

**Increasing Engagement and  
Motivation in the Classroom  
through the use of Differentiated  
Instruction**

### **Introduction and Literature Review**

In discussions with my colleagues, the lack of student motivation and engagement has become one of the most popular discussions when it comes to issues that most strongly correlate to failures in secondary mathematics. Not only is this discussion prevalent amongst math teachers but it pervades in all other subject areas. In fact, this has been such a popular discussion that school administration has required that teachers in our school attend a school-wide seminar that addresses this issue this past summer.

There are many reasons for why this is probably the case. Much of it can be attributed to a history of failure and the development of learned helplessness. “Learned helplessness—that is, the belief that nothing one does can lead to success ... Doing nothing can actually be therapeutic for such children, for at least failure following lack of effort does not lead to the conclusion that one is stupid” (Pressley, 2005). Not only is this true but students will feel justified in becoming a distraction to the rest of the class making it intolerable for developing a learning environment.

However, the focus of this research is not focused so much on the behaviors of students and how to manage it but is intent on improving a student’s self-concept as it relates academically. The desire as a teacher is to find ways to improve self-efficacy as it relates to learning and developing a desire to learn. “Self-efficacy is born only when any student encounters something that student believes to be out of reach, only to find that he or she had what it took to overcome what seemed impossible” (Tomlinson, 2005, p. 13). Since teachers are the designers of the lessons that is taught, this is one area that teachers have the potential to control in their classroom. In this case, it is the goal of this research to determine if it can be sufficiently addressed through the use of differentiated instruction. It is also my goal, for the purposes of the project, to determine what kinds of differentiated instruction are the most effective where I work.

“Differentiated instruction is an approach that enables teachers to plan strategically to meet the needs of every student. It is rooted in the belief that there is variability among any group of learners and that teachers should adjust instruction accordingly” (Tomlinson, 1999, 2001). Howard Gardner’s theory of Multiple Intelligences (Gardner, 1993) outlines eight different forms of intelligence as they are Linguistic, Musical, Logical-Mathematical, Spatial, Bodily-Kinesthetic, Interpersonal, Intrapersonal and Naturalist Intelligence. These intelligences offer us ideas as to students’ best thinking and learning styles so we have a better understanding as to what instruction and assessment best fits each student’s needs. Sternberg and Zhang discuss the thinking and learning skills and what kinds of instruction and assessment correlate to each “if we really want to show what they can truly do” (Sternberg, R. J., & Zhang, LF, 2005, p. 251). Our purposes, as teachers, are to put our students in the best position to learn.

However, Carol Ann Tomlinson, stresses that “differentiation is not an instructional strategy” (Tomlinson, C., 2000). It is a “philosophy or a way of thinking about teaching and learning that embraces students as individual learners with individual needs” (Tomlinson, C., 2000). In any case, differentiated instruction is still recommended by Sternberg and Zhang since “Teaching should be differentiated to help each child capitalize on strengths and compensate for or correct weaknesses” (Sternberg, R. J., & Zhang, LF, 2005, p. 252).

“There's no single formula for differentiation. It begins when a teacher takes an honest look at the diversity of learners in the classroom, accepts responsibility for the success of each of them” (Tomlinson, C., 2005, p. 13). In the same article, Tomlinson outlines seven necessary steps in order to administer differentiated instruction. They are to “pre-assess students at the outset of the year”, “pre-assess at the outset of each unit”, “meet with small groups in class”, “use multiple presentation/teaching modes”, “scaffold reading success”, “use differentiated

homework” and “encourage learning and expressing learning in varied ways” (Tomlinson, C., 2005, p. 13-14). I will not be able to administer differentiated assessments for a grade at the end of a unit since all of our tests in the district are standardized and cannot be altered. The same thing is true of the contents that must be taught. However, I will be able to pre-assess my students to recognize their strengths and hope to differentiate my instruction by either using multiple forms of presentation and differentiate homework and other classroom assignments. As it happens, these very tasks should meet the needs of the variety of students in the classroom.

