changes they would like to see me make in the future. There were a total of twenty letters, because three students were absent on that day. I used the same form of analyzing the data as I did in the first writing example. I searched for phrases such as: likes and dislikes math, loves or hates math, good or bad teacher, rewards, activities and fun environment, good or bad at math, and assigned an esteem level to them. Repeating my low-medium-high ranges from the first example, I could see the different levels of esteem through their writing pieces. The majority of the students didn’t think I should change anything.

A large part of my data gathering was weekly journaling and observation (February 6, 2007 through May 3, 2007). I wrote at least every week, and documented the lessons and activities the class engaged in. I also wrote about the success of the lessons and general feel of the students after completing the instruction and activities. Looking back there are only minor changes I would make in some of the activities. On the whole the kids were engaged in learning and I observed students with high esteem levels.

The second to last item of data was the Math Survey (See Appendix H) that measured math esteem once again. I asked the 23 students to take a few minutes at the end of the lesson that day, and fill the nine-statement survey out. It included six numerical answered statements,

and three statements that asked for a written answer. The numerical answer statements invited the students to circle a 1-5. An answer of 1 indicated a low score, and a 5 meant the highest score for that question. These statements ranged from, "I like math," and to "I feel comfortable asking questions in math if I don't understand a concept." The writing statements said, "This is my favorite math concept and why:" to one good thing that happened in math class, and one not so good thing. I analyzed the data by equating a percentage of each number (1-5) that was given as an answer. There were no 1's, only one 2, which doesn't amount to even one percent, twenty-one 3's equaling 15% of the answers, forty-nine 4's or 36%, and sixty-seven 5's which is 49%. The 4 and 5 numbered answers together consist of 85% of the answers. This told me the 23 students had high math esteem in these areas. The written portion of the survey revealed mostly positive answers.

The final portion of my data gathering was a thirty-minute oral interview on May 29th, 2007 with seven students whose names were chosen randomly out of a bowl that contained all the names of the math class. The seven students felt honored to talk with me. The interview consisted of four main questions titled, Oral Student Interview about Math Esteem (See Appendix I).

The students did a nice job of answering the questions; I had to remind them to take turns to answer. Overall, I got a very good feeling about the feedback they provided. They expressed a lot of statements that connected my research questions to having high math esteem. This was a very interesting thirty minutes and I feel like I made a difference in these students' math esteem. This interview took place seven days before the end of the school year, so I feel the students could pull from the year's experience. They were also getting excited and somewhat sad to move

on to middle school. I don't believe this had any affect on the outcome of our discussion. They remained very focused throughout the interview.

FINDINGS

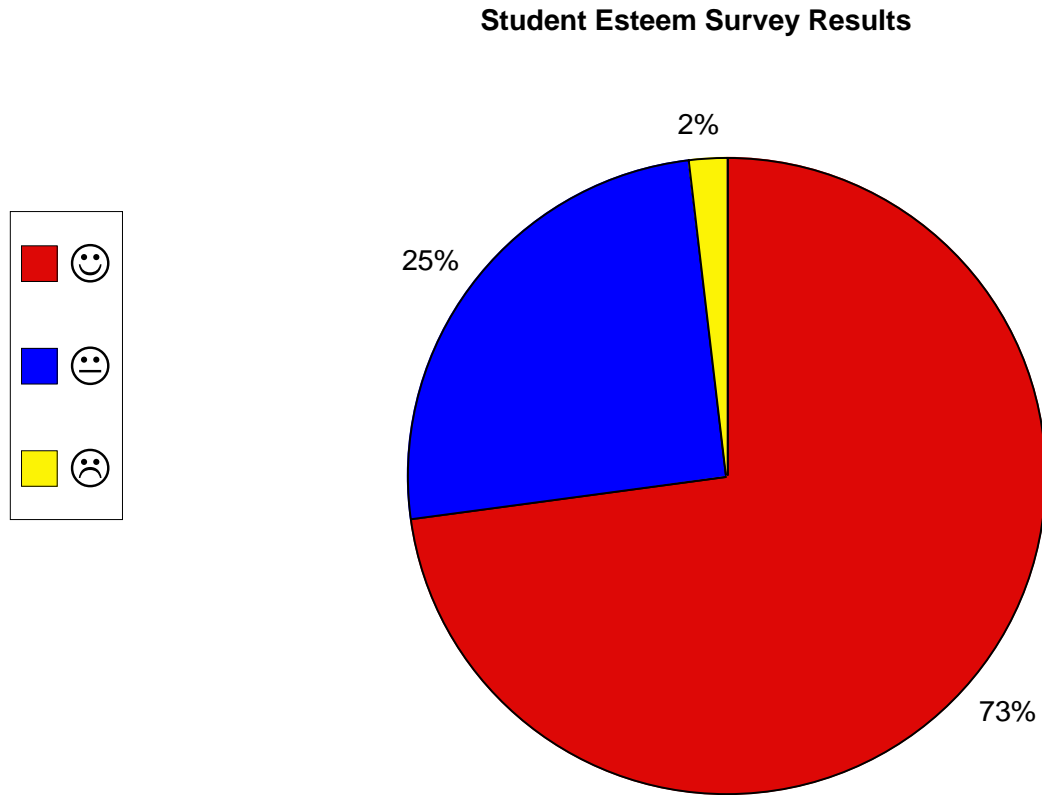
As I looked at each individual piece of data I collected, I found common outcomes to all of them. The students enjoyed the varied learning instruction, they happily participated in the activities that accompanied the daily lessons, my teaching was upbeat and fun, and they felt the math classroom was comfortable and inviting.

