INCREASING STUDENT ACHIEVEMENT THROUGH BRAIN-BASED STRATEGIES

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DEDICATION

We dedicate this project to our students who have inspired us to become better teachers. We also thank those who loved and supported us throughout this project, Jay, Ceci, Barb, Gay, Gene, Kathy, and Kelly.

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ABSTRACT

The students targeted were third and fourth grade students with learning-disabilities and seventh-eighth grade science students who exhibited poor test scores, motivation, and behaviors that negatively impacted their learning. The objective of this study was to change the level of student engagement in order to increase their academic achievement by incorporating Multiple Intelligences strategies into daily lessons. The study took place from September 2006 to January 2007. The purpose of the study was to determine if incorporating multiple intelligences would help raise test scores and improve student behaviors.

Data was collected through observation checklists, parent surveys, and Multiple Intelligence (MI) surveys as both pre- and post-intervention measurement tools. Students completed reflective journal entries over seven weeks to help identify their multiple intelligence strengths and how those affect their learning. Collated data is illustrated through graphs throughout the paper followed by narrative analysis.

The two teacher researchers in this project found students to be more engaged in the learning process as a result of the strategies introduced in their classrooms. This research indicated that incorporating MI into daily lesson improved students' self esteem, increased retention rates, enhanced motivation for learning, and decreased incidences of off-task behaviors. Students appeared to be more focused and engaged on assessments at the end of the study as a result of the use of various MI strategies. Students' learning experiences would be greatly enhanced if teachers taught to multiple student intelligences and incorporated alternative assessments.

CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

The students targeted in this study were six 3rd and five 4th grade students with learning-disabilities from School A and 110 7th and 8th grade science students from School B who exhibited a lack of engagement and motivation which impacted their level of learning. Evidence for the existence of the problem was found in formal and informal assessments, behavior write-ups, anecdotal notes, and multiple office visits for behavioral disruptions in class, such as talking out of turn.

Immediate Problem Context

School Site A

School A is located near a large Midwestern city. The school consisted of 805 students in kindergarten through fifth grade in 2006. The information in this section was derived from the State School Report Card 2005. Student enrollment in this school is the largest of six elementary schools in the district. School A predominately consists of White students with a sizable Hispanic population of students. Table 1 shows the racial and ethnic backgrounds.

Table 1.

Racial/Ethnic Background and Percentages as of September, 2004

Racial/Ethnic Background	Percentage of population
White	82%
Black	.5%
Hispanic	16%
Asian	1.2%
Native Americans	.2%

Of the students in School A, 15% receive public aide or free and reduced-priced lunches. Students' attendance is excellent with a rate of 95.6%. Of School A's 12.5% population are Limited-English-Proficient, which means these students are eligible for transitional bilingual services.

The administrative and office staff in School A includes a principal, assistant principal and three full-time secretaries. The faculty includes thirty regular education teachers, four learning resource and fine arts teachers, and three English as Second Language (ESL) teachers. Support staff include two reading specialists, one social worker, a psychologist, nurse, a part-time occupational therapist and five instructional aides for learning-disabled and speech students.

The general education curriculum at School A includes reading, writing, math, science, social studies, language arts, physical education, art, and music. The school provides a Bilingual and ESL program for students with multicultural needs. Special education services are delivered through the learning resource program and in the regular education settings. Learning Resource students are pulled from the regular education

classroom for remedial support in math, reading, and writing. Speech and language services are delivered in the regular education setting, as well as in individual or small groups. Small groups are held in the speech pathologist's office. Regular education and special education students participate in a variety of social skills groups delivered by the school psychologist and social worker. Title I services are available to first through fifth grade who experience reading difficulties, but are not identified as having a learning disability by the reading specialists. Most students are identified for Title I services through the use of the State Snapshot of Early Literacy (SOL) test.

School A has adopted a school-wide program called Character Counts. Each month the students focus on one of the six pillars. The six pillars of Character Counts are trustworthiness, respect, citizenship, caring, responsibility, and fairness. Each morning the principal and assistant principal start announcements with a quote about the "wise skills." Students can receive "airplanes" from teachers, instructional aides, fine art teachers, and lunchroom aides. Airplanes are slips of paper given to students who exhibit behaviors that correspond to the six pillars. These students are recognized during the school announcements stating what they did to show evidence of understanding the "wise skills." Each month the teachers pick one student from each grade to be "Wise Students of the Month."

School Site B

School B is located in a Midwestern state near a major urban area. Of students at school B 13.5% are considered low income and the school has a strong student attendance rate of 93.9%.

Table 2.

Racial/Ethnic Background and Percentages as of September, 2004

Racial/Ethnic Background	Percentage of population
White	93.6%
Black	.2%
Hispanic	4.8%
Asian	.4%
Native Americans	1%

School B has 28 teachers and 481 students. This school is unique in that it is a self-contained, one building district, which serves pre-k through 8th grade students. There are three administrators: two part-time superintendents and a full-time principal housed in the same building with students and teachers. Each administrator has support staff and secretaries. A health clerk and a bookkeeper are also housed there.

The current principal has been a life-long member of the community of School B. There are two teachers per grade level in School B. One part-time ESL aide serves the Spanish-speaking population. Other personnel in the district include one health clerk, a social worker, a part-time school psychologist, part-time occupational therapist, and one full-time speech and language therapist.

The library at School B was closed as a result of budget cuts in the 2004-2005 school year. It is currently open under the direction of a school librarian. There is a computer technologist in charge of computer classes. All students also receive services from full-time art, music and physical education instructors. There are three custodians and four lunchroom personnel.

School B also has four special education teachers with aides. There is one room that serves as a transition class between the kindergarten and first grade. This room has a teacher and an aide. The pre-k and kindergarten rooms each have a teacher and an aide. Kindergarten is currently a half-day program. The current third grade class consists of well over 60 students, so each classroom has an aide at this point. Due to the large class size, it is anticipated that the aides will remain with the class as they transition to upper grades.

Extra curricular activities at School B currently include sports for boys and girls, music, environmental club, after school art, student council, drama club, and cheerleading. All these activities were not available last year due to budget cuts.

The facility itself is a unique aspect of School B. The school was originally built in the 1940s. Additions expanded the building as the school population has grown over the years. The original building was built in a donut shape, which creates logistical problems every time any classes need to move through the building. Staggered start times make the morning hallways a continuing nightmare full of behavioral issues.

The shape of the building, the history of the surrounding community, the fact that this is a one-building district, all combine to make School B's unique setting. In addition, Botvin's Life Skills program has been implemented into the science/health curriculum. Botvin's Life Skill program is a research-based program based on skills that all students need to develop for successful life achievements similar to the Character Counts adopted by School A.

Surrounding Community

School A and School B are located within the same community. The community was originally a beach/summer cottage community with very small homes originally intended for weekend purposes only. Now those cottages are being used for full-time living. According to the census data from 2000, 90% of the total population in the community is white, .3% black, .2% Native American and Asian, and 7.1% Hispanic. The average age in the community ranges from 25 to 44 years old. Most citizens in the community are employed in non-manufacturing fields. The average income in the community is $55,759. Housing reports from the 2005 census data indicated 76.3% of the population owns their homes while 23.7% are renters.

The average population in the surrounding communities outside of the district is 47,813. The population in the community has increased by 19% in a ten-year period. The school population has increased by 21% from 3,819 students in 1990 to 4,614 in 2002. The current school population for the 2005- 2006 school year is 4,723.

School A passed a referendum during the 2005-2006 school year. This was the first referendum passed since the spring of 1993. Due to the successful passing of this referendum, five classroom teachers were added to each school in the district. The district made over $2 million in cuts at the beginning of the 2005-2006 school year. If the referendum had not been successful in March of 2006, the district would have made an additional $2 million in cuts. The cuts would have elimination of art, music, and physical education. The district formed a referendum committee to inform the public of factual information and how the cuts would impact individuals and the community. The district also formed a committee with the community and teachers who were concerned with

which programs should be reinstated and how the budget should be spent. The committee proposed their ideas to the school board. Some of the ideas included all-day kindergarten, extended day for kindergarten, year-round school, and possibly combining with another district.

The teaching staff of School B started the 2006-2007 school year without a contract. The relationship between school board members and teachers' union officials has been very adversarial throughout the past two years. This has created a very stressful working environment for the teaching staff and administration alike. The teachers' union has made a statement about the lack of contract talks by having the staff wear black on certain days of the week, which has caused students to ask questions. The union has instructed teachers not to discuss the contract issues with the students.

