

Differentiating Instruction using Multiple Intelligences in the
Elementary School Classroom:
A Literature Review

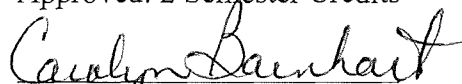
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Suzanna Gangi

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Carolyn Barnhart, EdD, CFCS

The Graduate School
University of Wisconsin-Stout

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**The Graduate School
University of Wisconsin-Stout
Menomonie, WI**

Author: Gangi, Suzanna

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Abstract

This literature review will investigate the instructional strategy of differentiated instruction and how Howard Gardner's theory of multiple intelligences (MI) can be used as a method to differentiate instruction. The MI theory explains how every person perceives the world through each of their intelligences. Specifically, this review will draw upon the research from 1983-2011 regarding using the MI theory as a way to differentiate instruction, resulting in greater student achievement in the elementary grades K-6. In the end, using multiple intelligences to differentiate instruction will assist teachers to accommodate the learning needs of all students.

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Chapter I: Introduction

Teachers are faced with the challenge of teaching students with a wide range of abilities. VanSciver (2005) stated, “Teachers are now dealing with a level of academic diversity in their classrooms unheard of just a decade ago” (p. 534). In a single classroom, students’ learning abilities may range from above grade level to below grade level. For example, in a second grade class made up of 22 students, one will find that reading abilities vary in level. One student may be reading at a kindergarten level, while another is reading beyond a fifth grade level. In this case, the teacher must find ways to adapt lesson plans to meet the learning abilities of both students, while also accommodating the needs of the other 20 students in the class. Therefore, teaching students with a wide range of abilities requires teachers to be innovative in how learning opportunities are offered.

One solution to this challenge is to implement differentiated instruction in the classroom. Differentiated instruction accommodates the diverse learning needs of the students by varying the methods and materials used to teach each concept. McBride (2004) stated that “Differentiated instruction is vital to effecting positive change in student performance, because the one-strategy-fits-all approach doesn’t work in a real classroom” (p. 39).

As a way to differentiate instruction, a teacher may implement the theory of multiple intelligences (MI). The theory was developed by Howard Gardner in the early 1980s and states that each person has several distinct intelligences correlating with a specific part of the brain. Gardner (1983) originally identified seven categories of intelligences: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical,

intrapersonal, and interpersonal. After continued research, Gardner added the naturalistic intelligence to his theory, and continues to research the existence of an existential intelligence (Gardner, 2009). Utilizing the MI theory, teachers can differentiate learning activities to accommodate each of the intelligences in the classroom. This means students will have targeted learning experiences, resulting in higher levels of achievement.

Problem Statement

In an ideal world, every student would learn the same content in exactly the same way. Teachers could teach a lesson once and all students would learn and understand the concept before moving on to the next topic of the day. Unfortunately, students are not like this; rather, each student has their own preferred way of learning. Therefore, it is increasingly important for teachers, especially in the elementary grades, to differentiate their classroom instruction using different methods and materials to teach each lesson. According to Tomlinson (2000), "Students in the elementary grades vary greatly, and if teachers want to maximize their students' individual potential, they will have to attend to the differences" (p. 3). If this is not done, students may become frustrated, confused, and unwilling to participate in the learning process. Thus, a select group of students may not be successful in school.

This literature review will define the teaching strategy of differentiated instruction and the use of MI as a method to differentiate instruction. MI research will be reviewed and analyzed to determine if it is an effective method to accomplish differentiated instruction.

Purpose of the Study

This literature review aims to show the effects of using MI as a way to differentiate instruction in the elementary classroom, determine if students are more engaged, and determine how students' academic achievement may be affected. Through a literature review and analysis, this review will attempt to illustrate that using MI is an effective way to differentiate learning opportunities in an elementary classroom, which may lead to greater success for most students regardless of their previous academic standing.

Research Questions

This literature review will attempt to answer the following questions:

1. Is the theory of multiple intelligences an effective method to differentiate styles of learning in an elementary classroom?
2. Will using multiple intelligences in the elementary classroom lead to greater student achievement?
3. Will implementing multiple intelligences help close achievement gaps between academic and cultural groups in an elementary classroom?

Definition of Terms

Differentiated Instruction. A strategy of teaching that accounts for the differing learning abilities of elementary students.

Elementary Grades. For the purpose of this study, elementary grades is defined as kindergarten through grade six.

Intelligence. Gardner (2006) defines intelligence as “a computational capacity- a capacity to process a certain kind of information...An intelligence entails the ability to

solve problems or fashion products that are of consequence in a particular cultural setting or community” (p. 6).

The Theory of Multiple Intelligences. A theory developed by Howard Gardner (1983) which states that people perceive the world around them through their intelligences. There are nine identified intelligences: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential. Every person possesses each of the nine intelligences; however, some may favor one intelligence over another (Gardner, 2006).

Assumptions and Limitations of the Study

It is assumed that all elementary school-aged students have the ability to learn and not all students learn in the same way. It is also assumed teachers are looking for ways to differentiate their instruction and would be interested in implementing the MI theory.

Results and final conclusions of this literature review may be limited depending on the resources available. The data analyzed for this review will be data from previous published sources. Although this review will attempt to find cases in which there were positive and negative effects from using MI, another possible limitation may be a lack of cases in which a negative effect occurred after using MI in the classroom.

Methodology

This literature review will explore the MI theory as defined by Howard Gardner. A summary and analysis will determine the effects of applying the MI theory to differentiate instruction in the elementary school classroom. Research will show, using MI can be a valuable method to differentiate instruction, which will help students learn.

Chapter II: Literature Review

This chapter is a review of the research and literature regarding differentiated instruction and the theory of multiple intelligences (MI). The chapter will begin with a definition of differentiated instruction, its application, and how its use can be beneficial to students in the elementary classroom. The chapter will continue with a review of the MI theory and how it is used in the classroom as it relates to meeting students' individual learning needs, engaging students in learning, and increasing student achievement. Some resources and information may apply to students of any educational level, while other resources are specifically targeted toward students in kindergarten through sixth grade.