My first research question was: What are the effects on my students' math esteem when I encourage open dialogue, support, teamwork, and positive reinforcement in the math classroom?

Providing a positive learning environment where the students feel comfortable about participating and sharing their ideas has impacted their confidence in learning math. One piece of evidence that supports this assertion is through observation. I have observed my class, and most of the students are willing to volunteer their ideas and solutions openly with their peers, in whole class discussions. They know the people in our class will listen and be respectful as they share. They understand if their solution isn't correct, we will all work together to find the best solution. They also work well together in small group and partnership settings, helping each other complete and check the assignments. They celebrate their successes together with verbal praise and applause.

The Daily Esteem surveys (See Appendix B) is another piece of evidence that reveals some increase in math esteem. Out of the seven surveys, and a possible 161 responses, the smiley face had 117 responses or 73%, the straight face had 41 responses or 25%, and the frown had 3 responses or 2%. This outcome shows the students exude high math esteem.

GRAPH 1



The third example of evidence that shows that a positive environment affects a student's esteem is the interview (See Appendix H) I conducted with seven of my students. When I asked the question: How important do you think the environment is for learning math? By environment I mean the desk arrangement, whether or not you can hear and see the teachers instruction, is it fun and inviting to participate? Is it a positive and respectful place to learn? One student answered, "Oh, I think it is really important. If it wasn't comfortable I wouldn't want to be here." Another student said, "I like the way we sit, and the bright colors in here. I never feel like anyone will laugh at me when I answer something wrong. I can always hear you." And a third student replied, "I always feel like you listen to me, and care about my learning

math. We should sit where ever we want though.” These comments revealed to me that the students felt a positive environment affected their math esteem.

My second research question was: If I incorporate diverse, fun, competitive games, in small groups, partners, and whole class situations, to practice the daily instruction, will my student’s math esteem increase?

Student comments centered on classroom activities were repeated throughout my data. All eight data gathering events produced some kind of score or personal remark about the activities that accompanied the daily lessons. The students loved looking forward to practicing a concept with some kind of activity. Whether it was a game, logic puzzle, group problem solving, or math fact relays, the students waited eagerly every day to see what activity we would do with the lesson.

One piece of evidence that supports this assertion is my daily journaling. In my journal I have written several activities that the math students participated in. On Monday, February 12th, I had written:

To review our chapter on multiplication of decimals, I handed out a book order form to each student. This was the standard four-page book order a company provides to classrooms to purchase books at a discount that I give the students monthly. It includes photos of the books, a price for each item, and an order form. I explained to them they each had \$100.00 (pretend) to spend. They needed to include 7% tax, and a shipping fee of \$2.95. I showed how they would fill the order out, figure the tax, and add the shipping fee. They could not go over the \$100.00 amount.