National Context of the Problem

Teachers have traditionally looked at education from the mind set that students learn primarily from one intelligence. This has been evidenced by a reliance on intellectual quotient (IQ) and other standardized testing. Brain-based research is an alternative perspective on education that has gained attention over the years as a result of Eric Jensen's studies and other's research. Jensen defines, "Brain-based learning as the informed process of using a group of practical strategies that are driven by sound principles derived from brain research" (Jensen, 2000, p. 6). As a result of this research teachers have become more interested in the brain and how the brain affects students' achievement. According to Linda Darling-Hammond, a researcher on the brain and learning, the school system hasn't changed since the late 1800s. Teachers are teaching the same way they did in the 1800s but with more technology and resources. "Our school

system must change to reflect what we now know about teaching, learning, mind, and brain" (Bruer,1999, p. 662).

To help school systems change, Darling-Hammond suggests educating teachers in brain-based strategies through professional development. Brain-based educators create learning environments that make the students feel welcome and comfortable. Lessons in a brain-based classroom are highly interactive and teach for meaning and understanding. Within such an environment, multiple intelligence approaches are addressed. "Information about learning styles and multiple-intelligence (MI) is helpful for everyone especially for people with learning disabilities and Attention Deficit Disorder. Knowing your learning style will help you develop coping strategies to compensate for your weaknesses and capitalize on your strengths" (Learning Styles and Multiple Intelligences, 2006, p. 1). Use of MI means students are challenged at all levels. The problem in some schools is they don't have the resources available to them to teach to all levels (The George Lucas Educational Foundation, p. 2 para. 4).

John Bransford (2003), a current researcher in learning theory and brain-based education, believes the main goal of education is to help students develop intellectual tools and learning strategies to be productive members in society. Current research in learning theory revealed teachers should implement a multidisciplinary approach. New information and research on the brain indicates teachers should carefully look at what they teach, decide what method and style of teaching they are going to use, and what they want their students to be able to do before implementing a lesson. Current research also shows teachers should provide students with many opportunities for hands-on activities, collaboration with other students and teachers to enrich learning, provide real life

examples and connections with students, create a classroom where attention is on individual learning styles, and use technology as much as possible. Students are more successful when viewed as independent learners, assessment is of high quality, and parents and community members actively participate in the betterment of the students.

Howard Gardener's theory of multiple intelligences has been shown to be an effective method to teach students in a brain-based classroom. Howard Gardener uses the eight intelligences to enrich lessons presented to students. The eight intelligences are logical/mathematical, interpersonal, visual/spatial, musical/rhythmic, intrapersonal, bodily/kinesthetic, naturalistic, and verbal/linguistic. Teachers need to remember, "Intelligences are cultivated more than they are inherited. And different cultures tend to reinforce certain intelligence" (Jensen, 2000, p. 212).

Bruer (1999) showed girls tend to be more left hemisphere dominant, which means they are better at analytical problem solving and verbal tasks. He also indicated boys use the right hemisphere and perform better at drawing, painting, math, and visual verbal tasks. He encourages teachers to incorporate both parts of the brain in each lesson. "To ensure that the left hemisphere gets equal time, teachers should let students, read, write, and compute often" (Bruer, 1999, p. 651).

Teachers who don't use brain-based approaches typically test students on what they are able to retain and recall. On the other hand, teachers in a brain-based classroom give students' options or test in more creative ways (i.e. mind mapping, journals, posters, dioramas).

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

The students being studied in the two classrooms exhibit poor test scores, a lack of motivation, lack participation, and behaviors that negatively impact their learning, such as off-task behavior and lack of homework completion. The purpose of this study was to increase student engagement and academic achievement in classroom tasks.

The teacher researchers gathered baseline data in four ways: a teacher-developed observation checklist, a parent survey, reflective journals and a Multiple Intelligence (MI) survey. The teacher researcher checklist targeted talking out, off-task behaviors, and disrespectful actions by students toward staff and peers. The MI survey was administered at the beginning of the study to determine students' learning styles. The MI survey was administered as a pre- and post-intervention measurement to see if students' learning styles changed. The parent survey was sent home after each administration of the MI survey. The purpose of the parent survey was to determine if parents noticed a difference in student behaviors at home. After the teacher researchers compiled baseline data, students completed reflective journal entries on their behavior.

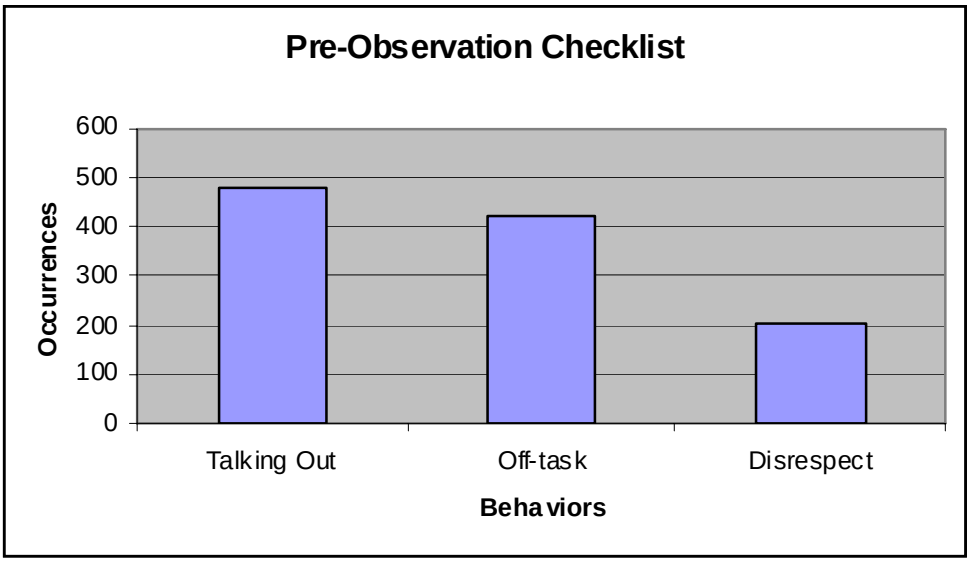
Teacher Observation Checklist

The Teacher Observation Checklist (See Appendix A) was used to document classroom behaviors of 130 students. The Teacher Observation Checklist was implemented in the classroom as a pre- and post- assessment measure. The checklist was used to track the frequency of the following behaviors in their classrooms: talking out of turn, off-task behaviors, and disrespect toward staff and peers in the respective

classrooms. Both of the teacher researchers used tally marks to track occurrences of behaviors. At the bottom of each checklist, teacher researchers have the option to add additional comments about students' behaviors. Each teacher researcher created checklists in two different colors to track behaviors within each classroom.

Table 3.

The number of times talking out, off-task, and disrespect occurred in Teacher Researchers A and B's classrooms.



The teacher researchers, using the Pre-Observation Checklist, found the most common classroom behavior was students talking out of turn. Off-task, which is described as behavior that is disruptive to the learning process of the individual and those around him or her, such as talking to their friend or passing notes. Disrespect towards staff and other students occurred with the least frequency. Incidents of disrespect towards staff and other students occurred most often in the seventh grade level where the teacher researcher observed students yelling at teacher and putting down other students.

Some explanations for the frequency of these behaviors are: students identified as

students with special education needs; students exhibiting attention deficit disorder (ADD) characteristics, such as fidgeting, squirming in seats, spontaneous movement in the classroom, and lack of focus; and students with special education needs who have been mainstreamed without sufficient support.

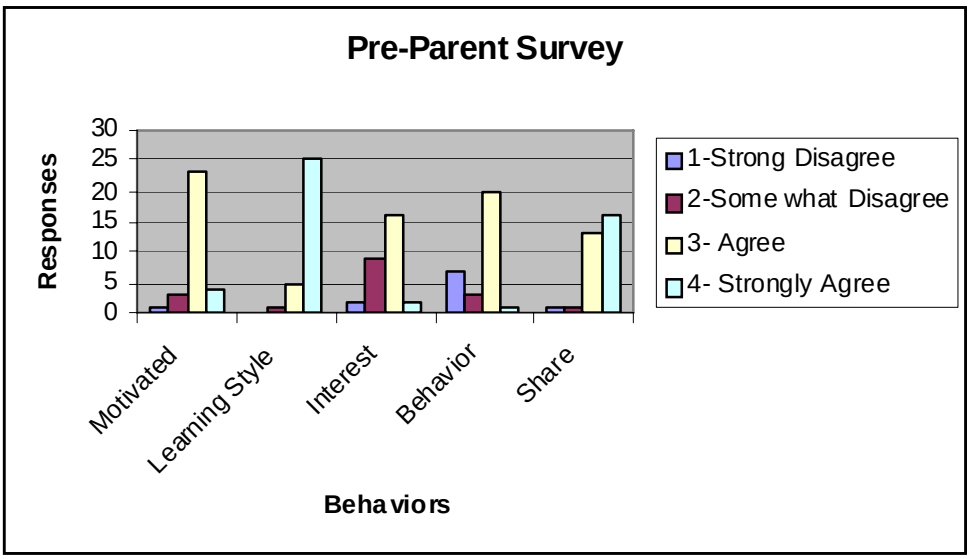
Teacher Researcher A had a behavior intervention plan in place from the beginning of the year. The behavior plan impacted the results because the students experienced immediate consequences for their behavior.