As mentioned earlier, differentiated instruction should begin with the development of the learning profiles (see appendices E and F) of each student with reference to the Multiple Intelligences (Gardner, 1993) mentioned earlier. The next step is to work through each objective using differentiated instruction that includes “flexible grouping” and “student choice on a variety of tasks” (Anderson, 2007, p. 52). Tomlinson also outlines many other techniques “to manage effectively the differentiation of process” (Tomlinson, C., 1999). For the purposes of my classroom, I will incorporate flexible grouping using an assessment tool to determine the readiness of my students for a specific objective. This will allow my students to work on assignments better aligned to meet their needs and challenge them appropriately.

This implementation process will be similar to the “Glass, bug and mud” strategy used in the article by Grimes and Stevens (2009). Each class will begin with an assessment that will help me and the students determine their level of readiness to perform the day’s task. The groups will be “flexible” in that students can work their way to the more proficient category. The names of each group will not be “Glass, bug and mud” but the goal is to provide tasks for each group that will strengthen their abilities and confidence to perform the objectives of the class.

The collection of data is also important to make the case of effective differentiated instruction. Since a part of the goal is to improve engagement through repeated self-efficacy, I will require knowing the impressions that my students have for my lessons through their feedback either by meeting with the flexible groups (Tomlinson, 2005, p. 13), through the formative assessments or through feedback in the form of journal entries described by Grimes and Stevens (2009) at the end of a class period, lesson objective or lesson unit.

“Differentiated math instruction based on student readiness meets the needs of students who are below grade level, as well as those who exceed benchmarks” (Grimes and Stevens, 2009). The goal of this research is to see if this form of differentiated instruction will increase “not only low-achieving students' academic performance, but also their motivation and self-efficacy” (Grimes and Stevens, 2009). Now differentiated instruction is not a perfect system. “Students need to learn, as does everyone, that the world does not always provide people with a perfect match to their preferred ways of doing things. Flexibility is as important for students as it is for teachers. But if we want students to show what they truly can do, a match of instruction and assessment to styles is key” (Sternberg and Zhang, 2005, p. 251).

### **Context for the Research**

As was stated in the introduction, motivation and engagement in the classroom are areas of concern. Some of us teachers have tried an array of ideas and implemented them in our class. We had a variety of success and failures in doing so. Even after implementing many of our strategies, many of which are based on differentiated instruction, we recognized the ever growing need for improved instruction. I knew of differentiated instruction and have implemented elements of leveling assignments but it wasn't until I spoke to our math coach that I

decided we needed to incorporate differentiated instruction through a significant portion of our curriculum. The math coach had stories of success and really pushed it. This is how I have come to accept the challenge of finding appropriate differentiated instruction in my context.

To give you an idea as to my situation in our high school, here are some statistics that suggest a need for a significant change in the classroom on the students and teachers part. First of all, I work in an urban city school with over 80% of our students require free and reduced lunch plans. Over 40% of all students in our school district have never passed a single math class in middle school by the time they enter high school. Our district policies allow students to fail a single course to be promoted to the next grade and many of these students know and understand how they can work this system. In my classes alone, at the end of the first semester of teaching Geometry and Algebra 1, approximately 43.6% of all my students failed the semester. Other teachers have had similar results although I do not have specific data.

At this moment, we have many students who have never done anything in a math class before and are very behind in the most basic skills necessary for math. The classes I work with the last three years have average 36 students per class. The numbers are expected to increase since two teachers have left the school and my district only plans on hiring one teacher in place. I am also expecting to teach the same two courses of Geometry and Algebra1 all year long. Needless to say, much if the situation that I am describing presents a daunting task for anyone. This is why I intend on finding the best methods of differentiate instruction for the situation I am working with.

### **Research Question and Subsequent Questions**

How can differentiated instruction be practically applied to increase student engagement and achievement in the classroom? More specifically, how is this accomplished in a very diverse setting with very large discrepancies in math skills? How can this be done effectively with a very large number of students (upwards to 50 students in a single class)? What methods can work best in this environment? Can differentiated instruction be carried out effectively at all? While there are many questions, the first one is the most important that I intend to address. The rest are more circumstantial.