Differentiated Instruction

Years ago when one-room school-houses were common, teachers had one classroom filled with students at different grade levels and different learning abilities. The teacher had to differentiate their instruction to accommodate for the various grade levels and learning needs of all the students. Therefore, teaching a lesson to an eighth grade student looked and sounded different than the same lesson content taught to a second grade student. Likewise today, in a single grade classroom, teachers are faced with similar challenges teaching students of varying abilities (Anderson, 2007; Rutledge, 2003). Teachers can use the same strategies, as later explained, of differentiating instruction by using a variety of techniques and materials to assist students of all abilities to have successful learning experiences.

According to educational consultant and expert on differentiated instruction, Carol Ann Tomlinson (2000), differentiated instruction is varying instruction to accommodate for the differences in students' learning needs. Differentiation "consists of

the efforts of teachers to respond to variance among learners in the classroom” (p. 2). When a teacher modifies the way they present a lesson or changes an assignment for specific students, they are differentiating their instruction. Even re-teaching a lesson offers a way to differentiate instruction. In re-teaching the same lesson, a teacher will use a different method and different examples to teach the same content. An attempt to adapt instruction or materials used to address the learning needs of students, is differentiating instruction.

In order to differentiate instruction in the classroom, a teacher must address three student characteristics, which Tomlinson (2001) identified as: readiness, interest, and learning profiles. Student readiness is how much background knowledge a student has relating to a topic. Student interests are the topics that students want to learn and will motivate them to be engaged in learning. Lastly, learning profiles of students involve how students learn. Considering these student characteristics, a teacher can effectively differentiate their instruction.

Areas of Differentiated Instruction

Even though students have different skills, abilities, and talents, the goal in differentiation is “to have all students attain a similar level of mastery over specific content” (VanSciver, 2005, p. 535). To achieve the goal of mastery, teachers can differentiate their instruction in four different areas: content, process, products, and learning environment (Tomlinson, 2000). Tomlinson (2001) stated “A differentiated classroom provides different avenues to acquiring content, to processing or making sense of ideas, and to developing products so that each student can learn effectively” (p. 1).

Content.

Content is what students need to learn. According to Tomlinson (2001), a teacher can differentiate content based on the student characteristics, as previously mentioned.

One way to modify content is based on students' readiness level. For example, a student who has mastered multiplication is ready to move on to division, while another student who is struggling with multiplication needs to finish mastering the subject before moving on to a new topic. Thus, the teacher needs to differentiate content to accommodate these two students' learning needs. Another way to differentiate content is by student interest. For example, one group of students may explore their interest in bugs, while another group explores the topic of changes related to weather. Allowing these students to explore their interests is differentiating content. A third way to differentiate content is through students' learning profiles, or how they learn. For example, one student may learn best by reading and taking notes, while another student needs to hear the new material and see graphs and pictures (Tomlinson, 2001). Thus, a teacher can present lesson content in a variety of ways to accommodate students' different learning profiles.

A teacher can use a variety of texts and materials to differentiate content in their classroom (Tomlinson, 2001). Using a variety of texts not only allows each student to find material at their level of understanding or readiness level, but also allows them to find material that matches their interests.

A teacher can also use mini-lessons to differentiate content in their classroom (Tomlinson, 2001). A mini-lesson is a short lesson based on a specific topic of instruction (Teaching Reading K-2 Workshop, 2003). By using mini-lessons, after the initial teaching of the lesson, students who have mastered the material can move on to a

new topic, or they can be challenged to apply new knowledge at a deeper level. Students who have not mastered the content can receive additional assistance to better understand the new content.

Process.

Another area of differentiated instruction that can be modified is the process, or “how the learners come to understand and assimilate facts, concepts, or skills” (Anderson, 2007, p. 50). Process involves the way students use the content that was taught and apply their understanding to a task. Teachers can adapt the process according to students’ characteristics of readiness, interest, and learning profiles. Examples of adapting the process for student readiness include allowing more time for a student to complete an activity. In addition, teachers can differentiate process by student interest by giving students a choice in the learning activity they wish to complete. Adapting process through students’ learning profiles may involve allowing students to work independently or with a small-group, or providing students with hands-on learning experiences of the content. Giving students several ways to understand the content makes use of differentiating process (Tomlinson, 2001; Anderson, 2007).

One method for differentiating process is interactive journaling. Journal topics or prompts can be assigned for specific students based on their ability level or interest. Students can also be allowed to write freely about any topic or write their feelings, thoughts, and reflections about what they are learning. The teacher then reads each student’s journal, assesses for understanding of the content, makes comments, and responds to student’s writing (Tomlinson, 2001).

Products.

Products, or the outcome measure, are what each student produces as evidence of their learning and can be modified as a way to differentiate instruction. Students demonstrate they have learned the content by applying what they have learned in creating a product; this could be an assignment, project, or an assessment. Based on students' readiness levels, teachers can differentiate the product to enable the student to apply their knowledge in a certain way, such as by varying the degree of difficulty of the product, or by varying the amount of teacher involvement. Using activity centers is one way to differentiate product according to students' interest and allows students to select the activity or outcome that matches their interests (Tomlinson, 2001). One activity to differentiate the product by students' learning profiles is to have students perform a skit or role-playing activity in an activity center, or complete a set of questions on a worksheet (Levy, 2008). As later explained, two specific methods to differentiate product are tiered assignments and choice boards.

Learning Environment.

Lastly, the learning environment can be adapted as a way to differentiate instruction. There are many elements involved in the classroom environment that may be modified, including rules, procedures, furniture, available materials, and mood (Tomlinson, 2000). If a student's learning profile requires absolute silence in order to concentrate on an assignment, the teacher might send that student to the library or find a quiet spot in the classroom for that student to work. Another student may benefit from working while sitting in a cubicle, with walls surrounding the desk to minimize visual

distractions (Tomlinson, 2000). Differentiating the classroom environment may provide a student with a more inviting atmosphere to learn.