Parent Surveys

Teacher Researchers A and B randomly selected thirty parents to complete the Parent Survey (See Appendix B). Each parent was identified only by a number to preserve his or her anonymity. The Parent Survey was administered twice during the study, once at the beginning and once at the end of the study. The Parent Surveys asked how parents saw their student in three areas: their student's motivation towards school and learning, their student's ability to recognize and control their own behavior during instructional time, and how they believed their student benefited from concepts being presented in different learning modalities, such as mathematical/logical, verbal, and visual.

Table 4.

Parents responses to perceptions of child's motivation, behaviors, and learning style. (n=30)



In this survey, 25 out of 30 parents strongly agreed that their son/daughter learned best when information was presented in a variety of learning styles. Twenty-three of 30 parents responded that their student was not motivated to learn at school.

Reflective Journals

Students were asked to write Reflective Journal entries (See Appendix C) following the teacher researcher completion of the Pre-Observation Checklist. Reflective Journal entries were administered each week on Friday for the last five to eight minutes of class for students. The prompts were designed to help students reflect upon their own and their peers' actions and behaviors during class time. The purpose of the Reflective Journal entries was to help students recognize inappropriate and appropriate behaviors. Teacher Researchers A and B randomly selected students to share their responses with

the class.

Both teacher researchers found that most of their students used their time wisely by paying attention, taking notes, and completing homework. Most students were distracted during instruction by other students talking out and random noises.

When one student in Teacher Researcher B's classroom was asked during Week 10 during the study if they worked well with other students, the student responded, "Sometimes I do but they don't like me or my ideas because I am not popular and don't have many friends." Another student responded, "Kind of because if people won't let other people do things like help, then I get mad. But if we all divide it we all get a part in whatever we are doing, then yes, I do work well with others."

Teacher Researchers A and B found that students overwhelmingly responded that they work well with others in groups. When students were asked how they should respond to working well with others their responses included "being nice," "helpful," and "sharing work."

When students were asked during Week 11 of the study if they considered themselves to be good listeners, 89% of the students surveyed responded that most of the time they thought they were. When asked how being a good listener helped them, students overwhelmingly responded that it helped them get their homework done, understand the subject material, and do better on tests and with their grades.

A student in Teacher Researcher B's classroom reported that being a good listener means "knowing the answers to questions. But then when the test comes I blank out and forget everything." Another student reported being a good listener helps them "do better, get good grades, and gets them off grounded. When I don't listen and I get called on I

have no clue what's going on around me." Another student reported "Being a good listener helps me but it would be better if my memory wasn't so bad."

When asked during week twelve if they liked their own personal behavior in class most of them reported that they were "happy," "excited," "stayed out of trouble," and were "quiet" and "calm" throughout the class period. Others reported they felt as if they were listening and talking appropriately. When asked how they did not like their behavior in class, they cited, "talking out of turn," "not listening," "talking out of turn," "goofing around," "not having homework done," and "being over tired" as reasons for their substandard performance. A student reported they liked their behavior because they were calm. I was not talking back. Another student reported they didn't like their behavior because they messed up on the test because they were trying to get it done fast.

During Week 13 when asked how a classmate's behavior affected learning students reported that talking out and movement around the classroom and distractions limited their ability to learn. When asked how students could help their own classmates learn the overwhelming response was that I could stop talking and be quiet. This indicated that some of the students are beginning to understand that their own behavior impacts others. A student from School B reported s/he could help their classmates learn better by being more supportive to their peers. Another student reported, "They could set an example and see if the other students could pick it up and do the same."

When students were asked if they talked too much during class, their responses consisted of "I got distracted," "I got in trouble," "I got yelled at," "Oh and by the way my homework wasn't done." When asked how talking out of turn during class disrupts learning students indicated that they can't learn, can't get information, get into trouble

more and the teacher gets off-task. A student wrote “Talking out of turn during class can be disruptive because some other student could be talking and I interrupt them. They could lose their train of thought. It could have been important.”

When students were asked to reflect on their behavior and how it helped them learn during week fifteen, they responded that concentrating more and paying more attention to the rules would increase their grades and improve their behavior. When asked how staying on-task would help, they answered that it helps to stay on-task because they are more able to get their work done, be better able to concentrate, stay out of study club, and their grades would improve. One of the students stated, “Reflecting on my behavior can help me because if I have a bad behavior I can learn from it and keep a positive attitude.” Another student reported, “Reflecting on my behavior can help me because it will show me how I can improve and also what I have done. I should always do the right thing but when I don’t then I don’t do my best.” A student reported, “Staying on-task is helping me because I can get my work done faster and better than if I just write answers to get it done. I also learn better that way because I get practice doing something.”

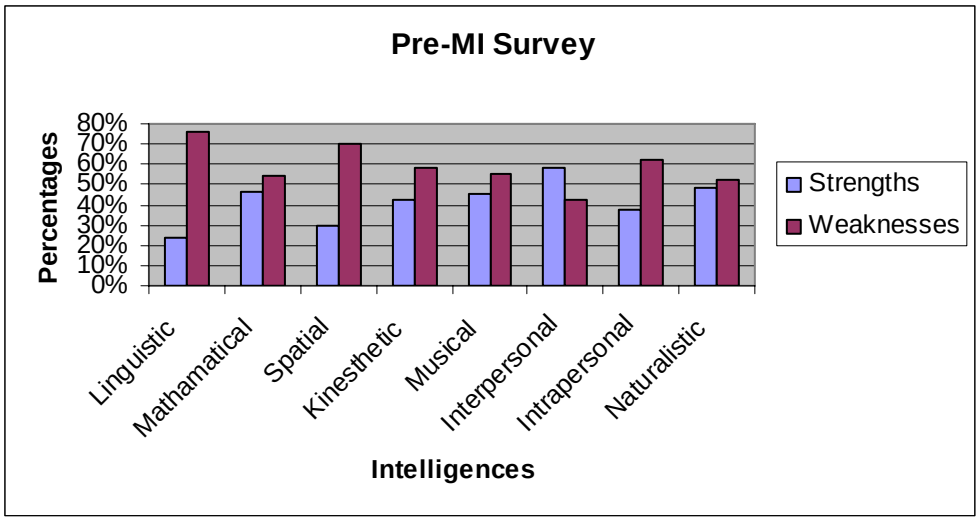
Student Survey

Teacher Researcher A and Teacher Researcher B used Student Surveys to determine each student's multiple intelligence strengths and weaknesses. Student Surveys were distributed to a total of 130 students in the classrooms of each teacher researcher. Teacher Researcher A administered the Learning Style Survey (See Appendix D) and Teacher Researcher B administered the Multiple Intelligence Survey (See Appendix E). Each of the surveys was administered at the beginning and end of the study to see if students gained interest in using other intelligences. The survey helped Teacher

Researchers A and B determined students' multiple intelligence strengths and weaknesses and if students' intelligences changed.

Table 5.

Students' perceptions of their strengths and weaknesses in Multiple Iintelligences prior to the interventions. (n= 130)



The interpersonal intelligence was the intelligence perceived by students to be their strongest intelligence. Linguistic intelligence was perceived by the students as their weakest intelligence overall. The students perceived that most of their strongest intelligences fall below 40%. Based on this, it appears the students are more aware of their weaknesses than their strengths. This could be due to lack of exposure to instruction utilizing multiple intelligence techniques.

Probable Causes

Multiple intelligences practices have been restricted in some districts due to households earnings less than $30,000 a year, a lack of funding and resources, district curriculum and state testing requirements. Some teachers are uncomfortable with

incorporating different learning styles other than visual and auditory practices because of perceived time restrictions and the perceived difficulty with using multiple activities within one lesson.

Howard Gardener believes multiple intelligences and learning models should be taught together not separately. By using both multiple intelligences theory and learning models together, teachers develop a holistic approach to education. Students exposed to a wide variety of modalities get the best education they deserve. In order for teachers to deliver instruction using the two models, they need to put forth their best effort otherwise this will not be successful.