They had a lot of fun competing to see who could get closest to \$100.00 with out going over. One of the female students placed an order that came out to exactly \$100.00.

She was very excited. Even after modeling the directions, I had a few students figure the tax after the shipping fee was added, and some forgot to add tax to their purchase. It was a great learning activity.

(Note: 20 out of 24 students received a 100% on the decimal multiplication chapter test). The journal represents documentation that the students had fun, they all participated, and they learned the new concepts practiced in the activities. It was also evident in my journal that the activity didn't have to be elaborate. There were days when the activity was simply practicing skills on the calculator, or getting in a group to solve and present a math word problem. At the end of every activity I would ask the students if they felt it enhanced their learning for the day. Very rarely did a student say no.

A second piece of evidence would be the surveys (See Appendices E and F) I had the students fill out on May 7th. In the single question survey (taken by 10 students) there were key phrases about classroom activities on seven of them. On the twelve-question survey (taken by 11 students) there were ten related comments to daily classroom activities. One student said, "My favorite thing about math are playing math activities." Another student replied, "I like the math activities when learning new math concepts." I believe this shows how important the students felt about the activities being a part of our math instruction. 81% of the students on these two surveys made a positive remark about the activities. I truly believe this enhanced their math esteem.

A third example of evidence relating to how math classroom activities build math esteem in fifth graders are the letters I had my students write telling me what they thought about math class this year. I searched for key phrases throughout the personal letters that centered on the word "activity." Out of 20 letters, there were 14 direct comments about how much they enjoyed the

math activities. These were free form letters. They did not include direct questions. From this, I can make the assertion that 70% of the students surveyed felt the activities were important components of their math esteem level.

My third research question was: Do my students' interest and enjoyment in learning math increase when I vary the ways I present the daily instruction, on the overhead, whiteboard, oversized paper, and hands on materials?

Throughout the year I incorporated a variety of learning styles in my daily lesson presentation and instruction. Some days I would write the notes for a new concept on the overhead projector while the students wrote notes in their journals. Sometimes I had prewritten information and questions on large pieces of colored paper, hanging around the classroom to follow as we learned. Other days I might hand out worksheets and manipulatives to practice a new concept as we went along. All these different presentation techniques have an impact on the math esteem of the students. A piece of evidence that supports this assertion is a survey I gave to my math students, and also to their parents. The surveys (See Appendix C and D, respectively) included questions on math computation, math facts, problem solving, math esteem in 5th grade, and overall math esteem till now. The numerical ranges given to represent the answers were 1-5, with 5 being high esteem and 1 being low esteem. Out of the 23 parent surveys, 57% answered with a 5, the 4's were 32%, 3's were 8%, 2's had 1%, and there were no answers with the number 1. There were also 3 questions with no response. Out of the 23 surveys filled out by the students, the results were: 59% -5's, 39% -4's, 2% -3's, and 0% for the 2's and 1's. When one compares the two surveys they have very similar results. The students and parents both had high percentages in the high esteem category, which correlates to the students and parents beliefs of high esteem in math. This table provides the responses of the students and parents on the esteem

survey. The S and P represent students and Parents. The numbers alongside them are the question number.

Esteem Level	S1	P1	S2	P2	S3	P3	S4	P4	S5	P5
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0	0	0	1
3	0	1	0	3	0	2	2	1	0	2
4	8	8	9	9	8	4	13	10	7	6
5	15	14	14	10	15	15	8	11	16	14
No response	0	0	0	1	0	1	0	1	0	0

The attitude of the students appears to be positive by varying the instruction periodically. They also appear to like some kind of routine in the daily schedule of class. A piece of evidence that supports this assertion is by observation and discussion. The students express how they like it when we do different learning practices like group work, solving problems with a partner, hands on activities, and writing out problems on the white board or large paper. One student named Jill¹ said it this way, “I like how math class is kind of different but the same everyday. We have the same order but different things mixed in.” Other students expressed the same thoughts. One student wondered if we could leave out the homework section everyday. I assured him this was an important part of the whole math lesson.