Benefits of Differentiated Instruction

Servilio (2009) stated that differentiating instruction is “an individualized method of meeting all of the students’ academic needs at their level” (p. 7). One benefit of differentiating instruction is that it helps teachers address the learning needs of each student. This can be accomplished by targeting the student characteristics Tomlinson (2001) identified as: readiness, interest, and learning profile. When planning for differentiated instruction, knowing students’ interests and dominant learning styles, or profiles, can allow the teacher to plan learning activities that specifically target what students would like to learn and how they learn best (Servilio, 2009). When teachers teach to students’ readiness level, they can accommodate a student who has mastered the lesson content, and is ready to be challenged. In this case, a harder text or a more complicated project could be assigned. Once a need is identified, the teacher responds by finding a method or solution to answer the need in order for all students to be successful in learning (VanSciver, 2005). In these examples, the teacher is able to use differentiated instruction to meet the learning needs of their students.

Using differentiated instruction in the classroom is not only a way to meet students’ learning needs, but it is also a way to motivate and engage students in learning. Tomlinson (2001) referenced the work of Bess and Brandt, which stated “Two powerful and related motivators for engagement are student interest and student choice” (p. 52). One way to engage students is to find content in which they demonstrate an interest. When a student is excited about a specific topic, they are more likely to participate in

learning (Tomlinson, 2001). Another way to engage students is by providing a choice in the learning activities they are required to complete. By allowing students to make their own decisions regarding which assignment or activity to complete, teachers involve them in the learning process. If students are engaged in learning, they are more likely to be motivated to learn (Anderson, 2007).

Another benefit of differentiated instruction is that it leads to increased student achievement. Servilio (2009) stated “The combination of a differentiated curriculum and the options for student choice are ideal for promoting success for students with disabilities and it can improve outcomes for other students as well” (p. 10). In a differentiated classroom, when students are engaged and have achieved their goal or completed a task, they are more motivated to continue learning and exceed their original goal or expectation. “With the tools of differentiated instruction, we can...take each child as far as he or she can go” (Levy, 2008, p. 164) towards further achievement and success. Studies have shown there are many benefits of implementing differentiated instruction and the following are a few examples.

Success Stories

Baumgartner, Lipowski, and Rush (2003) implemented differentiated instruction in three classrooms in a middle-class, suburban school district in northern Illinois. The targeted classrooms consisted of 25 second graders, 27 third graders, and 25 seventh graders, from a variety of ethnic backgrounds. Their goal was to reinforce literacy skills of students who needed remedial assistance and to increase reading achievement. They differentiated instruction by adapting the content, process, and products. Content was differentiated by allowing students to self-select books about a topic they found

interesting and matched their ability level. Process was adapted by allowing students to work in a variety of group settings and by giving students a wide range of materials to use. Students were grouped according to their learning needs and groups were frequently changed as students' needs changed. Products were adapted by allowing students to choose what assignment and tangible learning outcomes to complete.

Baumgartner et al. (2003) assessed students before, during, and after the 19 week differentiation trial period. An informal reading strategy checklist was used that students completed, along with two formal assessments: the San Diego Quick Assessment and the Nonsense Word test. A survey was also given to determine students' overall attitudes toward reading.

The student strategy checklists indicated students were using more reading strategies at the end of the 19 weeks than previously used. The results of the San Diego Quick Assessment showed increased reading levels in each selected classroom over the 19 week period. In the second grade class, before the study, 32% were reading below grade level. After the study, only 12% were reading below grade level. In the third grade class, the number of students reading below grade level went down from 52% to 11%. In the seventh grade class, 84% were reading below grade level before the study and only 36% were afterwards. The results of the Nonsense Word test showed that students at each grade level could read more of the nonsense words on the posttest than the pretest, meaning students demonstrated a greater mastery of skills in phonics. Moreover, the survey results indicated that students' overall attitudes towards reading increased. The third grade results showed an increase of 13% of students who thought positively about

reading, while the second and seventh grade results showed an increase of 8% and 16%, respectively.

Servilio (2009) detailed a study completed in a fifth grade classroom that had 24 students, 6 of whom had a learning or physical disability. The school was identified as one located in an area with lower family incomes. The study differentiated instruction in reading, comprehension, and personal connection by implementing a seven step program they called “You Get to Choose.” The seven steps the teachers created were:

- (1) identifying student needs and learning styles within your classroom;
- (2) assess current student achievement;
- (3) select empirically based strategies for reading, comprehension, and personal connection;
- (4) differentiate the material for the students with special needs;
- (5) provide options for student choice;
- (6) conduct the assessment;
- (7) evaluate student performance (p. 5).

These steps allowed the teachers to differentiate content, process, and products. The teachers in this study determined that by allowing students to have choices in the materials read and assignments completed, student involvement and motivation to read increased. After the implementation of the program was complete, students were assessed using teacher-student interview and portfolio review, student motivation increased, and 83.4% of the students improved their overall grades.

Beecher and Sweeny (2008) reported an eight-year study of Central Elementary School, a suburban school that scored in the 30th percentile in reading, math, and writing on standardized tests. Forty-five percent of students were on free or reduced lunch and 43% of the students were considered minorities; this number grew to 75% over the eight-year study. Approximately 30% of the students spoke English as their second language. The school implemented the Enrichment Triad Model, which provided three types of enrichment for students. Type I enrichment covered differentiating content which

exposed “students to a wide variety of disciplines, topics, or issues not ordinarily covered in the regular classroom” (p. 510). Type II enrichment focused on differentiating process, or the methods and materials teachers used to promote a higher level of thinking. Type III enrichment challenged students through differentiating products, or activities requiring them to act as “firsthand inquirer” or a “practicing professional” (p. 510). After implementing this approach throughout the entire school, student test scores improved for district and state assessments in every subject and in every grade level. The achievement gap between socioeconomic groups decreased from 62% to 10%. All cultural groups improved their scores. This study further supports the idea that “building upon students’ strengths with a differentiated approach to instruction and enriched learning experiences could help close the achievement gap between the rich and poor and among different ethnic groups” (p. 537).