### **Data Collection Plan**

“Carefully articulated, continuous assessment that drives curriculum design ‘maximizes teaching time, streamlines instruction, and facilitates learning for all students’”(Brimijoin, K, Marquissee, E. & Tomlinson, C, 2003, p. 73). In other words, assessment is what drives differentiated instruction whether it is a pre-assessment, an on-going assessment, self-assessments that students work through and reflect upon to end of lesson assessments that determine what a student has learned. Through these assessments, we derive data that is both quantitative and qualitative or formal and informal.

Much research has been able to show that there is a strong correlation between success in a subject and instruction that has been individualized to meet the student’s needs. The purpose of this plan is to see how effective the lessons carried out through the use of differentiated instruction can be. The many forms assessment that will be discuss are intended to shed light on the issue as they are used to determine students’ strengths and weakness in math, their

confidence levels and self-efficacy as well as reveal progress that they make over time. All of this data not only shapes instruction but also determines the effectiveness of a lesson. For the data collection plan, I will outline the methods used to inform me what to do for my instruction and the other half will discuss how to determine the effectiveness of the methods implemented.

### **Methods Utilized for the Classroom**

The collection of data needs to also determine whether or not differentiated instruction is being carried out effectively. This is an interesting predicament as this assumes that differentiated instruction, when done correctly, will be effective. As said previously, much research has been able to show that there is a strong correlation between success in a subject and instruction that has been individualized to meet the student's needs. "The key principle is that for students to benefit the most from instruction and assessment, at least some part of the instruction and assessment should match their styles of thinking." (Sternberg, R. J., & Zhang, LF, 2005, p. 251). In this article, Sternberg and Zhang want to emphasize the benefits of matching instruction to thinking styles as a way to know "what they can truly do" (Sternberg, R. J., & Zhang, LF, 2005, p. 251). While there is no guarantee that students will succeed, "differentiation simply suggests ways in which we can make that curriculum work best for varied learners. In other words, differentiation can show us how to teach the same standard to a range of learners by employing a variety of teaching and learning modes" (Tomlinson, C., 2000, p. 9).

In this case, I will be implementing differentiated instruction in all of my classes based upon their understanding of concepts by testing for their abilities and their learning styles. There will not be any control using "traditional" methods. The reason for this is that I have already



been teaching using alternative methods that comprise parts of differentiated instruction. To make a control class would be going backwards and may also be detrimental to the students being taught. All of the assessments that I will implement will provide me information on how to differentiate the assignments I give, the lessons I teach and the direction I take my classes through a unit.

At the start of the year, a pre-assessment is going to be given to all students to determine their level of proficiency of most skills taught in the previous years. Since I will primarily be teaching geometry, I want to see their skills that they developed from last year and from previous years. While Algebra 1 and Geometry are different, the best predictor of success in Geometry can be determined by their understanding of algebra concepts. I am speaking from experience. I will also give my students an assessment of their thinking style or intelligences (see appendices E and F). Both of these will give me a good idea as to how I might carry out my instruction in identifying the needs and deficiencies of my students.

One other assessment that I will use to determine my instruction will include the use of daily warm-ups that have two parts. The first will be a question to test the understanding of materials already taught. The other question will be to test a student's understanding of concepts that will apply to the new topic. This second part will help me to formatively assess and determine the student's level of proficiency and determine the task that they must work on for the day. I can keep these warm-ups to track progress that is being made.

One other assessment I will implement will be the unit tests as they are a summative assessment that is appropriate for determining a student's level of proficiency for a whole unit. The question at the end of the unit will be "did the student learn and retained anything that was

taught?” Then finally, keeping track of the homework completion and mastery done by the students can help me know if students are learning. While this is not always true (some students just don't do homework anyways), this can be tracked to see if a lesson was difficult for many of my students. If I notice a pattern with many students not doing a specific assignment, this will be a sign that I might need to revisit the lesson.

Now all of these assessments impact a grade and are what I will call “formal” data that helps determine the effectiveness of my instruction. In other words, I can keep track of progress made through their grades. Now the other form of assessments that I will be implementing will investigate issues related to the attitudes of the students. These are assessments that will inform me on the quality of my lessons. I cannot solely depend on looking at quantifiable data to assist me in my instruction, I also need to see if I am making the experiences of my students helpful in changing them to appreciate math better. I have found that students are at least more motivated to working on something that they appreciate rather than work on something because it is required of them.

