ABSTRACT

Bonnie Fortini's research centers on her students' math anxiety and possible ways in which MI-based applications could alleviate it. She uses a visual representation of math anxiety as well as a survey to help her students analyze and talk about their own experience. She also infuses her teaching with MI self-assessments and related discussions about MI theory. Her hypothesis is that knowledge about their own intelligence strengths will enable her students to develop better learning strategies which, in turn, will combat math anxiety.

To a lesser extent, Bonnie designs MI-based lessons. In this she feels constrained by her students' traditional expectations of numbers and workbooks and not much talk in a math class. She also runs up against her own teaching preferences and intelligence strengths. Nevertheless, the few MI-based lessons do draw positive comments from several students.

Bonnie finds that "The introduction of MI theory and the survey-generated illustration of our unique profiles of intelligences seemed to facilitate conversation among students about issues of education, even the more sensitive issues like learning difficulties and math anxiety. Perhaps the opportunity to recognize that each person is a complex collection of strengths and weaknesses created a comfort level that allowed students to open up about problem areas." In the end, Bonnie concludes that "Although students' discussions of MI, their own strengths, and math anxiety do not necessarily imply that MI helped alleviate math anxiety, they did provide the first step in that direction. MI showed itself to be an excellent point of departure for thinking about math anxiety and how students can work to overcome it."

Bonnie Fortini

RESEARCH CONTEXT

I teach in a small, rural, adult education program in "Downeast" Machias, Maine. Machias, is the county seat of Washington County, one of the three poorest counties in the nation. Our economy is divided between service industry and seasonal agricultural employment. Plagued by chronic unemployment (currently at 11%) and the lack of an industrial base, the county historically has a median income below the state average, welfare needs at or above the state average, and few community resources. To get by in this subsistence economy, individuals rely on practical skills, hard work, and wit, which the people of Washington County have in abundance.

What kind of MI-informed instruction and assessment can be developed that will help adult learners deal with math anxiety, so they may reach their stated goals?

Our program is housed in the local high school and at community-based sites, including the county jail, a sheltered workshop, and in students' homes. With a county functional illiteracy rate of roughly 24-30%, we want to make education accessible to all our adult citizens. Recent welfare reform has resulted in an increase in program enrollment, as recipients take courses in order to receive benefits, and, for some, to gain employment subsequently.

Most students are over 25-years-old and say they have forgotten or never learned basic academic skills. They have returned to formal education to "fill in the gaps" that impede their progress towards employment or post-secondary education, or that limit their ability to support their children's learning. A significant part of my class population is pursuing GED or high school diploma credentials. A number of them are recent K-12 system dropouts, some as young as 16. The last segment of the program is composed of ESL students, typically "Navy wives" who are stationed locally.

Many of these students attend our Math Lab to learn or improve basic math skills. I focused my research activities on the Math Lab students, who are mostly women. The Math Lab meets for a weekly, three-hour session in the evening, after typically long, tiring days for my students. In addition to this limited time together, and meeting at a less than ideal time of the day, my students and I are also facing a content area to which most people bring some strong negative preconceptions, often resulting in a lack of confidence and "math anxiety."

Most of the Math Lab students see themselves as never really having understood math, and consequently they have low expectations for their own success. Many students were "tracked" in applied math courses and feel inadequate to tackle abstract math. Some of my students are hoping to go on to the university as non-traditional students but are very anxious about the math requirements. Many of the men who come to the class work in the trades and use math for their jobs, but are seeking more formal and advanced skills to secure their employability. Most of my students come to classes between seasonal work times (e.g., blueberry raking, wreath making, fish packing) and often are not able to maintain consistent attendance. A common denominator among the vast majority of these students is their lack of confidence that they can succeed. Some are struggling to find the confidence even to try.

RESEARCH QUESTION

What kind of MI-informed instruction and assessment can be developed that will help adult learners deal with math anxiety, so they may reach their stated goals?