Drawbacks and Opposition to Differentiated Instruction

According to VanSciver (2005), there are some disadvantages to implementing differentiated instruction into a classroom. However, these disadvantages mainly impact the teacher rather than the students, and fall into three categories: time, resources, and complexity. Differentiating instruction does take time (George, 2005; VanSciver, 2005; Servilio, 2009). Teachers must take time out of the school day to assess students’ learning needs and determine their learning styles. They must also take time to look through the assessments, determine the appropriate action to best accommodate students’ learning needs, plan lessons, and implement accordingly. Likewise, for a teacher to accommodate their students’ learning needs, resources are required to follow through in assisting students. Differentiation is also complex. Lessons will not only be written for

the whole class, but for specific groups of students or individual students. In fact, some teachers “found it almost impossible to provide sustained properly executed lessons for every child or group” (Schmoker, 2010, p. 22).

Servilio (2009) also suggested that another disadvantage of differentiated instruction could be a noisier, or “chaotic” (p. 10) classroom. When students are actively participating and engaged in working groups, the noise level of the classroom will likely be higher than one with students who are independently working. However, Servilio admitted that once teachers and students are accustomed to the increased noise level, this may no longer be an issue.

Schmoker (2010), a critic of differentiated instruction, stated there is “no research or strong evidence to support its widespread adoption” (p. 22). Instead of differentiated instruction, Schmoker recommended focusing on a “content-rich *guaranteed* curriculum” making sure students can “read, write and discuss... across the curriculum” (p. 23), using a model of instruction that is known to work. This model focuses on using a “clear, curriculum-based objective and assessment, followed by multiple cycles of instruction, guided practice, checks for understanding, and ongoing multiple checks for understanding” (p. 23).

Methods for Differentiating Instruction

There are many methods to differentiate instruction in the classroom. “There is no one-size-fits-all model for differentiated instruction; it looks different depending on the prior knowledge, interests, and abilities students bring to a learning situation” (Huebner, 2010, p. 80). Three specific methods a teacher can use to differentiate

instruction in the classroom are tiered assignments, choice boards, and using the guidance of Bloom's taxonomy to encourage higher-levels of thinking.

With tiered assignments, teachers can differentiate content, process, or products based on students' readiness level, interests, or by preferred learning profile. With the assistance of the teacher, students can work in the tier that best suits their learning abilities, interests, or learning profile (Tomlinson, 2001; Levy, 2008). For example, one tier could have students label the steps of the water cycle on a diagram. Another tier may have students find a way to act out each step in the water cycle. The second tier requires students to have a greater understanding in order to act out each step in the cycle.

Choice boards modify content, process, or products by allowing students the opportunity to choose from several activities the ones they would like to complete. The assignment may be to complete three out of the six assignments on the choice board. Students then select the assignments that best fit with their interests and ability levels (Anderson, 2007).

Heacox (2002) suggested differentiating instruction using Bloom's taxonomy. Bloom's taxonomy of educational objectives was developed by educational psychologist Benjamin Bloom and "provides a logical structure for students to build both learning and thinking" (Cash, 2011, p. 112). There are six levels of the taxonomy: knowledge, comprehension, application, analysis, evaluation, and synthesis. Each level consists of a list of educational objectives, or verbs, that requires a certain level of thought and understanding to complete a task. As you advance to a higher level on the taxonomy, the amount of thought needed increases and activities become more difficult. As a way to differentiate, teachers can use the taxonomy as a guide to create activities that will

accommodate students' readiness, interests, or learning profiles. As students master the more basic concepts at the knowledge level, they can be challenged to dig deeper in their thinking and advance to a higher level of complexity on the taxonomy, synthesis, and evaluation (Heacox, 2002; Cash 2011). For example, one student may be learning the basic knowledge of the butterfly life cycle, while another student can learn about the life cycle of a frog then be challenged to analyze and compare the two life cycles.

Although teachers have developed many effective methods over the years to differentiate instruction, including the methods as described above, this paper more closely examines Howard Gardner's MI theory as a method to differentiate instruction in the classroom.

The Theory of Multiple Intelligences

Howard Gardner first introduced his MI theory in 1983 through his book *Frames of Mind*. Gardner stated, "I believe that human cognitive competence is better described in terms of a set of abilities, talents, or mental skills, which I call *intelligences*" (p. 6). The theory is based on a "pluralistic view of the mind" (Gardner, 2006, p. 5), and details the idea that the mind is made up of several intelligences. This "pluralistic view of the mind" accounts for the different ways people think and act. It also acknowledges that everyone has various levels of strengths and weaknesses in each area of intelligence.

Gardner conducted his research at Harvard University through the Project Zero program, which reviewed case studies of people with various mental abilities, including gifted, idiot savants, mentally disabled, brain-damaged, and "normal" individuals. The study aimed to determine how the mind works and to "document how different parts of the brain are dominant for different cognitive functions" (Gardner, 1983, p. 2).

According to Gardner (1995), intelligence is “a biological and psychological potential; that potential is capable of being realized to a greater or lesser extent as a consequence of the experiential, cultural, and motivational factors that affect a person” (p. 202). In other words, intelligence is the ability or the potential to process and use information to solve a problem or create a product (Gardner, 1983). Throughout the Project Zero study, Gardner questioned the existence of a single intelligence and began to investigate the possibility of several specialized intelligences. When he introduced the theory of MI, Gardner identified the existence of seven distinct intelligences: spatial, linguistic, logical-mathematical, bodily-kinesthetic, musical, intrapersonal, and interpersonal; each correlated to a specific part of the brain. It was not until the 1990s that he added an eighth intelligence, the naturalistic intelligence (Gardner, 2003). Still in development is a ninth intelligence, the existential intelligence. Gardner hopes to officially add it as an intelligence after more data has been collected and analyzed (Gardner, 2009).