For differentiated instruction to become successful, I need to be able to make my instruction connect with my students to where they are. Already stated, students will take an assessment on their thinking style and intelligences (see appendices E and F) at the start of the school year. Also at the start of the school year, they will be taking attitude surveys (see appendix A) where I will be able to get a background of their experience in previous math courses as well as other pertinent school experiences. I hope to find their thoughts of math/school, what they have had success or lack thereof in math before. It is hope that I can design lessons more attuned to their goals in life as a way of differentiating not just the instruction of the lesson but the contents of the lesson as well as the modes of representation.

As the school year continues, I have my students work on a reflection (see appendix B) after a unit test to tell me what they felt confident in doing, what was the most difficult and what was the most helpful in my lessons. I will also have questions pertaining to their attitudes. Then, at the end of the year, I will have my students take another attitude survey (see appendix C).

### **Analysis of Effectiveness**

So while differentiated instruction uses assessments to drive its instruction, it still needs to be determined as to what kinds of data are most appropriate to determining its effectiveness. In order to determine effectiveness, drawing any sort of conclusion “involves the use of multiple independent sources of data to establish the truth and accuracy of a claim” (Sagor R., 2000 p.113). According to this author, such a method is called triangulation and, in this case, it will disseminate data that is formal and informal. The plan is to also look at this data throughout the course of the year to even see what lessons were effective for the students I work with and what does not work. This may also help me determine a pattern within the most successful lessons.

As stated earlier, I will not design a class using “traditional” teaching methods as a control to classes taught using differentiated instruction for comparison. Rather I will be comparing data collected from previous years so I at least have a baseline to compare my current results with. This sort of data for comparison is known as “existing archival sources” (Calhoun, EF., 1994, p. 53). Besides, the goal is to see how full implementation of differentiated instruction can be effectively worked out and so most of the results will compare progress made by groups of students throughout the year.

Let me clarify what it means to use formal data to determine effectiveness of a lesson using differentiated instruction. What is meant by formal is ways of measuring that is quantifiable. In other words, success as determined by quiz and test scores, daily warm-ups on the previous day's lesson and success determined by the completion of homework. As stated earlier, I will have my students take a pre-assessment to determine their level of proficiency of most skills taught in the previous years. Along with helping me in differentiating my instruction, this will also help me track the progress of groups of students as the year continues if there is any progress.

Another formal data assessment described previously was the daily warm-ups. Along with helping me in my instruction, I can keep these warm-ups to track progress that is being made since the first part is devised to help me know what the student learned from the previous lesson. This can answer the question of whether or not the student was engaged to learn anything.

The other formal assessments will include unit tests as they are a summative assessment that is appropriate for determining a student's level of proficiency for a whole unit. Then finally, keeping track of homework can also be used to determine if students understand to the point that they can direct themselves to do the tasks. Doing homework is also a good indication that a student has sufficient self-efficacy to the point they actually do the task. I will see progress made or retained by simply seeing if they have done their homework on a regular basis.

As stated previously, all of these sets of formal data affect the students' grades. They give me a good sense of whether or not a student has been engaged and has developed confidence through continued success through these lessons. The assumption is that there is a

strong correlation between engagement in the classroom and success as can be told through the students' grades. It will also be assumed that higher grades for this single year may indicate success in using differentiated instruction. Without the use of a class as control, it will be difficult to know exactly what has improved to make the correlation.

The other form of data that will be collected is known as informal. In this case, informal data is data that is not necessarily quantifiable as a grade can be for formal data. Informal data includes impressions from the teacher and students, attitudes as well as incorporate the use of observations from a third party of the classroom.

Throughout the course of the year, I will be keeping my own journal where I keep track of my interactions with my students and what I observe for each lesson. By doing this, I can make notes of things that need to be corrected in my own teaching as well as help me recognize students patterns of behavior as well as my own patterns of behavior. I can use this information to at least make the case. This is something that needs to take place throughout the year as I look for patterns of success in engaging students as I look for ideas that need to be dismissed. It needs to be remembered that differentiated instruction is continuous and is never set. It is always adjusting. So keeping a journal is a practical step for me to see what I did to succeed and to be able to compare my impressions with what really happens from the formal data that I will also be collecting. I should hope to make a correlation between the two.