The subject of math anxiety has been of particular interest to me ever since I personally experienced it. I was rescued by an experimental approach to math that I now realize served to reduce stress and fear and, indeed, turned me into a lover of things mathematical. Over the past eight years I have recognized that same fear of math and expectation of failure among my students. My research question grew out of these observations and my experiences with students who struggle with math. I wondered how multiple intelligences theory might support my ongoing efforts to help my students overcome "math anxiety" and its sometimes debilitating effects.

I had my students describe what math anxiety felt like to them, hoping to help them make a more explicit connection to the phenomenon by having them articulate it. About Stress (1995) describes anxiety as the result of tension caused by stress, brought about by pressure, possibly from outside forces, and manifested as physical, mental, and/or emotional problems. These were the three major categories of math anxiety "symptoms" identified by my students and that they further elaborated with a list of nineteen modifiers (see Appendix 1). I hoped to use MI theory to address students' math anxiety by somehow acknowledging and tapping their areas of strength among the eight intelligences.

EVOLUTION OF MY WORK AND THINKING

I took advantage of the opportunity the AMI Project provided to study MI Theory more intensely than I could have otherwise. In Frames of Mind (Gardner, 1983, 1993a) I uncovered new ideas and possibilities, and I felt that in some respects it validated my own understanding of my students' intelligence and learning. Hearing and reading about K-12 applications of MI theory was also helpful in developing my understanding of MI theory and how I might use it in my setting.

At the start of the AMI Project, I was already incorporating learning styles, or learning modality strategies. This involves the identification of students' learning preferences (e.g., auditory, visual,

or kinesthetic learner; individual or group learner), and tailoring instructional strategies and suggested study practices in a manner that uses students' preferred modalities to best advantage.

My understanding of learning styles was enhanced over the course of the project (Wilson, 1991). I learned more about the Gregorc approach and also came to a better understanding of how the work on personality styles (e.g., Carl Jung, Myers-Briggs) is connected to learning, specifically by describing ways people interact with others and how they react to information. Silver, Strong, and Perini's (1997, Sept.) synthesis of learning styles/personality types and MI theory helped concretize how these two sets of ideas can work together to describe and support the different ways people learn.

Caine and Caine's (1994), Making Connections, helped clarify the concept of "math anxiety" for me. In their discussion of the physiological effect of stress on learning they observed that individuals under stress cannot carry out learning activities and "lose intrinsic motivation" as they "downshift" into a self-protective complacent inactivity (p.76). That seemed to describe the experiences of at least some of my students. It was also something that I hoped MI theory could help me alter.

Over the course of the project, meeting and sharing with project directors, advisors, and fellow teacher researchers helped me develop my MI-informed thinking and teaching practice. MI resources also informed my work. For example, In "How Teachers Interpret MI Theory," Linda Campbell (1997, September) describes representative forms of MI-informed practices in use, including lesson design, interdisciplinary curriculum, student projects, and assessment. These "forms" helped shape different types of MI practices I considered and implemented, such as Math Anxiety and MI survey activities, two hands-on lessons using Skittles™ and M&M's ™ (Cross reference Vol. 1, Lessons), and providing different ways to represent their learning (e.g., drawings, graphs).

Gardner cautions that MI is not an *educational* theory and is therefore not prescriptive. As a theory of intelligence, MI can lead to any number of applications (Checkley,1997, September). This has been an important distinction for me in my use and understanding of MI theory. Gardner emphasizes that MI is essentially an intensive, rigorous observation of how the brain works to solve problems or make products. This notion made MI available to me as a philosophical foundation, rather than primarily the instructional tool I had envisioned and, to some extent, utilized.