The teacher researchers have heard many teachers saying that multiple intelligences strategies area waste of time. Teachers seem to feel they are taking too much time out of their day coming up with different projects that support the eight intelligences when they would rather be spending time on developing curriculum. Howard Gardener believes teachers should be focusing on depth not breadth.

Incorporating multiple intelligences theory into lessons can seem overwhelming because of district curriculum and state testing requirements. “Schools dictate that teachers should follow curriculum frameworks, meet state standards, and prepare students for state tests and academic and vocational callings. Integrated learning respects these realities. The approach is designed so that it can be incorporated into current practices easily without asking teachers to rethink everything they do” (Perini, Silver, and Strong, 2000, p. 1).

Howard Gardener believes teachers should use multiple intelligences in lessons because it helps students relate to real world experiences (Smith, 2002, p.6). By

incorporating all eight intelligences teachers are helping students become life long learners and productive members to society. The eight intelligences also help teachers teach eight different ways instead of one. Studies conducted by Project Schools Using Multiple Intelligences Theory (SUMIT) have shown schools that incorporate the eight intelligences have increased students' motivation toward school, higher parental participation, less discipline problems, and higher ACT scores. All of the results have been because the school used the eight intelligences in all subject areas (Kornhaber, 2001, p. 276).

Mindy L. Kornhaber (2001) was actively involved with Project Zero, an educational research group from the Graduate school of Education at Harvard University. Project Zero's mission is to understand and enhance learning, thinking, and creativity in the arts. Mindy identified a number of reasons why teachers and policymakers in North America have responded positively to Howard Gardner's presentation of multiple intelligences. She says that:

> The theory validates educators' everyday experience: students think and learn in many different ways. It also provides educators with a conceptual framework for organizing and reflecting on curriculum assessment and pedagogical practices. In turn, this reflection has led many educators to develop new approaches that might better meet the needs of the range of learners in their classrooms (p.276).

Some teachers may not be willing to change and may choose to continue to use the traditional model of teaching. Traditional models tend to focus on verbal/linguistic and mathematical/logical intelligences. For some students this may cause them to become frustrated because those ways of learning are weaker and less comfortable for them

(Smith, 2002).

Elliot Eisner (2004), a teacher and researcher of multiple intelligences, is concerned with whether multiple intelligences can be emphasized in a classroom with the high demands of expected curriculum and standardized tests. He indicated it appears as if the school systems today are more concerned about standardized tests than making the difference in student performance. Standardized tests have become very important on judging students, teachers, and schools. With this emphasis on tests, teachers have little time to teach and incorporate each of the multiple intelligences. Eisener says that standardized tests don't incorporate the use of multiple intelligences (Eisner, 2004). He believes in order for multiple intelligences to be successful in the classroom, teachers need to use different curriculum or different programs to meet the needs of their intelligences. "If students are exposed to different curriculum and programs, teachers have nothing to compare student's progress" (Eisner, 2004, p. 31-39).

Many teachers teach primarily to two types of intelligences and learning styles because of district curriculum and state testing requirements. These teaching methods are mainly in the verbal and auditory areas. However, Gardener has shown that multiple intelligences theory is easily incorporated into regular classroom activities. Districts with teachers who incorporate multiple intelligences theory in their regular curriculum have more parental involvement in student education, fewer discipline problems, higher standardized test scores and greater student motivation in learning, according to research performed by Project Zero and Schools Using Multiple Intelligence Theory (SUMIT).

CHAPTER 3

THE SOLUTUION STRATEGY

Literature Review

Pokey Stanford (2003), states that multiple intelligences (MI) can make the greatest contribution to education. He suggests that teachers "expand their repertoire of techniques, tools, and strategies beyond the typical linguistic and logical ones predominantly used in U.S. classroom" (p. 82). Howard Gardener says, "It is of the utmost importance that we recognize and nurture all of the varied human intelligences. We are all so different because we have different combinations of intelligences. If we recognize this, I think we will have a better chance of dealing appropriately with the many problems that we face in the world" (as cited in Pokey, 2003, p. 81).

Multiple Intelligence (MI) Theory is not a new term or concept. It expands on what teachers have been or are doing in the classroom. The teacher's role in an MI classroom consists of constantly shifting methods of presentation from linguistic to naturalistic. Teachers are going beyond the text to reach the needs of all students. All MI does is "Help teachers reflect on their best teaching methods to understand why these methods work (or why they work well with some students)" (Pokey, 2003, p. 82). MI also helps teachers go beyond the text and create a variety of tools to meet the needs of all students. MI helps good teachers vary opportunities to learn and show evidence of what was learned. MI has helped students who don't experience success in school and lack motivation. By incorporating MI into the classroom, students can experience success and academic growth (Pokey, 2003, p. 81). Teachers who expose students to MI will see an increase in student achievement and desire to learn. "By integrating MI an educator is

potentially opening a world of possibilities to diverse learners and empowering their sense of responsibility and efficacy as learners" (Kolata, 2003, p. 1).

MI helps teachers differentiate instruction to meet the needs of all students. Teachers need to remember to shift intelligences when presenting lessons. In the course of a day, activities presented should incorporate each of the intelligences to meet student learning styles. Teachers need to have a balance of intelligences to help students who are at-risk of not retaining information. In fact, MI is beneficial to learning disabled students because it emphasizes their strengths (Pokey, 2003).

If students aren't accepted or viewed as individuals, how can educators expect others to accept them? By implementing MI, teachers are developing positive relationships between students of all levels of ability. Teachers can also expect to see an increase in student performance and willingness to learn. Teachers would be supporting individual student's interests and learning styles, which helps student's become more motivated and engaged in the learning process (Kolata, 2003).

According to Howard Gardner, before implementing multiple intelligences in a classroom, teachers should administer a multiple intelligence checklist to determine students' strengths and weaknesses. The checklist will also help the learner recognize their intelligence strengths (as cited in Perini, Silver, & Strong, 2000, p. 10).

In an MI classroom, assessment is of high quality and endless. Since instruction and assessment go together, teachers are constantly assessing their knowledge. The MI classroom lets the teacher have the control of varying strategies. The teachers can also use more authentic assessment, which helps reach the needs of all students (Pokey, 2003, p. 84).

Not only has MI been implemented in elementary and secondary education, but also it is becoming more common at the college level. Glendale Community College in Arizona completed a study in 1994 on incorporating the multiple intelligences and creating assessment tools for students. The purpose of the study was for students to be exposed and show mastery of material in different ways. The college adheres to the following:

> Not all students learn or understand material the same way. The teacher is the expert in the material being presented and the students choose which way they would like to show mastery. The purpose of learning is to provide options and let students show their creativity using their intelligence strength. The assessment covered outside and inside of class may appear on a quiz or test (Diaz Lefebvre, 2003, p. 4).

These approaches help students to explore learning in a variety of creative ways and have fun, too. The faculty member's role is to support the student in the learning process. When students take more responsibility for learning, they become more accountable for their learning and behaviors (Diaz Lefebvre, 2003).

The study conducted at Glendale Community College in Arizona was composed of more than 2,400 students who completed classes that incorporated multiple intelligences instead of traditional classes (Diaz Lefebvre, 2003). Rubrics were created and handed out to students with expectations set by teachers and professors. Students were graded on creativity/imagination, demonstration/performance, organization/ format, reflection/meta-cognition, and evidence of understanding. Due to the success of this pilot program, Glendale Community College recognized the MI Learning for Understanding as

an academic program (Diaz Lefebvre, 2003).

Bruce Campbell, a teacher and consultant on teaching through the multiple intelligences, conducted a study during the 1989-1990 school year on incorporating multiple intelligences into a third grade classroom (Campbell, 1990). Every day he set up seven different learning stations dealing with the day's topic. Students learned through reading, writing, moving and building, solving problems cooperatively, creating rhymes, and computing. Information was gathered by daily journals, classroom survey, and student assessment inventory of the centers. The findings from the study showed an increase in student independence and a decrease in inappropriate skills. At the same time, cooperation skills improved, leadership skills improved, and student's retention of material improved. Parents also reported behavior improved at home (Campbell, 1990).

Campbell stated that the role of the teacher did change (Campbell, 1990). The teacher started working with students instead of for them. He also became a resource person instead of a guide or taskmaster for students. The teacher became less directive and more facilitative. He was a resource to the students as they worked on student-selected projects.