During his research with Project Zero, Gardner reviewed case studies of individuals who had certain types of brain damage, and found that while one area of the brain was not functioning “normally,” another area was not damaged. Therefore, he concluded that even though a person may not have any of one particular intelligence, they may have another intelligence which is still functioning in another part of the brain (Gardner, 2005).

Gardner (2006) suggested that each person has and uses all nine intelligences, and, even though one intelligence may be stronger than another, they all work together in an ordinary person. Moreover, genetic and cultural backgrounds influence how an

individual uses and develops their intelligence preferences. For example, a dancer must use the spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal intelligences to become good at dancing. The dancer may have one intelligence that is stronger than another, yet they all work together to perform the art of dancing. Genetically, the dancer may have inherited an exceptional sense of balance and as part of their culture, the dancer may be exposed to specific types of dances and participate and/or excel at only that style of dance. All factors of genetics, culture, and personal intelligence preference play a role in how the dancer uses their talent to perform.

Originally, Gardner did not identify how he intended the MI theory to be applied or who would benefit from using it (Williams, 2002). He anticipated his work to be reviewed and used by psychologists but instead, educators have looked to his theory and applied it to their teaching (Gardner, 2003).

In order for a teacher to implement the theory of MI in their classroom, they must first understand the nine intelligences. Once a teacher understands the nine intelligences, they will be able to perform the next step, which is identifying the intelligence strengths of their students. The teacher can then target those specific intelligences and teach new materials using those intelligence strengths. Studies have shown that teaching to students' strengths using MI has many benefits, including meeting students' learning needs and engaging students, which can lead to higher student achievement.

Gardner's Multiple Intelligences

Linguistic intelligence.

The linguistic intelligence is the capacity to understand written and spoken language. Thus, students with a strong linguistic intelligence learn through language. Activities such as storytelling, brainstorming, tape recording, journal writing, and publishing allow these learners to demonstrate their strengths (Dickinson, 1996). Books are important to the linguistic learner; they thrive on using words, reading, and telling stories.

Logical-mathematical intelligence.

The logical-mathematical intelligence is the capacity to understand logic and numeric operations. Students with this intelligence strength enjoy learning activities such as calculations and quantifications, classifications, and categorizations using logical reasoning (Armstrong, 2009).

Spatial intelligence.

The spatial intelligence is the capacity to visualize what is spoken, read, or written and the ability to manipulate those visualizations (Gardner, 2005). According to Nicholson-Nelson (1998), students with this intelligence strength learn best by using a “mental or physical picture to best help understand new information” (p. 11). Activities such as drawing, using maps, and solving puzzles allow these students to demonstrate their strengths.

Bodily-Kinesthetic intelligence.

The bodily-kinesthetic intelligence is the capacity to learn through movement and to “solve problems or fashion products using your whole body, or parts of your body, like

your hands or mouth” (Gardner, 2005, p. 8). Students with a strong bodily-kinesthetic intelligence have excellent hand-eye coordination. Activities in which these learners do well include: role-playing, building, playing games, and participating in hands-on activities (Armstrong, 2009).

Musical intelligence.

The musical intelligence is “the capacity to create, perform, and appreciate music” (Gardner, 2005, p. 7). Students with this intelligence strength understand musical concepts and learn well through songs, rhythms, chants, and poetry.

Interpersonal intelligence.

The interpersonal intelligence involves understanding people. These students are known as being “people smart” (Lazer, 2000). They have a strong sense of community and work well with others. Interpersonal activities include: peer sharing, cooperative groups, board games, and simulations (Armstrong, 2009).

Intrapersonal intelligence.

The intrapersonal intelligence is the “capacity to understand oneself” (Gardner, 2005, p. 8). Students with this intelligence strength have a strong sense of self and do well working alone. They are in touch with their own feelings and are good at reflection. Activities an intrapersonal learner would enjoy include: working alone, setting goals, meditating, and choosing which activity to complete. (Nicholson-Nelson, 1998).

Naturalistic intelligence.

The naturalistic intelligence is the capacity to “distinguish and categorize objects or phenomena in nature” (Moran, Kornhaber, & Gardner, 2006, p. 25). Students with this

intelligence strength enjoy being outdoors, exploring, and learning about plants and natural events.

Existential intelligence.

The existential intelligence is the capacity to think about the big picture and why things or people exist. Students with this intelligence strength may ponder questions such as “who are we, why do we die, [and] how did we get here” (Nicholson-Nelson, 1998, p. 12). McCoog (2010) stated that students who display a “strong existential intelligence need the freedom to ponder, conceptualize, and hypothesize about the content presented in class” (p. 127). Activities for these types of learners may include: analyzing and thinking about questions that do not have a clear answer, pondering how variables interact, and evaluating how concepts relate to one another (McCoog, 2010).

The existential intelligence is still in development, and Gardner considers it to be “half an intelligence” (Gardner, 2006, p. 21). Because it has not been determined if there is a part of the brain that specifically corresponds with this form of intelligence, Gardner (2009) continues to gather evidence regarding the existential intelligence and hopes to report his findings in the “next few years” (p. 5).

Identifying Student Strengths

After teachers understand each of Gardner’s nine areas of intelligence, the next step is to determine how each student will learn best, which can be done by identifying their intelligence strengths (Campbell & Campbell, 1999). Because each area of intelligence focuses on a specific set of strengths, teachers can provide their students with opportunities to advance by drawing upon students’ strengths (Moran et al., 2006).

There are many ways to determine students' intelligence strengths. Several inventories, questionnaires, and tests have been created for this purpose. The Multiple Intelligences Developmental Assessment Scales (MIDAS) and the Teele Inventory of Multiple Intelligences (TIMI) are two examples of questionnaires teachers can use to determine the intelligence preferences of their students (Shearer, n.d.; Özdemir, Güneysu, & Tekkaya, 2006). Teachers can also observe students. If a teacher sees that some students often sing, they probably have a strong musical intelligence. If others like to move around or build things, then they probably have a strong bodily-kinesthetic intelligence or spatial intelligence. Armstrong (2009) developed a checklist, see attached Appendix, that can be used when observing students to help determine their intelligence strengths, as students will naturally participate in activities when something interests them.