IMPLEMENTING MI THEORY

Early in the project I developed a project map (Appendix 2), a representation of the common experiences shared by those who have math anxiety and limited math skills. I designed this map as a talking point, an "anchor" that encouraged students to look at their own experiences with math anxiety, past and present, and to begin to consider potential steps toward overcoming this barrier to their math-related goals. I explained that I believed that if they faced their anxiety and strengthened their abilities to relax and learn, my students would be able to attain their goals. I also felt it necessary to introduce and provide a rationale for the degree of conversation and communication thatthe application of Mitheory would bring to the classroom. Most students would not be

expecting so much talk in a math lab, and very possibly would not be comfortable with it. The project map activity helped introduce and encourage class talk in the context of a very relevant topic to my students' learning goal, math anxiety.

Working from the contention that students could reduce anxiety with the appropriate strategies, MI theory presented itself as one possible tool toward that end. Having read Armstrong's (1993), Seven Kinds of Smart, I decided to develop a paper/pencil survey similar to Armstrong's (1993) to help students consider their areas of strength (Appendix 4).

As preparation for the data collection and analysis that would follow, I facilitated two MI-informed math activities. Students sorted and counted M&Ms™ and Skittles™ candies using fractions, decimals, percents, and means, learning math skills in a highly accessible (and tasty!) way. The first semester students then completed the MI survey. Following analyses of their data, the students brainstormed math "stress busters" based on the eight intelligences.

At the start of the second semester, I used the first semester's project data, materials (e.g., project map), and analysis to introduce multiple intelligences to new students and as a review for returning students. This review included a presentation and discussion of first semester findings about math anxiety and ways to overcome it.

Several factors, including increased student enrollment, limited my MI implementation in the second semester, which I had planned as a repeat of the first semester research activities. MI implementation was limited to introduction of the theory, as described above and students' participation in an audio MI self-assessment. By semester three, I was unable to implement any explicit MI-informed practices beyond providing the MI self-assessment and discussing the results in terms of math learning strategies.

METHODS

First Semester

For the first semester of this research project I worked with my Math Lab class of 19 students: 90% women, 31.5% ABE, 31.5% GED/HSD, and 37% ASE/basic skills. We met Monday evenings from 6pm to 9pm.

Data I collected included students' reflections, learning logs, and work. I observed student behavior and interactions and kept my own log. As a variation on a log, students provided weekly "snapshots" to indicate their reaction to and reflections on that evening's activities or class. Students used slips of paper about the size of a photograph to give written and/or drawn feedback (Appendix 6). During the semester I decided to maintain a reflection journal for thoughts that the project provoked in me outside of class and beyond the scope of my research question.

I used other discrete, measures as well. These include: a math test, a class-generated list of "Nineteen Kinds of Anxiety about Math" and a companion anxiety rubric, and paper/pencil and audio MI self-assessments. These are described below.

To create a stressful math situation and, in effect, cause a low level of anxiety for research purposes, I administered a timed math test (Appendix 3). The group then delineated their sense of the emotional, mental, and physical components of math anxiety (Appendix 1). Following the test, I had my students rate their level of anxiety, using a five-point scoring rubric the class developed (Appendix 5). The rubric gave us a common language to discuss math anxiety and also involved students in authentic math activities through data collection, analysis, and presentation.

The students used the rubric to reflect on the components of math anxiety, particularly in terms of their own experiences on the timed math test. I used this one-hour process with 19 students upon our intial meetings (dates varied). We collected and recorded the data, which I later used for computation and statistics instruction with my students, again in the "real-life" problem-solving context of a research project.

Second Semester

For the second semester, my Math Lab class included 17 students: 94% women, 30% ABE, 35% GED/high school diploma, and 35% ASE/basic skills. Eight (49%) students were returning from the previous semester.

I had planned to repeat my MI survey, but considering that many of my students were auditory learners and that several students had already taken the paper/pencil survey, I adapted and used an audio MI survey developed by Meg Costanzo (1997), fellow AMI teacher-researcher. I also added a selection for students to consider the naturalist intelligence (Appendix 7). With this new assessment, I was able to provide an MI self-assessment to second semester students that was more appropriate to their learning styles. I also felt more comfortable about having returning students complete an MI self-assessment that was different from their first experience. The audio MI Survey presented a new entry point into students' reflections on their intelligences.