Project Schools Using Multiple Intelligence Theory (Project SUMIT) is a three-year project directed by researchers from Harvard University's Project Zero. Project SUMIT identifies schools that have been implementing MI for three or more years. According to the Project SUMIT study forty-nine percent of the schools interviewed reported positive outcomes on standardized tests. They also reported students had an increase in test scores, discipline, parent participation, and skills for students with learning disabilities (Kolata, 2003). A principal interviewed from an MI school reported

One impact of the MI curriculum was that children felt better about themselves….student attitude might have a positive impact on test scores. A fifth grade student from a school in Farmington stated about MI “It gets you so that you’re not putting anybody down--you’re not putting yourself down!” (Kolata, 2003, p. 5).

If students’ beliefs do not fit the notion of what is normal on intelligences, then they lack competence in their abilities. This lack of confidence in turn affects the student’s success in school. Students are less likely to engage in tasks that are difficult to them and show little effort in challenging tasks.

> When students are valued and appreciated for who they are and how they learn, meaning in this case respects the varied intelligences set forth by Gardener, they have a higher sense of self-efficacy which will enable them to be more successful in their intellectual and personal careers. It therefore follows that this greater sense of self-efficacy will promote self-directed and self-regulating behaviors that will allow students to become more autonomous in their learning (Kolata, 2003, p. 5).

A high school in Libertyville, Illinois requires students to take a course on style-based meta-cognition. Sue Ulrey, instructor of the class, feels students need to understand their learning styles and behaviors, which leads to an increase in self-awareness (Perini, Silver, & Strong, 2000). According to Ulrey, multiple intelligences can be introduced to students as early as first grade. Teachers teach about the intelligences to help students understand themselves.

Project Objectives and Process

As a result of multiple intelligences lesson plans, during the period of September 2006 to January 2007, the student populations at schools A and B will show a decrease in off-task behaviors, an increased use of a variety of learning styles, and will exhibit an increase in cooperative learning, as measured by observation checklist, parent surveys, and multiple intelligences surveys.

The teacher researchers developed materials to address all learning styles. These materials were developed in the form of lesson plans prepared by each teacher researcher concerning a variety of appropriate topics. Teacher Researcher A developed lesson plans concerning the topics of place value, single digit subtraction, and written expression. Teacher Researcher B developed lesson plans concerning the topics of chemistry, the organization of body systems, and fetal development. All lesson plans were developed using as many of Gardener Multiple Intelligences as deemed appropriate for each topic.

Project Action Plan

July 3-7
-Develop instruments to administer to students- Develop Pre-and Post-Observation Checklist and Reflective Journals
-Copy MI survey for students- Teacher Researcher A 15, Teacher Researcher B 115
-Copy Reflective Journals- Teacher Researcher B 110 and Teacher Researcher B 15
-Copy Pre-and Post-Observation Checklist for teachers- Teacher Researcher B 4 and Teacher Researcher A 4
-Copy parent consent forms and parent letters- Teacher Researcher B120 and 25 Teacher Researcher B

July 10-14
-Start developing lesson plans involving multiple intelligences-Teacher Researchers A and B

July 17-21
-Continue developing lesson plans-Teacher Researchers A and B

July 24-28
-Continue to develop lesson plans-Teacher Researcher A and B

July 31- August 4
- Set up classroom environment-Teacher Researchers A and B
- Make copies of Reflective Journals- Teacher Researcher B120 and Teacher Researcher A 15
-Create journals for students-Teacher Researcher A and B

August 7-11
-Continue to set up classroom environment-Teacher Researchers A and B
-Determine timeline for lesson plans developed-Teacher Researchers A and B

August 14-18
-Continue to work on classroom environment-Teacher Researchers A and B
-Continue to develop lesson plans-Teacher Researchers A and B

August 28-September 1
- Send home consent letters to parents- Due September 1 Teacher Researcher B

September 4-8
-Administer MI survey to all students-Teacher Researcher B
-Teacher Researcher A send home consent letters

September 11-15
- Administer MI survey-Teacher Researcher A
-Tabulate MI survey and import results onto an Excel sheet. Then create graphs
-Start Pre-Observation Checklist

September 18-22
-Continue checklist-Teacher Researchers A and B

September 25-29
-Finish checklist-Teacher Researchers A and B
-Send home Parent Survey-Teacher Researchers A and B

October 2-6
-Introduce Reflective Journals- Do writing #1-Teacher Researchers A and B

October 9-13, 16-20, 23-27, 30- November 3, November 6-10, 13-17
-Reflective Journal entries 2, 3, 4, 5, 6, 7-Teacher Researchers A and B

November 13-17
-Re-administer MI survey-Teacher Researchers A and B

December 4-22
-Administer Post-Observation Checklist-Teacher Researchers A and B

November 27- January 2
-Tabulate data
-Create graphs
-Determine results

January 8-12
-Send home Parent Survey-Teacher Researchers A and B

January 15-19
-Tabulate results from Post-Observation Checklist
-Create a graph of Pre-and Post-Observations Checklist data
-Analyze Reflective Journal entries

January 22-26
-Start Chapter 4
-Start post conclusions
-Tabulate Pre-Parent Survey

January 29-March 14
-Make recommendations
-Review and revise chapters

Methods of Assessment

Four methods of assessment were used to measure the effects of the intervention. The methods were an Observation Checklist (Appendix A), a Parent Survey (Appendix B), Reflective Journals (Appendix C), a Learning Style Survey (Appendix D) for younger students, and an MI survey (Appendix E) for older students.

Multiple intelligence surveys were administered at the beginning and end of the study to assess MI strengths and weaknesses. Parent surveys were also administered at the beginning and end of the study to determine parental perception of student attitudes toward learning. Weekly reflection logs were given to students to reflect on behavior. Checklists were implemented as a pre- and post-intervention tool to determine if incorporating MI into daily lessons decreased off-task behavior, lower incidences of

disrespect towards peers and teachers, and lessened talking out of turn.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Interventions

The objective of this study was to change student engagement in order to improve academic achievement in classroom tasks. This was to be accomplished by incorporating multiple intelligences into daily lessons. We anticipated that students participating in the study would show a decrease in off-task behaviors, an increased use of a variety of learning styles, and would exhibit an increase in cooperative learning.

The Action Plan was implemented as indicated in Chapter 3. Teacher Researchers A and B implemented the plan as described in the Action Plan with no deviations. Teacher Researchers A and B conducted the study from August 2006 to January 2007. At the beginning of the study parent consent forms were sent to all parents. Parent Surveys were sent to thirty randomly selected families. Before implementing MI strategies in the classroom, Teacher Researchers A and B conducted a Pre-Observation Checklist to determine the occurrences of off-task behaviors, disrespect towards staff and students, and talking out. After the Pre-Observation Checklist students completed an MI or Learning Styles Survey (depending on age) as a method of discovering individual student learning strengths. While Teacher Researcher A and B added MI strategies to classroom activities, students completed Reflective Journal entries. At the end of the study, Teacher Researchers A and B completed a Post-Observation Checklist and MI or Learning Styles Surveys.

Presentation and Analysis of the Results

Table 6.

Students' perceptions of their strengths and weaknesses in Multiple Iintelligences prior to the interventions. (n= 130)