Another piece of evidence that backs my assertion is the student interview (See Appendix H). I directly asked, “Do you think the way the teacher presents the math instruction makes a difference in how you learn and feel about math? Does it matter if the teacher varies the presentation of the math information daily or weekly, for example the overhead projector, the white board, a power point, or handout?” A female student named Kelly said, “Yes it matters how the teacher teaches us math. I like some things done the same way.” A male student named John replied, “I had trouble seeing the overhead sometimes, so I’m glad you let us move to

¹ All names are pseudonyms.

where ever we could see it. I liked when you had the geometry shapes, geo-boards, and things we could hold.” Another student, Mark, said, “I like the variety. You don’t get bored as easy.” These direct student quotes support how a variety in curriculum presentation aids in acquiring high math esteem in fifth grade.

My fourth research question was: If I model an enthusiastic, fun, passionate approach to teaching and learning math, and make statements like “you will love this lesson,” will my student’s absorb this passion and will it amplify their esteem in math?

I feel strongly that this makes a huge impact on building math esteem in fifth grade students. By continuing to model a positive, up-beat attitude towards math, by repeating daily how cool and fun this information is, and how you will love what we are doing today, the students begin to take on the same attitude and believe in them. One piece of evidence that supports my assertion is the continuous observations and discussions with my students. They express how much they love coming to math and how good their grades are. I didn’t choose to collect students’ scores for my data, but there is a high percentage of 100%’s on chapter tests. I believe modeling an “I can” attitude everyday leads to math students with high esteem, which in turns leads to high scores.

A second piece of evidence that supports this assertion is the student survey (See Appendix I) the directions asked the students to circle a number 1-5, 1 being low and 5 being high, that correlates to their beliefs. The first statement said, “I like math,” this was answered with a 4 or 5 on 18 of the 23 surveys, or 78%. The statement, “I am good at math,” was answered with 21 out of 23, 4’s or 5’s, this translates to 91% of the answers.

These figures support my assertion that modeling a positive attitude towards math perpetuates others to feel the same way. Some quotes from the written portion of this survey

were, “This year my attitude changed towards math entirely. Now I love it!” A second student wrote, “I ended up with a really good teacher that made me learn and think harder.”

A final piece of evidence that supports my assertion is the Daily Esteem survey, with the face icons. I shared the results earlier. I believe this survey relates to the impact of a positive role model in the classroom because I gave it on seven random days over a two-month period. The results show the high percentage (See graph 1) of students who liked math on that day. Granted this is only seven days, but I believe these results would be similar throughout the year.

CONCLUSIONS

After implementing this action research, I have come to the conclusion that four important components of building math esteem in fifth grade students are: provide a positive learning environment, incorporate a math activity with one’s daily instruction and practice, vary the instruction and presentation as a teacher, and model a positive attitude towards math as a teacher. I believe these four components are a recipe to build fifth grade students’ esteem in math. I believe each of these components is important on its own, but when you combine all four of these components it will heighten the total math esteem of the entire class. I believed these four components would have a strong effect on my math students. I believe having higher math esteem increases achievement. A higher esteem in math usually correlates with more persistence, asking better questions, taking more pride in achievement (and so putting more effort into it), and more success solving complex problems. All of these are factors in a successful student. Successful students make up successful learning groups (classes).

As I came to the end of the 2006-2007 school year, I believe this recipe is even more effective than I first thought. After looking at the essay I asked my students to write in September, about different math esteem issues, and comparing those with the year-end surveys

and interviews, I believe the numbers show a positive impact on the students math esteem. I witnessed first hand the smiles and cheers of my fifth grade math students as I relayed to them the 95.3% grade average of the entire class (26 students) on the State Math Criteria Reference Test. They all felt successful and prepared for sixth grade math.

While saying goodbye on the last day of school, I had several of my math students come up and tell me what a great year they had in math. I agreed with each one of them.

I thought to myself, these four components would be a part of my teaching for the rest of my career. I truly believe they make a difference in the esteem of fifth grade math students.