Along with this, it is my hope that I will be able to videotape my class. In doing so, I can reflect on my teaching by observing things that I probably have not seen before. While doing this by myself is good, it is even more impactful if I were to have a colleague help me evaluate my performance. They can help me notice things that I never saw before related to my

instruction as well as helping me determine my students' level of engagement by following a few students in the video and see the extent of their attention that is being used.

As well as what I will be doing throughout the year, I will also have some specific tasks for my students to help me understand them better. For differentiated instruction to become successful, I need to be able to make my instruction connect with my students to where they are. At the start of the school year, they will be taking attitude surveys (see appendix A) where I will be able to get a background of their experience in previous math courses as well as other pertinent school experiences. I can use this information to track different groups of students. Over time, I hope to see how their attitudes have changed if they change at all.

As the school year continues, I have my students work on a reflection (see appendix B) after a unit test to tell me what they felt confident in doing, what was the most difficult and what was the most helpful in my lessons. I will also have questions pertaining to their attitudes. I can track progress in their attitudes through the year and can also determine which ideas worked the best in my classroom. Then, at the end of the year, I will have my students take another attitude survey (see appendix C). It is my hopes to see that my students are developing self-efficacy through continued success. I hope to be able to read the progress in attitudes that is made by my students over the course of the year. I also hope to find that my students are well challenged at all levels to the point where even the successful students can find worth in my classes. It is important that I compare student comments with that of comments from prior reflections and surveys to see if there is any progress being made or maintained.

As was stated at the start of this data collection plan, determining success in my classroom is difficult. It assumes that differentiated instruction is the answer and that the lack of

success does not always imply that differentiated instruction is not effective. That is why I am determined to find out how to make it successful in my classroom under the circumstances I work with. The circumstances that I work in (the very large classroom with very high needs students) are unique from all of my own research of differentiated instruction. I have yet to find a single article on differentiated instruction that deals with this many high school students and so I am testing to see how differentiated instruction can be successful in my classroom. In the end, this will be mostly anecdotal to my situation but it is my hope that patterns of success can be found as this form of instruction is refined in my classroom.

## Resource List

Anderson, K. (2007). "Differentiating Instruction to Include All Students" Tips For Teaching v. 51 n. 3, p. 49-54.

Brimijoin, K, Marquissee, E. & Tomlinson, C. (February, 2003). *Using Data To Differentiate Instruction*. Educational Leadership, p. 70-73.

Calhoun, EF. (1994). *How to use action research in the self-renewing school*. Alexandria, VA: ASCD.

Gardner, H. (1993). *Frames of mind: A theory of multiple intelligences*. New York: Basic.

Grimes, K and Stevens, D (2009). "Glass, bug, mud" Phi Delta Kappan, 90(9), p. 677-680.

Pressley, M. (2005) Motivation and literacy. In Reading instruction that works: A case for balanced literacy. New York: Guilford

Tomlinson, C. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners*. Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (2000). "Reconcilable differences? Standards-based teaching and differentiation." Educational Leadership, 58(4), p. 6-11.

Tomlinson, C. (2001). *How to Differentiate Instruction in Mixed-Ability Classrooms* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (2005). "Differentiating Instruction: Why Bother?" Middle Ground v. 9 n. 1, p. 12-14.

Sagor R. (2000). *Guiding school improvement with action research*. Alexandria, VA: Association for Supervision and Curriculum Development.

Sternberg, R. J., & Zhang, LF. (2005). "Styles of thinking as a basis of differentiated instruction." Theory Into Practice, v. 44 n. 3, p. 245-253.