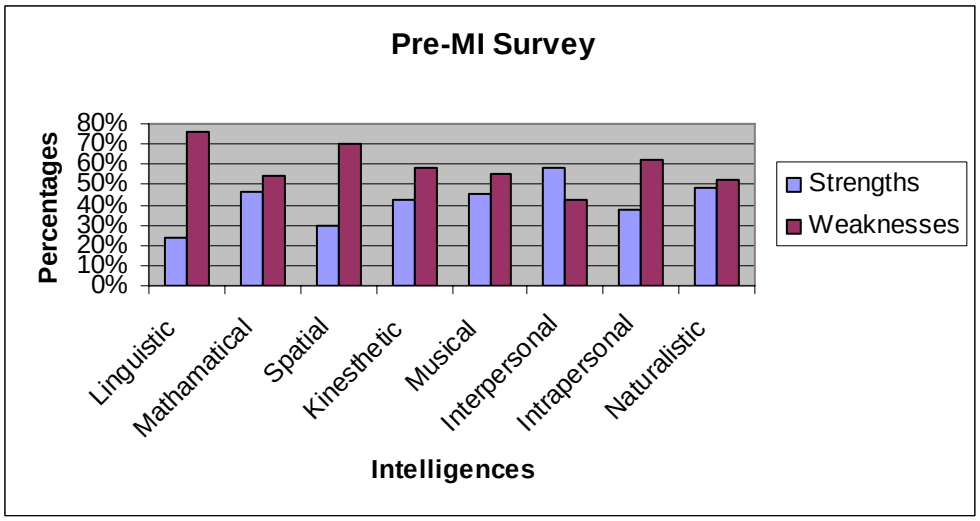
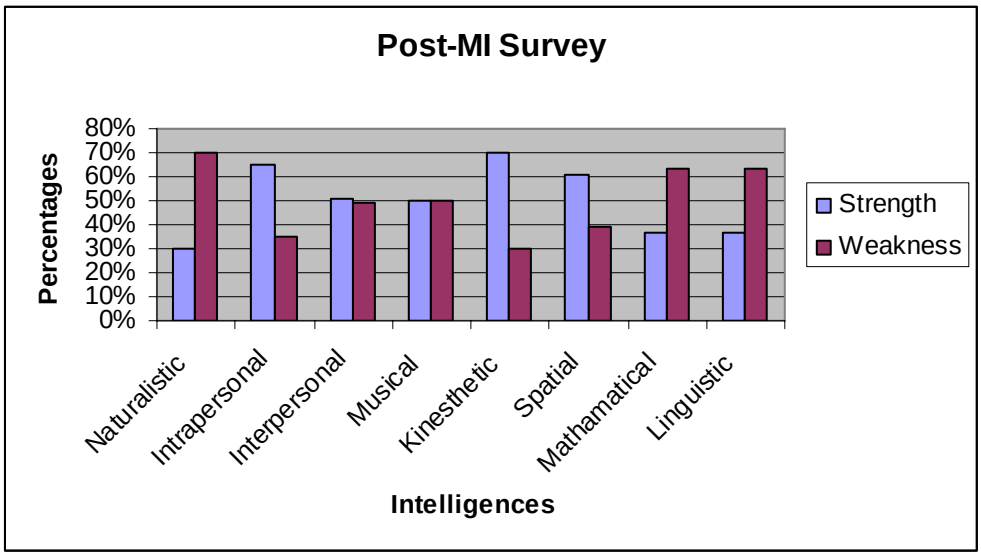


Table 7.

Students' perceptions of their weakest and strongest intelligences after MI interventions. (n=130)



The kinesthetic intelligence was the strongest intelligence overall. Intrapersonal

and visual/spatial intelligences were the next closest. The weakest intelligence is naturalistic intelligence. All of the surveyed students' intelligences were above the 30th percentile.

In comparing the pre- and post-data survey results, interpersonal intelligence ranked highest on the pre-MI survey and kinesthetic ranked highest on the post-MI survey. Students also reported significant increases in the strengths of their intrapersonal and visual/spatial intelligences. Naturalistic and mathematical/logical intelligences dropped in percentage from the pre-MI survey.

Table 8..

Parents responses to perceptions of child's motivation, behaviors, and learning style. (n=30)

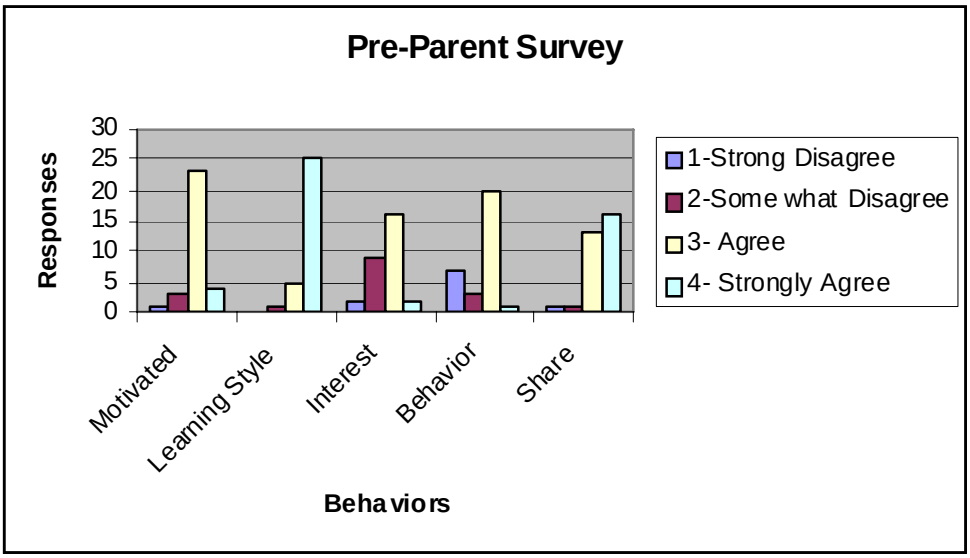
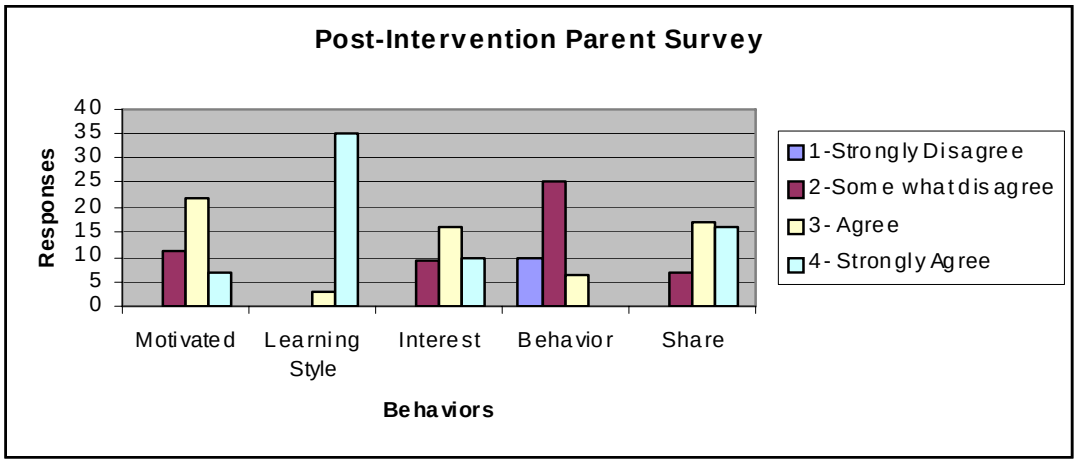


Table 9.

Parents' responses to questions about their students' motivation, learning style, interest, behavior, and sharing of educational experiences at home after the interventions. (n=30)



Thirty-five parents strongly agreed that their child learns best when concepts are presented in different ways. Less than 10 do not view their child as having a hard time controlling their own behavior in class. About 30 parents feel somewhat included in their child sharing learning experiences with them. Twenty-nine parents felt their children were motivated to learn in school.

Pre- and post-surveys of parents indicated parental perception of student motivation had changed slightly in the positive direction at the end of the study. Parental perception of students' learning styles stayed the same; most indicated that their children learned best when material was presented in a variety of ways. None of the parents strongly disagreed with anything except their perception of how their children behave in class.

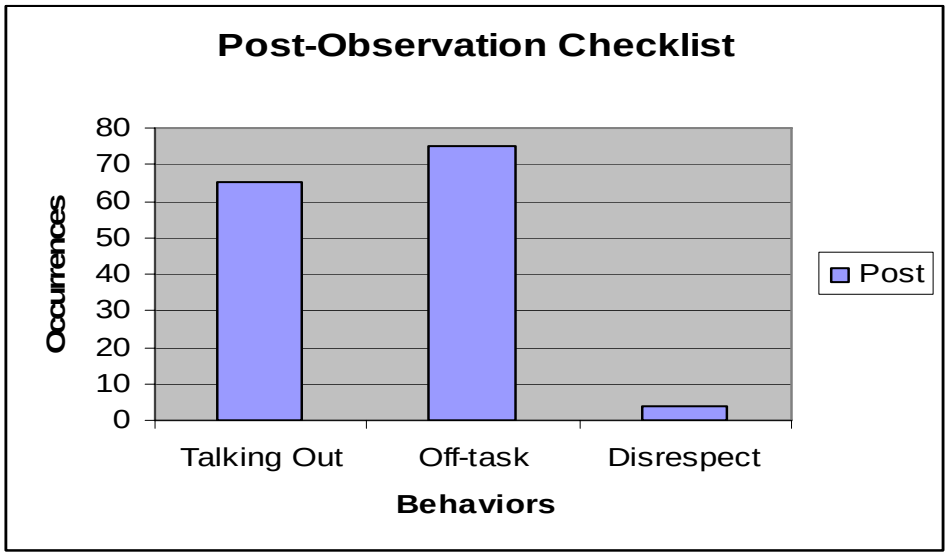
More parents participated in the post-survey than the pre-survey. Surveys were sent home and returned through the students.