New students also took a learning styles inventory (Appendix 8), as part of our program's intake process. Therefore, information regarding individuals' learning modality preferences was available and added to a class chart for easy reference.

I had intended to replicate our first semester research activities as closely as possible, but mitigating factors prevented it. These included: increasing student enrollment without additional instructors, greater numbers of mandated students who were more challenging and more likely to resist new instructional practices or ideas, the presence of returning students who had already participated in the project, and the ongoing interruptions caused by my administrative and program responsibilities. I could gather student data sporadically at best. I continued to maintain both my teacher log and reflection journal. Three instruments provided important student reflections: About Me and Math" questionnaire (Figure 1), Review activity reflection sheet (figure 2), and the "Final Word" survey (Figure 3).

Me and Math

My name is_____

Today's date is _____

How I feel about math in general, in my own words or pictures.

Do any of these words describe me and math?

- math anxiety
- math phobia
- afraid of math
- math is a 4 letter word
- "I hate math!"

Thoughts about my past math experiences (in school or out):

Why I need math (or why I've been told I need it) :

short term:

long term:

Figure 1. "Me and Math" Questionnaire

In the "Me and Math" Questionnaire I used a variety of terms to elicit student responses about their feelings toward math because I felt I might have a varied level of sophistication in understanding some of the words (anxiety, phobia). I wanted to give students a choice of responses, and I hoped to interject some humor ("math is a 4 letter word") into the activity. I also wanted the students to experience the expectation of communication in the math class.

Activity Input/Reflection

Date: Name:

What we did:

What I learned:
(about me, about math)

How I might use this information:

Comments:

Figure 2. Activity Input/Reflection

The Activity Input/Reflection sheet (Figure 2) was in response to an activity that translated students' MI profiles information into a "radar" graph format (Appendix 9). I used this activity to have students revisit their profiles, think about the eight intelligences, experience a new way of expressing the information, and to start some conversation. I used "A Final Word" (Figure 3) to gather students' post-project reflections on math, math anxiety, and multiple intelligences.

A Final Word (or Two) for Math Lab+-
Fall semester 1997

1. Would, or did you, think of yourself as being fearful of math , or having math anxiety?

2. Do you feel more in control around math now? Why or why not?

3. Did you learn about how you learn, and did this play a part in any change for the better? (learning style, Multiple Intelligences, etc.)

4. Can you make any direct connection between less math anxiety and Multiple Intelligences? Please explain.

Figure 3. "A Final Word" Reflection Sheet

Third Semester

In the third semester of this project, Math Lab enrollment had increased to 25, ten (40%) of whom were returning students. The group represented a range of skill levels so great that the prospect of having a unified teaching situation seemed remote. Moreover, in order to accommodate the varying levels of quiet students needed to work, the class divided itself among four separate spaces -three classrooms and an office. My MI-related efforts involved providing new students with the audio MI Survey and consulting with them around the results of their surveys and related approaches to learning math skills. I continued to make regular entries in my teacher log and occasional entries in my reflection log.

FINDINGS

Findings

- MI-related topics and activities seemed to encourage and generate student discussion about learning.
- My own profile of intelligences affected the development and application of my MI-informed instruction and assessment.
- My introduction to MI theory and use of MI-informed instruction and assessment spurred changes in my teaching practices.

Finding 1: MI-related topics and activities seemed to encourage and generate student discussion about learning.

Our program has been developing an intake process to gain more information about our students and to inform curriculum development, instructional planning, and assessment. Prior to the introduction of MI theory, we relied heavily on a learning modality inventory which helped students define the sensory aspects of their preferred learning styles. In our program we try to structure instruction and assessment to address students' preferred learning modalities. The information is helpful to students, but its use is somewhat limited as the modalities are relatively fixed and the strategies are basic (e.g., working alone or in a group). The learning modality inventory did not generate interest or a great deal of interest among students.