**Appendix A****Class Entrance Attitudinal Survey**

Name \_\_\_\_\_

Grade \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_

**1. I often worry that it will be difficult for me in math classes.**

- strongly disagree
- disagree
- agree
- strongly agree

**2. I keep trying in math, even if the work is hard for me to do.**

- strongly disagree
- disagree
- agree
- strongly agree

**3. I get very tense when I have to do my math homework.**

- strongly disagree
- disagree
- agree
- strongly agree

**4. I look forward to my math classes.**

- strongly disagree
- disagree
- agree
- strongly agree

**5. I am certain I will be good in math when I leave school.**

- strongly disagree
- disagree
- agree
- strongly agree

**6. I get very nervous doing math problems.**

- strongly disagree
- disagree
- agree
- strongly agree

**7. I get good grades in math.**

- strongly disagree
- disagree
- agree
- strongly agree

**8. I work as hard as I can in math.**

- strongly disagree
- disagree
- agree
- strongly agree

**9. I worry that I will get poor grades in math.**

- strongly disagree
- disagree
- agree
- strongly agree

**10. I am not good in math.**

- strongly disagree
- disagree
- agree
- strongly agree

**11. I enjoy math and like to do it.**

- strongly disagree
- disagree
- agree
- strongly agree

**12. I am interested in the things I learn in math.**

- strongly disagree
- disagree
- agree
- strongly agree

**13. I only do math because I have to.**

- strongly disagree
- disagree
- agree
- strongly agree

**14. I often try to think of different way to solve math problems.**

- strongly disagree
- disagree
- agree
- strongly agree

**15. I think about how the math I have learned can be used in everyday life.**

- strongly disagree
- disagree
- agree
- strongly agree

**16. I try to relate the math I learn to work in other subjects.**

- strongly agree
- disagree
- agree
- strongly agree

**17. To learn math, I try to remember every step in a procedure.**

- strongly disagree
- disagree
- agree
- strongly agree

**18. When I cannot understand something in math, I always look for more information to help me understand the problem.**

- strongly disagree
- disagree
- agree
- strongly agree

**19. Learning math is important because it will help me in the work I want to do later.**

- strongly disagree
- disagree
- agree
- strongly agree

**20. When I study math, I start by working out exactly what I need to learn.**

- strongly disagree
- disagree
- agree
- strongly agree

**Appendix B****Post Unit Reflection**

- 1.) In 3 sentences, explain how you felt about the test yesterday and why?**
  
- 2.) Which of the trigonometric themes below in this unit did you have the most trouble understanding?**
  - **Finding missing sides and angles**
  - **Finding angles and length of sides using the Law of Sines**
  - **Finding the area of any triangle**
  - **Finding angles and length of sides using the Law of Cosines**
  
- 3.) Of these, which was the best?**

**Post-test Reflection** (given after going over the test)

- 1.) How do you think you did now on the test?**
- 2.) What could you do differently to improve?**
- 3.) What, if anything, helped you the most to prepare for this test?**

**Appendix C****Class Exit Attitudinal Survey**

Name \_\_\_\_\_

Grade \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_

**1. I often it difficult for me to understand the materials in this math class.**

- strongly disagree
- disagree
- agree
- strongly agree

**2. I found myself to be very tense when I have to do my math homework.**

- strongly disagree
- disagree
- agree
- strongly agree

**3. I look forward to this math class.**

- strongly disagree
- disagree
- agree
- strongly agree

**4. I feel better about math after this past year.**

- strongly disagree
- disagree
- agree
- strongly agree

**5. I found methods of doing math problems in the class less stressful.**

- strongly disagree
- disagree
- agree
- strongly agree

**6. I got good grades this year.**

- strongly disagree
- disagree
- agree
- strongly agree

**7. I felt that the way this class was put together helped me understand math concepts better.**

- strongly disagree
- disagree
- agree
- strongly agree

**8. I felt that I always made progress in my understanding of math.**

- strongly disagree
- disagree
- agree
- strongly agree

**9. I enjoy math and like to do it.**

- strongly disagree
- disagree
- agree
- strongly agree



**10. I am more interested in the things that use math.**

- strongly disagree
- disagree
- agree
- strongly agree

**11. I only did the math because I had to.**

- strongly disagree
- disagree
- agree
- strongly agree

**12. I often tried to think of different way to solve math problems.**

- strongly disagree
- disagree
- agree
- strongly agree

**13. I now think about how I can use math in everyday life.**

- strongly disagree
- disagree
- agree
- strongly agree

**14. I found that I can relate the math I learned to work in other subjects.**

- strongly agree
- disagree
- agree
- strongly agree

**15. I found the environment in this class helpful to learning math.**

- strongly disagree
- disagree
- agree
- strongly agree

**16. When I could not understand something in math, I felt that I could always look for more information to help me understand the problem.**