Implications

As a result of my study, I plan to continue to implement the four components I touched on in this research: provide a positive environment, incorporate a math activity with daily instruction and practice, vary the instruction and presentation of the curriculum as a teacher, and model a positive attitude towards math as a teacher. I understand each year I will have different students with different levels of abilities, and things may not go as well as this year, but I will still continue to incorporate these factors into my teaching. As a result of this study I will continue to journal weekly, about the events and the dynamics of the present math class. I believe this form of reflection helped me be aware of the students needs as a whole class and individually too. This study also relates to my theory that a positive attitude in life can help you achieve great things. Watching a young person gain esteem in math education, or be successful in anything, is a great experience.

I will use the results of my data to encourage colleagues to incorporate these components into their teaching of math. I will share my enthusiasm that I believe building each math students' esteem will increase their achievement. When you build several students' math esteem,

it will influence large group achievement, district achievement, and so on. Providing a positive learning environment, incorporating math activities with the daily instruction and practice, varying the instruction and presentation as a teacher, and modeling a positive attitude towards math as a teacher are all attainable factors to a successful math classroom. These four components don't require a huge amount of time to plan and implement. Most of the activities I incorporated into my lessons were provided in the math book, and the other three components of my research are commitments we make as educators. I believe most teachers already strive to provide a positive environment, act as a positive model to their students and vary the instruction they present. Therefore, these are more often than not, present in our teaching and not a big time commitment to learn and implement. I would also challenge teachers to incorporate these four factors into their daily teaching and make their own assertions about whether or not building esteem in our math students will increase achievement. We may complete tasks we don't always enjoy or feel great about, but I truly believe our drive and success is due to how good we feel about what we are trying to achieve, or our self-esteem.

Two of the research areas I will focus on improving, are discovering and trying even more math activities, and varying my presentation of lessons more frequently. I found sharing activities in my math class didn't always go smoothly, but that's how we build and refine our instruction as teachers. I will also include suggestions from my students about what activities and learning tools they enjoyed. I will also continue to invite my students to give me feedback about these components of our math class. I'm excited about continuing to implement the four pieces of this research in my teaching.

REFERENCES

- Haladyna, T., Shaughnessy, J., & Shaughnessy, J. M., (1983). A causal analysis of attitude toward mathematics. *Journal for Research in Mathematics Education*, 14(1), 19-29.
- Hannula, M. S. (2002). Attitude towards mathematics: Emotions, expectations and values. *Educational Studies in Mathematics*, 49(1), 25-46.
- Heaton, R. (1992). Who is minding the mathematics content? A case study of a fifth-grade teacher. *The Elementary School Journal*, 93(2), 153-162.
- Kloosterman, P. & Cougan, M. C. (1994). Students' beliefs about learning school mathematics. *The Elementary School Journal*, 94(4), 375-388.
- Okazaki, M. & Koyama, M. (2005). Characteristics of 5th graders' logical development through learning division with decimals. *Educational Studies in Mathematics*, 60, 217-251.
- Ruffell, M., Mason, J., & Allen, B. (1998). Studying attitude to mathematics. *Educational Studies in Mathematics*, 35(1), 1-18.
- Ruthven, K. (2005). Short communication on alternate interpretation of the dataset on K-12 calculator usage and college grades as analysed by Wilson and Naiman (2003, 2004). *Educational Studies in Mathematics*, 60, 383-387.
- Schacht, S. & Stewart, B. J. (1990). What's funny about statistics? A technique for reducing student anxiety. *Teaching Sociology*, 18(1), 52-56.

Appendix A

Student Reflection

How do you feel about math? Think back to Kindergarten through fourth grade. Write about your feelings towards math. You might include how you feel about learning math, activities you remember doing, and any particular lessons you liked or disliked. You may include your feelings about memorizing math facts, computation, problem solving, and tests you have taken. Please share any memories you have about your math classes whether they are positive or negative. You do not need to include your name.

Appendix B

How do you feel about math today?



Circle the smiley face that best describes how you feel today about math.

Appendix C

5th Grade Student Math Survey

Ms. Schur 2007

Esteem in this survey refers to the judgment or estimation of the self-assurance you have in math.