Presenting the theory of multiple intelligences to the students led to comfortable and relaxed class discussions about learning, including learning difficulties. Talk in Math Lab is unfamiliar to Math Lab and had been unwelcomed. But more than a dozen students' self-assessments when viewed together illustrated concretely that each person has individual areas of strength. Each student could identify an area of strength. Discussing the intelligences helped some ABE students, who may never have experienced school success, recognize that they possess different kinds of intelligence.

Bringing in MI theory also seemed to help support a discussion about math anxiety among students. Prior to this study, students would tell me they hated math and leave it at that. After a discussion about the intelligences, one student responded in writing, "It was O.K. to feel all the feeling(s) that I felt when I do math. Know[ing] that I know this I will be able to do better at math. This week was better to understand" (sic) (Student D.B., Snapshot 02/03/97).

Several sessions were roundtable discussions in which students shared their frustrations with their own educational histories, along with their growing awareness of how people in general, and they in particular, learn. The students who participated appeared to be comfortable discussing problems related to learning, something that had not occurred prior to the introduction of MI. Several students expressed the wish that strength-based approaches such as MI were used with their children or when they first were in school.

The introduction of MI theory and the survey-generated illustration of our unique profiles of intelligences seemed to facilitate conversation among students about issues of education, even the more sensitive issues like learning difficulties and math anxiety. Perhaps the opportunity to recognize that each person is a complex collection of strengths and weaknesses created a comfort level that allowed students to open up about problem areas. At the same time, their introduction to MI theory might have helped students recognize the value of discussion and reflections about learning, making it a more acceptable activity, even for math class.

From my own perspective, I see the power of MI in this case was to get my students to acknowledge math anxiety on an explicit level, in discussion, and in combination with strengths-based strategies for dealing with it. Although students' discussions of MI, their own strengths, and math anxiety do not necessarily imply that MI helped alleviate math anxiety, they did provide the first step in that direction. MI showed itself to be an excellent point of departure for thinking about math anxiety and how students can work to overcome it. With my encouragement these students later developed a list of intelligence-related personal "stress busters," based on their understanding of how math anxiety manifests itself and of their own areas of strength. These included taking a walk in nature, listening to music or soothing sounds, focusing on the inner self through yoga, talking to a friend or relative, or doing Tai Chi.

Finding 2: My own profile of intelligences affected the development and application of my MI-informed instruction and assessment.

Drawing on my logical-mathematical and linguistic strengths, I had planned my project around discussions, printed information, paper/pencil surveys, and text-heavy material. I increasingly felt that I would have trouble conducting math activities and using resources that relied on intelligences in which I did not feel strong (e.g., musical, bodily-kinesthetic). As revealed in an entry in my teacher log, "Right now I am trying to teach past my own intelligences and include material to meet as many intelligences as I can, or examples thereof, so that the students can start doing this on their own" (February, 1997).

At the beginning of my research I felt the need to understand how the intelligences that were not my strengths actually worked for my students. Having never been able to master the very math manipulatives that helped many of my students, I felt unable to connect with their use, and therefore not able to provide as much support with manipulatives for my students as I hoped. This is an analogous situation with any intelligences, or areas of particular intelligences, that are not a teacher's strength area. It's a matter of not knowing enough to provide students with enough support to enable them to tap a particular intelligence.

I felt my only recourse was to set out materials related to my "intelligences of discomfort" and see what happened. For example, one class session was devoted to letting the students work on fractions, and demonstrate their understanding, using manipulatives and craft materials they selected. Mostly choosing to work in groups, students produced collages, cut paper into fractions, and drew pictures and diagrams. Student reflections that evening included the following: "It was much more fun this time because we worked in groups." (G.H.) "It went much better. We worked in groups doing fractions. Doing mixed numbers, improper fractions, and proper fractions. It was more relaxing." (S.H.) "Tonight was a great learning experience. The activity on fractions was fun and I learned from it. I also worked with a classmate which helped me learn easier."(S.S.) My own reflection in my teacher log was, "I do feel more positive about using a "hands-off" methodology in class and about involving more manipulatives (which don't work for me)."