After students' intelligence strengths are identified, a teacher can view their students in a new way. Campbell and Campbell (1999) stated "MI provides a new lens to perceive students and a new tool for acting on that information" (p. 10). This new lens has teachers and students looking at their strengths instead of weaknesses. "Instead of defining themselves as either 'smart' or 'dumb,' students can perceive themselves as potentially smart in a number of ways" (Moran et al., 2006, p. 23). In thinking this way, teachers and students have higher expectations because the focus is on the strengths of the learner. This also gives students a can-do attitude since they are using their strengths (Campbell and Campbell, 1999).

Knowing the intelligence strengths of students allows teachers to take the next steps to educate them. Teachers can use these strengths as a foundation for planning

lessons and learning activities in the classroom (Williams, 2002). By incorporating learning activities and using a variety of materials, students can use their strong intelligences and also gain exposure to the intelligences which may be weaker.

Implementing the Theory of Multiple Intelligences

There are many ways to implement MI in the classroom. Teachers can use daily learning activities such as activity centers, simulations, and presentations. Another way a teacher can incorporate MI is through lesson presentation. Teachers can also use MI to group students in a variety of ways, including the complimentary and compatible profiles explained below. There are various ways to implement the MI theory and the implementation may look different in every classroom (Baum, Vines, & Slatin, 2005).

Rettig (2005) recommended targeting one or more of the intelligences into daily lesson plan activities. He suggested that many teachers already incorporate MI without realizing it. With the knowledge of how to implement MI, a teacher can make sure they are incorporating all the intelligences throughout the day. However, the idea is not to create nine different activities of the same content to accommodate each of the intelligences, but to select a few intelligences to target in one lesson or activity (Moran et al., 2006).

Moran et al. (2006) explained that using MI in the classroom allows teachers to provide students with “rich experiences—activities in which they can engage with the material personally rather than just absorb it in an abstract, decontextualized way” (p. 25). Rich experiences often incorporate many intelligences into one lesson or unit. For example, a class may be working on the water cycle. Students can act out the water

cycle, draw a mural, write a story, or sequence the order of the cycle, among other activities that incorporate the intelligences.

Author, speaker, and education consultant Thomas Armstrong (2009) wrote that one way to incorporate MI in daily learning activities is through activity centers. Each center can be dedicated to one specific intelligence, and activities can be set up where the student will use that intelligence to complete the activity. Students can choose which activity center they would like to complete. This allows students to select an activity that suits their intelligence strengths and also gives them an opportunity to explore other intelligences.

Hampton (2009) identified simulations and presentations as two other methods to incorporate MI into lesson plans. Examples of simulations are role-play, debating, and simulation software. Hampton explained that simulations are beneficial because students learn and understand when they experience something first-hand rather than only hearing new information. Moreover, students can actively engage each of the intelligences while participating in simulations. Presentations allow students to showcase their intelligence strengths by first, creating a project that reflects those strengths, and then, by sharing their project with others.

Teachers can also use MI to think about how they should present or deliver new material to their students. Gardner (2006) suggested using “multiple entry points” to teach each topic. He explained that any topic or concept can be taught in at least seven distinct ways correlating with the intelligences. Approaching a topic in several different ways allows students more exposure to the topic, which in turn has more impact on student learning. Gardner wrote,

Understanding is far more likely to be achieved if the student encounters the material in a variety of guises and contexts. And the best way to bring this about is to draw on all of the intelligences that are relevant to that topic in as many legitimate ways as possible (p. 60).

Multiple entry points also allow students to arrive at their understanding in more than one way, which Gardner calls, “multiple representations” (p. 141). Having multiple representations allows students to think of the material like an expert, who can explain their ideas in many ways. Lastly, students can take those multiple representations and make “multiple connections” to other representations. To make a connection, students relate the new content they have learned to their previous knowledge to further expand their learning.

Williams (2002) suggested that, when using Gardner’s multiple entries, multiple representations, and multiple connections, as described above, “five effects are implied: asking the right question, and the effects on curriculum, instruction, assessment, and the school environment” (p. 17). The “right questions” include “How are you smart?” or “How are you intelligent?” As described earlier, this is thinking of students in a new light, looking and teaching to strengths instead of weaknesses. The second effect of using MI is on the curriculum. The curriculum needs to be adapted to match the intelligence strengths of students so they can connect with what they are learning. The third effect of using MI is on instruction. Williams explained, teachers must be prepared to present their content, or lessons, in a number of ways. This satisfies Gardner’s “multiple entries,” as information is presented more than one way to accommodate the varying learning needs of students. The more ways the information is presented, the better chance a student has to understand and also make connections and representations to other material they have learned. The fourth effect is on assessment. When

information is taught using more than one method, it should also be assessed using more than one method. For example, it is unfair for students with a strong bodily-kinesthetic intelligence to always be assessed using pencil/paper, which commonly only assesses verbal-linguistic and logical-mathematical intelligences. Rather, other ways of assessment should be used, such as portfolios, projects, and presentations. The last effect of using MI is on the school environment. Williams suggested that when schools implement MI, they encourage “responsible risk-taking and innovation” (p. 24).

Moran et al. (2006) offered two suggestions for grouping students together as a way to implement MI in the classroom. First, the “complementary profiles” method (p. 25) groups students so one member has an intelligence strength in which the other member is weaker, while both have a different intelligence in which they are both stronger. For example, take two students who are both fairly strong in the spatial intelligence, but one is weak in the logical-mathematical intelligence and the other has strong logical-mathematical skills. The student with the strong logical-mathematical skills will be able to assist the other student using their shared intelligence to work through an assigned abstract math problem.