- strongly disagree
- disagree
- agree
- strongly agree

**17. I can see myself using the math I learned later in life.**

- strongly disagree
- disagree
- agree
- strongly agree

**Appendix D****Notification to Conduct Research at Lansing Eastern High School****Sent to Principal of Lansing Eastern High School**

August 4, 2011

Sue Land,

During the 2011-2012 school year, I will be conducting an action research project to determine how the use of differentiated instruction will have a positive impact in the instruction my students will receive. I am instituting this project in response to concerns pertaining to the high failure rates in our school. All students will be given the same treatment throughout the program and parents will be informed of the plan as a part of the syllabus they sign at the beginning of the school year. I just wanted to inform you that this is occurring. I have attached my research proposal. If you have any questions please notify me and I would enjoy discussing it with you.

Thank you,

Brandon Cook

Math Teacher

Lansing Eastern High School

**Appendix E****MULTIPLE INTELLIGENCES TEACHER INVENTORY**

Place a check in all boxes that best describe you.

**LINGUISTIC**

- I really enjoy books  
 I hear words in my head before I write, read or speak them  
 I remember more when I listen to the radio or an audiocassette than from television or films  
 I enjoy word games such as crossword puzzles, Scrabble, anagrams, or Password  
 I like puns, tongue twisters, nonsense rhymes, and double meanings  
 English, Social Studies, and History were easier subjects for me than Science and Math  
 When I am driving I like to read the billboards and signs, and notice them more than the scenery along the road.  
 I often refer to things I have read or heard in conversations  
 People often ask me the meaning of words  
 I have written something recently that I was proud of, or that was published or recognized  
 Total Linguistic boxes checked

**LOGICAL**

- I can quickly and easily compute numbers in my head (example: double or triple a cooking recipe or carpentry measurement without having to write it on paper)  
 I enjoy Math and Science in school  
 I like solving brainteasers, logical games and other strategy games such as chess/checkers  
 I like to set up "what if" experiments (example: "What if I fertilized my plants twice as often?")  
 I look for structure, patterns, sequences, or logical order  
 I wonder about how some things work and keep up-to-date on new scientific developments and discoveries  
 I believe that there is a rational explanation for almost everything  
 I can think in abstract, clear, imageless concepts  
 I can find logical flows in things people say and do at work or home  
 I feel more comfortable when things have been quantified, measured, categorized, or analyzed in some way.  
 Total Logical boxes checked

## SPATIAL

- When I close my eyes, I can see clear visual images  
 I am responsive to color  
 I often use a camcorder or camera to record my surroundings  
 I enjoy visual puzzles such as mazes, jigsaw puzzles, 3-D images  
 I have vivid dreams at night  
 I navigate well in unfamiliar places  
 I often draw or doodle  
 Geometry was easier than Algebra  
 I can imagine what something would look like from a bird's eye view  
 I prefer reading books, newspaper, magazines, etc. that have many illustrations
- \_\_\_\_\_ Total Spatial boxes checked

## BODILY-KINESTHETIC

- I take Part in at least on sport or physical activity regularly  
 I find it difficult to sit still for long periods of time  
 I like working with my hands (for example, sewing weaving, carving, carpentry, model-building)  
 I frequently get insights or ideas when I am involved in physical activities, such as walking, swimming, or jogging  
 I enjoy spending my free time outside  
 I tend to use gestures and other body language when engaged in conversations  
 I need to touch or hold objects to learn more about them  
 I enjoy dare-devil activities such as parachuting, bung jumping, and thrilling amusement rides
- I am well-coordinated  
 To learn new skills, I need to practice them rather than simply read about them or watch them being performed
- \_\_\_\_\_ Total Bodily-Kinesthetic boxes checked

## MUSICAL

- I have a nice singing voice  
 I know when musical notes are off-key  
 I often listen to musical selections on radio, records, tapes, CDs, etc.  
 I play an instrument  
 My life would be less dynamic without music  
 I often have a tune running through my mind during the day  
 I can keep time to a piece of music  
 I know the melodies of many songs or musical pieces