Finding 3: My introduction to MI theory and use of MI-informed instruction and assessment spurred changes in my teaching practices.

Before my AMI research project, instruction in the Math Lab drew on information collected about students' preferred learning modalities. For example, my instruction was tailored around whether an individual was an auditory or visual learner, and whether the student was more comfortable learning alone or in a group. I used individualized study plans and commercially available math materials, as well as some teacher-generated materials. Most students were preparing for a formal assessment and worked on related practice tests (e.g., GED Math Test, college placement test, competency test).The student-set pace of the Math Lab limited the number of group activities I could conduct, as students worked on different math content at various levels, in support of their self-stated goals. However, I included some hands-on, group activities over the course of the semester that encouraged students to tap different intelligences.

With the introduction of the MI survey, administered at intake, my students came to have the MI language and their own survey results as an additional tool for understanding themselves as learners and math students. The survey encourages student to think about their learning and to develop a strategy based on this self-knowledge. The information is also made available to instructors. In Math Lab, we use the information as the basis for group math activities, finding different ways to present the data, for example using fractions, decimals, and/or percents.

As previously mentioned, I feel MI theory has become an intrinsic part of my approach to my students. I have always tried to see them as people with many possibilities, strengths and abilities; attributes which many ABE students react to with skepticism. With MI, however, the information appears more acceptable or believable to them. They buy into the notion that they have strengths that they can tap. This has made my educational philosophy both richer and more integrated, and it has given me more common ground on which to help students build their own foundations.

NEXT STEPS

I bring many ideas for future application in my classroom. from the AMI Project. For example, I plan to chart my classes' MI profiles, which helps me direct materials and instruction better in these often large groups and helps students recognize the complexity of intelligences (and available strategies) in their group. The information will be shared with the students to reinforce their growing awareness about learning, and to suggest learning strategies that incorporate the intelligences. For example, in a class where a number of students identify themselves as highly linguistic, I will encourage keeping math journals and using word problems. With students who identify themselves as highly spatial, I will encourage them to develop flow-charts or diagrams as we discuss algorithms or problem-solving strategies.

I also am planning to continue to share the knowledge I have gained through this project with my co-workers and to seek more information from the literature and fellow practitioners in the hopes that we might devise some kind of prerequisite course or orientation in which all our students would participate to provide them the knowledge about how they learn, so that their time with us will be as productive as possible, and so that they retain what they learn, and build on it to remain life-long learners.

As for my own approach to teaching, I will draw on my now internalized MI-informed lesson planning checklist as I prepare for class. While I can tailor my presentations along the specific intelligences I know the group exhibits, were I to be explaining a math concept to a group of students whose profiles I did not know, I would include as many of the checklist components as possible. For example, I might make sure to explain math concepts orally and in written form, use diagrams, charts, graphic memory aids, provide physical movements to elaborate on concepts when possible, such as walking two places to the right as I convert myself from a decimal to a percent. I believe that even if I were to be the only person in the room who had any knowledge about MI, and I used these techniques, students' intelligences would be engaged, and learning would be enhanced.

FINAL THOUGHTS

What "MI-informed" means to me now

As a result of my involvement in this project, I can now identify three areas in which I feel the MI-informed instruction and assessment I used can play an influential role:

1. In the student's metacognition: the awareness of the multiple intelligences adds substantially to students' toolbox of ways to enhance their learning.
2. In the teacher's metacognition: awareness about multiple intelligences and learning adds significantly to a teacher's toolbox of possible strategies to reach students.
3. In the classroom: materials and tools are aimed at or crafted around the multiple intelligences. This broadens the scope of experiences the student will encounter. MI enriches the learning environment in ways that resonate with students' intelligences, becoming a more relaxed and challenging environment for learning.