The second suggestion by Moran et al. (2006) for grouping students together is to use the “compatible profiles” method (p. 24). Here, one student is paired with another student having the same or similar intelligence strengths. In working together to complete a simple task using their shared MI strengths, they can go beyond the assigned task to a higher skill level. Thus, “two students highly capable in storytelling can support each other by moving beyond the basics of plot to explore and develop twists in the narrative” (p. 25). Having students work together using their intelligence strengths helps

them “become aware of their own intelligence profile, to develop self-regulation, and to participate more actively in their learning” (p. 27). Using these grouping strategies, students will be more engaged, grasp the content more easily, and have the opportunity to work with peers having similar or different intelligence strengths.

Benefits of Using Multiple Intelligences

Teachers are better able to accommodate students’ learning needs by incorporating MI in the elementary classroom. Students are also more engaged in their learning through MI activities. A MI classroom also leads students to greater student achievement.

One benefit of MI is that it helps teachers accommodate their students’ learning needs, which in turn allows teachers to cater instruction for the academic needs, intelligence strengths, and weaknesses of their students. Gardner (1983) believed once individuals identify their intelligence strengths, they can “draw upon this knowledge to enhance that person’s educational opportunities and options” (p. 10). This also better accommodates students’ learning needs (Nicholson-Nelson, 1998). The learning method that works best for one student may not work for another due to their differing intelligence strengths. Therefore, if a teacher uses Gardner’s multiple entries approach to target several intelligences in one lesson, students will get more exposure to the content and more students will be reached (Gardner, 2006; Heacox, 2002). “The more variety you offer students in ways you ask them to learn and show what they have learned, increases the likelihood of reaching more students” (Heacox, 2002 p. 70). Thus, students’ learning needs will be accommodated.

MI also helps teachers create more personalized and diverse lessons to accommodate their students' learning needs, which leads to more opportunities for students to learn the expected material (Wilson, 1998). This also allows teachers to "provide concrete opportunities to develop their students' intellectual potential" (Campbell & Campbell, 1999, p. 11). For example, a teacher may have a set of repeated addition or subtraction problems on a worksheet. A MI approach would allow the spatial learner to draw a picture that illustrates the problems; the linguistic learner to write out the steps needed to solve the problems; and the bodily-kinesthetic learner to role play or use manipulatives to solve the problems. Thus, students use their own strengths to ultimately come up with the same answer, but doing so in a way that accommodates their own individual strengths and abilities.

When students have the opportunity to learn through their strengths, not only will their academic needs be met, but they will also be more engaged in their learning (Dickinson, 1996). Armstrong (2009) stated, "The MI teacher provides hands-on experiences, whether they involve getting students up and moving about, passing an artifact around to bring to life the material studied, or having students build something tangible to reveal their understanding" (p. 57). The activities Armstrong suggested actively engage students by helping them relate learning to real life.

According to Lazer (2004), using MI in the classroom makes lessons more interesting, which causes students to pay more attention to what is taught and then learned. As a result, students are more engaged, they remember more, and achievement increases. Lazer (2000) also stated that when students become aware of their intelligence

strengths and consider themselves as being “smart” in that area of intelligence, their self-esteem is raised.

Campbell and Campbell (1999) found that when teachers looked to their students’ strengths instead of weaknesses, both teachers and students had higher expectations and this led to greater student achievement. As a result of higher expectations and the “positive and explicit belief in student intelligence, teaching practices change and, ultimately, so does student achievement” (p. 97). As the following section will show, implementing MI in the classroom has increased student achievement in many classrooms.

Success Stories

Campbell and Campbell (1999) completed a study of Expo Elementary School in St. Paul, Minnesota, which was created as a MI magnet school and fully implemented MI each year. As a result, students consistently scored higher on state standardized tests than other schools in the district. In 1996, 36% of the students scored above average on the administered standardized test. This percentage increased to 38% in 1997. Expo Elementary continuously scored above the district average in grades three through six on the Minnesota Comprehensive Assessment Series II (MCAII) state tests in Reading and Math and also on the fifth grade Science test. According to Expo’s yearly report card, every year from 2005-2010, Expo scored higher than the district average for elementary schools and on many tests, also scored higher than the state average (Minnesota Department of Education, 2010).

Campbell and Campbell (1999) also studied Russell Elementary School in Lexington, Kentucky. After only four years following the initial implementation of MI,

students at Russell Elementary doubled their baseline scores on the Kentucky Instructional Results Information System (KIRIS) test. This test categorized students into four levels: Novice, Apprentice, Proficient, and Distinguished. Initially, 50% of the students scored in the Novice category, making the school fall within the 30th percentile of schools in the state. But after only four years of using MI, two significant results were determined: “1. Not a single student scored at the novice level, a feat only 2 other elementary schools out of the 35 in the county accomplished. 2. The discrepancy between black and white student scores disappeared” (p. 24).

Douglas, Burton, and Reese-Durham (2008) compared the results of methods used in two different classrooms in a North Carolina, eighth grade public school mathematics classroom. The teacher in the first group, the control classroom of 29 students, used the direct instruction method. Direct instruction was comprised of “teacher directed lectures, notes on the overhead, notes on the board, practice problems from the textbook, teacher developed worksheets and the student workbook” (p. 186). The second classroom teacher, the experimental classroom of 28 students, implemented a MI approach. Students participated in hands-on activities such as “building or constructing a model, inventing a board game to illustrate learned material, giving feedback on what they would like to learn, and performing a class presentation using at least one of the intelligences” (p. 186). Both classrooms had similar boy-to-girl ratio and similar ethnic backgrounds. Each classroom was given the same pre and post-test for the unit. After being taught with their method of instruction, direct instruction for the control classroom and MI for the experimental classroom, the results showed that the experimental classroom showed a significant difference in knowledge of 25.48 points

higher from the pre-test to the post-test while the control group only gained 17.25 points. Based on this study, Douglas et al. concluded that using MI assisted teachers to create “innovative lesson plans” (p. 187) that met the learning needs of their students and also led to improvements in “student’s academic, social, and emotional well-being” (p. 187).