1=low esteem

5=high esteem

1. Thinking back to when you started 5th grade, rate your level of overall esteem in math.

1 2 3 4 5

2. Thinking back to when you started 5th grade, rate your level of esteem in math computation.

1 2 3 4 5

3. Thinking back to when you started 5th grade, rate your level of esteem with math facts (addition, subtraction, multiplication, and division).

1 2 3 4 5

4. Thinking back to when you started 5th grade, rate your esteem with mathematical problem solving.

1 2 3 4 5

5. Thinking back to when you started 5th grade, rate your level of esteem in 4th grade math.

1 2 3 4 5

Appendix D

**Parent Math Survey
5th Grade Ms. Schur
2007**

Purpose: to measure the esteem of fifth grade students

Esteem in this survey refers to the judgment or estimation of the self-assurance of your student in math.

1=low esteem

5=high esteem

1. How would you describe your child's overall esteem in math?

1 2 3 4 5

2. How would you describe your child's esteem with math computation?

1 2 3 4 5

3. How would you describe your child's esteem with math facts (addition, subtraction, multiplication, and division)?

1 2 3 4 5

4. How would you describe your child's esteem with mathematical problem solving?

1 2 3 4 5

5. How would you describe your child's esteem in fifth grade math?

1 2 3 4 5

Do you have any other comments on your child's esteem in math?

Appendix E

Student Letter

Please write me a letter and tell me what teachers could do to help students learn math.

Appendix F
Student Written Interview

Please answer the following questions. I would appreciate honest and complete feedback from you. Thank you for taking the time to help me better understand fifth grade math students.

1. What do you like best about math?
2. What do you like least about math?
3. What makes math easy or difficult for you?
4. What math activities do you enjoy? Do they help you learn new math concepts?
5. Have you ever had a really bad experience with math? If so, what happened?
6. What could teachers do to help students learn math?
7. How successful do you feel about using Math skills in and out of class? Give an example of how you use Math outside of class.
8. What is your overall opinion of your math ability?
9. When your teacher is excited about math, does that make you excited about math?
10. What is your favorite thing about math?
11. Is there anything you want to know from me?
12. Is there anything else I should know about you to better understand your general math experience?

Thank you, Ms. Schur

Appendix G

Please write me a long letter on a piece of notebook paper, and tell me what you think about your math class this year. Include anything about the class that will help me improve it for future students. Don't hold back. I appreciate this feedback.

Thanks,
Ms. Schur

Appendix H

MATH SURVEY

Please give your honest response to each statement, 1 being low and 5 being high.

- | | | | | | |
|---|---|---|---|---|---|
| 1. I like math. | 1 | 2 | 3 | 4 | 5 |
| 2. I am good at math. | 1 | 2 | 3 | 4 | 5 |
| 3. math skills are important for other skills. | 1 | 2 | 3 | 4 | 5 |
| 4. I am able to show the work required to solve math problems. | 1 | 2 | 3 | 4 | 5 |
| 5. I like to answer questions asked in math class. | 1 | 2 | 3 | 4 | 5 |
| 6. I feel comfortable asking questions in math if I don't understand a concept. | 1 | 2 | 3 | 4 | 5 |

COMPLETE THE FOLLOWING STATEMENTS .

7. This is my favorite math concept and why:

8. One good thing that happened in math is:

9. One not so good thing that happened in math is:

Appendix I

Oral Student Interview About Math Esteem

1. How important do you think the environment is for learning math? By environment I mean the desk arrangement, whether or not you can hear and see the teachers instruction, is it fun and inviting to participate? Is it a positive and respectful place to learn?
2. Do you think it helps you learn and feel good about math concepts when the teacher provides different activities to enhance the instruction? For example, games, partner work, group work, puzzles, etc.?
3. Do you think the way the teacher presents the math instruction makes a difference in how you learn and feel about math? Does it matter if the teacher varies the presentation of the math information daily or weekly, for example the overhead projector, the white board, a power point, or handout?
4. Do you think it makes your esteem in math higher if the teacher models a positive attitude and love for math herself? What if the teacher just said, “here, read this and do these problems”. Would you feel worse or better about learning math?