Observation Checklist

The teacher researchers used the Pre- and Post-Observation Checklist (Appendix A) to record the occurrences of three different student behaviors in their classes before and after the interventions.

Table 10.

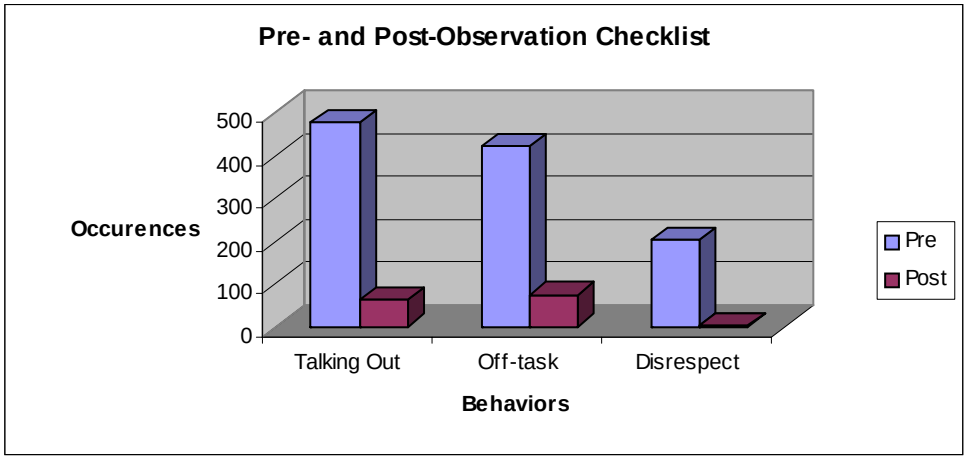
Number of poor behavior after interventions in Teacher Researchers A and B's classrooms.



Disrespect towards staff and peers had the lowest number of occurrences with off-task behaviors with talking out occurring more often. For ease of comparison we combined the pre-and post-data in table 9.

Table 11.

Comparison between observations of poor behavior both before and after interventions occurred.



All negative behaviors decreased significantly over the course of the study. Disrespect towards staff and peers decreased the most. Teacher Researcher A had a behavior plan in place from the beginning of the year to help students identify negative behaviors. Teacher Researcher A also had a change in the number of students being remediated.

Conclusions and Recommendations

At the end of the study Teacher Researchers A and B noticed students were more engaged in their learning.Table11 shows a dramatic decrease in the inappropriate classroom behaviors studied. For example, in the beginning of the study over 450 incidences of talking out occurred and at the end of the study there were less than 50 during the observation periods. Most of the students showed more enthusiasm toward their learning and took more pride in their work. Teacher Researcher B noticed a significant increase of homework completion. At the beginning of the study Teacher Researcher B had half of the 7th grade students not completing their homework on a

regular basis. At the end of the study the 7th graders were completing homework at 95% of the time. Teacher Researchers A and B also noticed when materials were presented using different learning styles, it appeared that most students retained and recalled more information. This result could be seen on daily homework assignments and routine assessments, such as greater percentages of homework completion and higher test scores.

The two teacher researchers found that incorporating MI into daily lesson plans improved students' self esteem, retention rates, motivation towards learning, and incidences of off-task behaviors. Students were more focused and engaged on assessments due to their increased awareness of their strongest learning styles. Students understanding of the intelligences broadened. At the same time it appears that their ability to accurately identify their own strengths and weaknesses occurred after intervention strategies were implemented.

Kinesthetic intelligence may have increased due to a greater inclusion of movement in classroom activities, such as acting out vocabulary words, dancing to content related materials, and building three-dimensional models. The intrapersonal intelligence increased due to the journaling experiences. Students became more introspective with these activities this was evidenced by comments made both in their journals and verbally in class discussions, which indicated personal responsibility for classroom behavior and learning. Visual/spatial intelligence also increased after numerous hands-on projects were done throughout the study. The Post-MI Survey results indicated that students became more aware of different learning styles available to them than previously had been perceived.

More responses on the Parent Survey could indicate an increased willingness of

students to share their learning experiences with parents because of greater individual success in the classroom. Parents' responses could also be linked to increased student communication. Parents, over the course of the survey, became more realistic about their children's actual behavior in the classroom as evidence by comments made by parents during parent teacher conferences and written on the Post-Parent Surveys.

Both researchers felt that the significant decrease in poor student behaviors was due to more diversified use of multiple intelligences activities. Students in both classrooms appeared to be more engaged and enthusiastic towards learning and seemed to focus more on their skills as opposed to their weaknesses.

Students learning experiences would greatly increase if teachers taught to intelligences and incorporated alternative assessments. Future research will focus on broadening the data base and number of students studied.

Reflection

Teacher Researcher A continues to incorporate MI into remedial skills. MI has greatly benefited the learning disability population. Students became more confident in their skills and abilities and transferred these skills into the regular education classroom. Incorporating MI as a part of remediation has helped my students gain the confidence they need. Most of the students I see are more willing to take risks and be more independent. Regular education teachers have reported the special education students are focusing more in class and putting forth more effort on daily assignments. Teacher Researcher A was surprised by how MI changed the attitude and motivation for students. Researcher A has been trying to get teachers to try alternative assessments for lower achieving students.

Teacher Researcher A learned a lot about herself. Researcher A feels more confident in teaching and differentiating instruction to meet each student's individual needs. By slowing down and meeting those needs the students gained the confidence and skills they needed to become productive life long learners. MI has and will be continued to be implemented into my classroom. Researcher A will continue to work with regular education teachers to help develop alternative assessments in an effort to further promote student success.

Teacher Researchers A and B were not surprised by the entire process. Both researchers felt incorporating MI and brain-based strategies into the classroom would help increase student performance and behavior. The researchers felt their beliefs were proven to work and be successful for student learning.

The research and the process of the research helped Teacher Researcher B to be more flexible to alternative assessments in general. Teacher Researcher B was surprised by this since this researcher had formally considered herself to be very open to alternatives prior to this project. Researcher B will always remember to incorporate learning styles into teaching and also use alternative assessments for students. She also has become acutely aware of how hard this is to do when she has over 100 students, health problems or there is a lack of support from administration.

Researcher B also stated MI could have helped decrease the number of students in danger of falling. Researcher B was surprised by the information that six 7^{th} graders were in danger of failing 7th grade. To this researchers knowledge this is a record in the history of the school. This information lead to further internal reflection about how to best help motivate these students in particular to complete work and feel better about

themselves and their school experiences. To that end currently there are only two who are in danger of failing 7th grade.

Teacher Researcher B learned that I've been "ahead of the curve" on my thoughts of education my entire life. This process has just reinforced that feeling and has given me confidence in resources when dealing with those that tend to disagree. My intention is to continue to learn and remain open and do more research about learning and authentic assessment so that I can best help my students throughout my career.

Teacher Researchers A and B will continue to incorporate MI strategies in their respective classrooms. They hope to continue to see student improvements over time and intend to study those changes in the future.

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APPENDICES

Appendix A

Observation checklist

Class: _____

Number of students: _____

Week of: _____

Behaviors	Monday	Tuesday	Wednesday	Thursday	Friday
Talking out					
Off-task					
Disrespect toward staff and peers					

Additional comments:

Appendix B

Parent Survey

Directions: Place a checkmark in the box that describes your feeling on the following statements.

Statements	1- Strongly disagree	2-Some what disagree	3-Agree	4- Strongly agree
I feel my son or daughter is motivated at school.				
I feel my son or daughter learns best when concepts are presented in different ways. (I.E. visual, hands-on)				
My son or daughter is interested in school.				
My son or daughter has a hard time controlling behaviors. (I.E. talking out, not focusing)				
My son or daughter shares learning experiences with me.				

Appendix C

Reflective Journal Entry #1

Today I used my class time effectively by……

_____

_____

_____

_____

_____

_____

_____

The thing that distracted me during instruction was…….

_____

_____

_____

_____

_____

_____

Reflective Journal Entry #2

Did you work well with other students? How?

_____

_____

_____

_____

_____

_____

_____

Working well with others means I should…..

_____

_____

_____

_____

_____

_____

_____

Reflective Journal Entry #3

Do you think you are a good listener?

_____

_____

_____

_____

_____

_____

_____

Being a good listener helps me…..

_____

_____

_____

_____

_____

_____

_____

Reflective Journal Entry # 4

I liked my behavior today because…..

_____

_____

_____

_____

_____

_____

_____

I didn't like my behavior today because….