How MI theory might help strengthen students' readiness to learn

In looking back over this project, I see MI theory addressing student readiness to learn in areas that reach beyond my inquiry area. Readiness as we view it in our ABE program includes the cognitive knowledge base the student brings to class and where the student falls on the "reluctance-receptivity to learning" continuum. Students with a relatively broad knowledge base have several advantages over those with limited ones. They have more experiences and bits of learning on which to hook new learning. They have most likely included some risk-taking and learning from failure, which are assets and characteristics of a life long learner. For students who have not had the opportunity to acquire a relatively broad knowledge base, MI-based instruction might help provide new experiences and different ways to look at the world, all within a student-centered, supportive framework.

It would be ideal for all adult students to have access to a multi-faceted classroom, rich with materials, diverse learning opportunities, and a student-centered philosophy. I feel many students, particularly those who had difficult, impoverished (emotionally as well as materially) childhoods, would benefit greatly from such a learning environment. Many barriers would have to be met and overcome before adult students could have such experiences. Program finances and relatedly, paid instruction and preparation time are two that come to mind. However, the one barrier that money cannot solve is many students' reluctance or resistance to the change that learning will ask of them. ABE and GED students may be reluctant to try MI-based approaches at the outset, but MI may prove to be a positive influence for many of these students.

An approach that incorporates MI can help students begin to look at themselves in ways that lead to the kind of self-knowledge that generates the courage and fortitude to make and stick to goals. Students may become secure enough to "risk" learning and the inherent, requisite failure that accompanies it. Particularly through the development of the personal intelligences can a student become reflective which will lead the student to a better understanding of him or herself. This may explicitly or implicitly lead to acceptance, then desire for learning.

Fitting, rather than forcing, MI into instruction

An added word to other math teachers on the issue of presenting "non-math" topics in a math class in any depth. This was a topic I wrestled with, and one which influenced how I approached this research project. Most ABE and GED students come to the program with specific expectations, among which are that in a math class we will work with numbers and use workbooks. Such an approach is definitely not MI-informed, nor does it usually relieve people of the anxiety that math produces, as it only reinforces the "specialness" that math seems to have.

I had the good fortune to receive a copy of the Massachusetts ABE, and found in those standards the justification for presenting math in a different manner,consisted with MI theory. These standards define math as communication, problem solving, reasoning, and as connected to other subjects and real life. These standards resonated with my own personally long-held beliefs. My students were, perhaps, less easily convinced, alhough the ensuing discussions did provide the opportunities for much learning on both parts; for them about math, and for me about them.

I was further delighted to find that I was definitely not alone when I read an article in The Change Agent (vol 6) called "The Math Connection" by Kay Young, an ABE teacher from Shelbyville, TN. She expressed being concerned about planning lessons that would satisfy the Equipped for the Future (EFF) standards framework which emphasizes real life applictions and "be pertinent to my students whose goal was to get their GED or complete their high school diploma." I shared this concern for my classes, wanting my students to experience and understand MI, but not leave class feeling they were doing activities at the expense or instead of "doing math." As Kay had done, I too used data collection and statistics as a lesson framework in an effort to make a more natural connection between numbers and words. We used fractions, percents, decimals, and graphic representation of our data. And like Kay, I experienced some resistance from my students. This was probably because we were doing something different, non-traditional, and unexpected. But I kept going, with the help of non-resistant students in the class, and those who began to see some benefit from, or became interested in the Multiple Intelligences/Math Anxiety topic. I partnered this topic with information about the ABE Math Standards which I hoped would further legitimize the talking about math and numbers. I realized that, in spite of their expectations, especially for students with strengths in the linguistic intelligence, readings and discussions could open the way to feel more at home in the often alien world of numbers and symbols.