- \_\_\_\_\_ If I hear musical piece once or twice, I can easily repeat it  
 \_\_\_\_\_ I often tap, whistle, hum or sing when engaged in a task

\_\_\_\_\_ Total Musical boxes checked

### INTERPERSONAL

- \_\_\_\_\_ People often come to me to seek advice or counsel  
 \_\_\_\_\_ I prefer team and group sports to individual sports  
 \_\_\_\_\_ When I have problems, I prefer to seek help from other people rather than work it out alone  
 \_\_\_\_\_ I have at least three close friend  
 \_\_\_\_\_ I enjoy social pastimes like board games and charades more than individual ones such as video games and solitaire  
 \_\_\_\_\_ I like the challenge of teaching other people what I know how to do  
 \_\_\_\_\_ I have been called a leader and consider myself one  
 \_\_\_\_\_ I am comfortable in a crowd of people  
 \_\_\_\_\_ I am involved in local school, neighborhood, church and community activities  
 \_\_\_\_\_ I would rather spend a Saturday night at a party than spend it at home alone

\_\_\_\_\_ Total Interpersonal boxes checked

### INTRAPERSONAL

- \_\_\_\_\_ I regularly spend time reflecting, meditating or thinking about important life questions  
 \_\_\_\_\_ I have attended classes, seminars and workshops to gain insight about myself and experience personal growth  
 \_\_\_\_\_ My opinions and views distinguish me from others  
 \_\_\_\_\_ I have a hobby, pastime or special activity that I do alone  
 \_\_\_\_\_ I have specific goals in life that I think about regularly  
 \_\_\_\_\_ I have a realistic view of my own strengths and weaknesses backed up by accurate feedback from others  
 \_\_\_\_\_ I would rather spend a weekend in a cabin or hide-away than at a large resort with lots of people  
 \_\_\_\_\_ I am independent-minded and strong willed  
 \_\_\_\_\_ I keep a journal or diary to record the events of my inner life  
 \_\_\_\_\_ I am self-employed or have seriously considered starting my own business

\_\_\_\_\_ Total Intrapersonal boxes checked

**Appendix F**

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**MULTIPLE INTELLIGENCES PALETTE**

The array of competencies found in each intelligence. Place your totals for each on the line provided.

**Verbal/Linguistic**\_\_\_\_\_

Reading  
Vocabulary  
Formal Speech  
Journal/Diary Keeping  
Creative Writing  
Poetry  
Verbal Debate  
Impromptu Speaking  
Storytelling

**Bodily/Kinesthetic**\_\_\_\_\_

Folk/Creative Dance  
Role Playing  
Physical Gestures  
Drama/Martial Arts  
Body Language  
Physical Exercise  
Mime/Inventing  
Sports Games

**Musical/Rhythmic**\_\_\_\_\_

Rhythmic Patterns  
Vocal Sounds/Tones  
Music Composition/creation  
Percussion Vibrations  
Humming/Environmental Sounds  
Instrumental Sounds  
Singing  
Tonal Patterns  
Music Performance

**Logical/Mathematical** \_\_\_\_\_

Abstract Symbols/Formulas  
Outlining Graphic Organizers  
Number Sequences  
Calculation  
Deciphering Codes  
Forcing Relationships  
Syllogisms  
Problem Solving  
Pattern Games

**Visual/Spatial** \_\_\_\_\_

Guided Imagery  
Active Imagination  
Color Schemes  
Patterns/Designs  
Painting  
Drawing  
Mind-Mapping  
Pretending  
Sculpture  
Pictures

**Interpersonal** \_\_\_\_\_

Giving Feedback  
Intuiting Others Feelings  
Cooperative Learning Strategies  
Person-to-Person Communication  
Empathy Practices  
Division of Labor  
Collaborative Skills  
Receiving Feedback  
Sensing Others Motives  
Group Projects

**Intrapersonal** \_\_\_\_\_

Silent Reflection Methods  
Metacognition Techniques  
Thinking Strategies  
Emotional Processing  
"Know Thyself" Procedures  
Mindfulness Practices



Focusing/Concentration Skills

Higher-Order Reasoning

Complex Guided Imagery

"Centering" Practices