_____

_____

_____

_____

_____

_____

_____

Reflective Journal Entry #5

My classmates behavior in class affected my learning today because….

_____

_____

_____

_____

_____

_____

_____

To help my classmates learn better I can….

_____

_____

_____

_____

_____

_____

_____

Reflective Journal Entry #6

If I talk too much during class I….

_____

_____

_____

_____

_____

_____

_____

Talking out of turn during class can be disruptive because….

_____

_____

_____

_____

_____

_____

_____

Reflective Journal Entry #7

Reflecting on my behavior can help me because….

_____

_____

_____

_____

_____

_____

_____

Staying on-task is helping me because…..

_____

_____

_____

_____

_____

_____

_____

Appendix D

Learning Style Survey

Instructions: Circle the number that describes you.

Linguistic Intelligence

1. I love to read.

2. I can spell words without sounding them out.

3. I enjoy listening to the radio, CD's, recording TV shows, movies, and plays.

4. I like word games, such as Scrabble, Crosswords, etc.

5. I like to repeat nursery rhymes.

6. Reading classes are easier for me than math or science.

7. I enjoy reading billboards on the highway rather than looking at the scenery.

8. I am proud of what I write.

9. I talk about things I read or heard.

Total _____

Logical-Mathematical Intelligence

1. I can solve math problems in my head.

2. Math and/or science are some of my favorite subjects.

3. I enjoy games that involve math.

4. I like finding patterns in things.

5. I'm interested in learning new ideas and concepts in science.

6. I have an explanation for everything I talk about.

7. I use images instead of words when I am talking.

8. I like finding things wrong with what people do (this could be positive or negative).

9. I feel I can prove my point when it is something that is researched.

Total _____

Spatial Intelligence

1. When I close my eyes, I see visual images.

2. I am sensitive to color.

3. I enjoy taking pictures with a camera.

4. I like doing jigsaw puzzles, mazes, or other visual puzzles.

5. I dream at night.

6. I can find my way around new places.

7. I enjoy drawing and doodling.

8. I do better in geometry than algebra.

9. I like to read books that have lots of illustrations.

Total _____

Bodily-Kinesthetic Intelligence

1. I participate in one sport or physical activity daily.

2. I find it hard to stand still for a long period of time.

3. I enjoy learning with my hands (i.e. sewing, labs, blocks).

4. My best ideas comes when I am walking, running, or playing a sport.

5. I enjoy spending my time outside.

6. When I am having a conversation, I talk with my hands.

7. I enjoy going on the roller coasters at an amusement park (i.e. Great America).

8. I can walk and chew gum at the same time.

9. I learn best by seeing or hearing the new skill.

Total _____

Musical Intelligence

1. I have a good singing voice.

2. I enjoy listening to music.

3. My life would be happier without music.

4. I often have a song in my head.

5. I can tell when an instrument is off-key or out of pitch.

6. If I hear a song once or twice, I can sing the song.

7. I often tap or sing when I am studying.

8. I play a musical instrument.

9. I know beats to many songs.

Total _____

Interpersonal Intelligence

1. People come to me for advice.

2. I prefer to do group sports (football, softball) rather than individual sports (running, jogging).

3. I talk with an adult when I have a problem.

4. I have three or more close friends.

5. I enjoy playing social games (monopoly, scrabble) instead of individual games.

6. I like to show others my projects.

7. I am a leader.

8. I like being in a crowd.

9. I'd rather be with friends than by myself.

Total _____

Intrapersonal Intelligence

1. I've participated in groups to learn about myself.

2. I'm able to control myself when something doesn't go my way.

3. I have a hobby that keeps me to myself.

4. I have goals for myself that I think about often.

5. I can tell how I am feeling most of the time.

6. I can work by myself.

7. I keep a diary or journal.

8. I like to pick from many different assignments.

9. I like to think about things that are bothering me.

Total _____

Naturalistic Intelligence

1. I like to recycle things.

2. I like camping and hiking.

3. I enjoy programs that have to do with nature (outside environment).

4. I feed the birds.

5. I am concerned about the rainforest.

6. I like vegetarian food.

7. I support animal rights, human rights, and protecting trees.

8. I watch the news.

9. I like to read about how to save the environment.

Total _____

Modified from: A Simple Multiple Intelligence Inventory, Western Michigan University, 2004

Appendix E

Multiple Intelligences Inventory

Part I

Complete each section by placing a "1" next to each statement you feel accurately describes you. If you do not identify with a statement, leave the space provided blank. Then total the column in each section.

Section 1

_____ I enjoy categorizing things by common traits
_____ Ecological issues are important to me
_____ Classification helps me make sense of new data
_____ I enjoy working in a garden
_____ I believe preserving our National Parks is important
_____ Putting things in hierarchies makes sense to me
_____ Animals are important in my life
_____ My home has a recycling system in place
_____ I enjoy studying biology, botany and/or zoology
_____ I pick up on subtle differences in meaning
_____ TOTAL for Section 1

Section 2

_____ I easily pick up on patterns
_____ I focus in on noise and sounds
_____ Moving to a beat is easy for me
_____ I enjoy making music
_____ I respond to the cadence of poetry
_____ I remember things by putting them in a rhyme
_____ Concentration is difficult for me if there is background noise
_____ Listening to sounds in nature can be very relaxing
_____ Musicals are more engaging to me than dramatic plays
_____ Remembering song lyrics is easy for me
_____ TOTAL for Section 2

Section 3

_____ I am known for being neat and orderly
_____ Step-by-step directions are a big help
_____ Problem solving comes easily to me
_____ I get easily frustrated with disorganized people
_____ I can complete calculations quickly in my head
_____ Logic puzzles are fun
_____ I can't begin an assignment until I have all my "ducks in a row"
_____ Structure is a good thing
_____ I enjoy troubleshooting something that isn't working properly
_____ Things have to make sense to me or I am dissatisfied
_____ TOTAL for Section 3

Section 4

_____ It is important to see my role in the “big picture” of things
_____ I enjoy discussing questions about life
_____ Religion is important to me
_____ I enjoy viewing art work
_____ Relaxation and meditation exercises are rewarding to me
_____ I like traveling to visit inspiring places
_____ I enjoy reading philosophers
_____ Learning new things is easier when I see their real world application
_____ I wonder if there are other forms of intelligent life in the universe
_____ It is important for me to feel connected to people, ideas and beliefs
_____ TOTAL for Section 4

Section 5

_____ I learn best interacting with others
_____ I enjoy informal chat and serious discussion
_____ The more the merrier
_____ I often serve as a leader among peers and colleagues
_____ I value relationships more than ideas or accomplishments
_____ Study groups are very productive for me
_____ I am a “team player”
_____ Friends are important to me
_____ I belong to more than three clubs or organizations
_____ I dislike working alone
_____ TOTAL for Section 5

Section 6

_____ I learn by doing
_____ I enjoy making things with my hands
_____ Sports are a part of my life
_____ I use gestures and non-verbal cues when I communicate
_____ Demonstrating is better than explaining
_____ I love to dance
_____ I like working with tools
_____ Inactivity can make me more tired than being very busy
_____ Hands-on activities are fun
_____ I live an active lifestyle
_____ TOTAL for Section 6

Section 7

_____ Foreign languages interest me
_____ I enjoy reading books, magazines and web sites
_____ I keep a journal
_____ Word puzzles like crosswords or jumbles are enjoyable
_____ Taking notes helps me remember and understand
_____ I faithfully contact friends through letters and/or e-mail
_____ It is easy for me to explain my ideas to others
_____ I write for pleasure
_____ Puns, anagrams and spoonerisms are fun
_____ I enjoy public speaking and participating in debates
_____ TOTAL for Section 7

Section 8

_____ My attitude effects how I learn
_____ I like to be involved in causes that help others
_____ I am keenly aware of my moral beliefs
_____ I learn best when I have an emotional attachment to the subject
_____ Fairness is important to me
_____ Social justice issues interest me
_____ Working alone can be just as productive as working in a group
_____ I need to know why I should do something before I agree to do it
_____ When I believe in something I give more effort towards it
_____ I am willing to protest or sign a petition to right a wrong
_____ TOTAL for Section 8

Section 9

_____ Rearranging a room and redecorating are fun for me
_____ I enjoy creating my own works of art
_____ I remember better using graphic organizers
_____ I enjoy all kinds of entertainment media
_____ Charts, graphs and tables help me interpret data
_____ A music video can make me more interested in a song
_____ I can recall things as mental pictures
_____ I am good at reading maps and blueprints
_____ Three dimensional puzzles are fun
_____ I can visualize ideas in my mind
_____ TOTAL for Section 9