Like the previous study, Özdemir et al. (2006) conducted a study in a fourth grade science classroom in an urban area using an experimental classroom which implemented the MI theory and a control classroom which did not. The classrooms each had 35 students and were taught using the same educational objectives. The purpose of the study was to determine if the use of MI would impact students’ ability to comprehend science objectives. In both classrooms, a unit test was given before the unit began, a second time after the unit ended seven weeks later, and a third time two months later to assess the retention of knowledge from the unit. Results showed that after using MI instruction in the experimental classroom, students performed an average of 12 points higher on the posttest than the control classroom. Students also scored an average of 14 points higher than the control classroom on the test two months later. Özdemir et al. concluded that the students with MI instruction had “better acquisition and retention of knowledge” (p. 77).

The Özdemir et al. (2006) study also looked at which of the intelligences students used most. The Teele Inventory of Multiple Intelligences (TIMI) was given before and after the unit to assess which intelligences were used. In the control classroom, students’ dominant intelligences were interpersonal and logical-mathematical. The results from the posttest indicated this changed very little over the course unit. In the MI experimental classroom, the dominant intelligences before the unit were also interpersonal and logical-mathematical. However, after the implementation of MI, the study found students used

other intelligences, including spatial and musical, as well as the intelligences common to the control group.

These studies document the many benefits of implementing MI into the classroom. With a focus on teaching to students' strengths using MI, more students' learning needs were accommodated, along with increased student engagement, and led to greater student achievement.

Views Regarding the Multiple Intelligences Theory

There are mixed reviews of the MI theory and applying it in a classroom setting. According to Waterhouse (2006a), sufficient empirical evidence is necessary before a theory should be implemented into a classroom. Therefore, Waterhouse concluded MI should not be implemented into the classroom because there is no such evidence to support the theory that several different intelligences exist.

Waterhouse (2006b) further stated that the studies Gardner used to base his theory on were good to support his "hypothesis" however, "the studies he read cannot validate the existence of MI" (p. 248). Waterhouse (2006a) also pointed out that there has not been a test created to measure any of the intelligences. Waterhouse argued general intelligence "g" is the correct theory of intelligence, as it has been effectively proven and tested, whereas MI has not. Waterhouse (2006b) also believed that any evidence derived from applying MI is not a legitimate way to validate the theory because "the act of applying MI theory *assumes* the validity of the intelligences" (p. 249).

Contrary to Waterhouse's views, Chen (2004) argued that the MI theory is valid because it was based on the empirical data of studies from a variety of disciplines. Gardner based his theory on case studies from "biology, neuropsychology, developmental

psychology, and cultural anthropology” (p. 18). Chen further explained that the MI theory has earned its credibility through the successful applications of MI in many educational settings and, therefore, does not need to have further empirical testing done to support the theory.

Eisner (2004) believed that since each person is born with their own unique strengths and abilities, it makes sense that students learn at different rates. Therefore, it also makes sense that teachers should teach using a differentiated technique, such as MI. However, there is a push among policy holders for standardized education, especially when dealing with assessment. Standardization makes comparability possible. When MI is used in the classroom, standardization is not as important and student individuality is praised. According to Eisner, using MI makes it difficult to know how students are doing because students are taught using different curriculum and assessed using methods other than a standardized test. As such, “the ability to make meaningful comparison across students, classrooms, schools, and school districts is compromised” (p. 33). Nonetheless, Eisner concluded that Gardner’s contributions to education are “worth celebrating” (p. 39) in that the MI theory offers teachers much to think about in how to teach students.

Gardner’s Response to Criticism

In response to Waterhouse (2006a), Gardner and Moran (2006) defended the MI theory as based “entirely from empirical findings...from a variety of disciplines” (p. 229). Gardner and Moran also stated that, as new empirical evidence is found, the theory is modified. For example, as new data was analyzed and synthesized, the theory was modified by the addition of the naturalist intelligence.

Gardner does believe it is possible to create an intelligence-fair assessment, which “assesses a particular intelligence in its most natural milieu” (Gardner and Moran, 2006, p. 230). Instead of developing intelligence-fair assessments, Gardner would “prefer to spend more resources helping learners understand and develop their individual intelligence profiles and less resources testing, ranking, and labeling them” (p. 230).

The MI theory provides a new way of thinking about intelligence and how to teach students in the classroom. Gardner’s theory now includes nine distinct areas of intelligence. Each person has and uses each of the intelligences, however, each person has their own level of strengths and weakness within the intelligences. Studies have proven by teaching to students’ strengths using MI, the theory can be a successful method of raising the achievement level of students.

Chapter III: Conclusions and Discussion

This chapter will explore the multiple intelligences (MI) theory as a method to differentiate instruction in the elementary classroom. A summary of the research obtained from the literature review will be given. Also, an analysis of the literature will be conducted to discuss the research questions of this paper: 1) Is the theory of multiple intelligences an effective method to differentiate styles of learning? 2) Will using multiple intelligences lead to greater student achievement? and 3) Will implementing multiple intelligences help close achievement gaps between academic and cultural groups in an elementary classroom? Conclusions will be stated and recommendations offered to assist teachers to make an informed decision whether or not to implement MI in their classroom as a method to differentiate instruction.

Summary of Literature

Students learn in different ways. “If we give all students the same material, each student will have a different experience according to his or her background, strengths, and challenges” (Moran et al., 2006, p. 25). In order to accommodate for those differences, a teacher can differentiate their instruction and provide a variety of learning activities for students. Tomlinson (2000) stated there are four areas in which teachers can differentiate instruction in the classroom: content, process, products, and learning environment. Research has shown by differentiating those areas, students will assume self-ownership of their learning and motivation will increase.

Gardner’s MI theory is based on the idea that the mind is made up of several distinct intelligences. Each intelligence is independent of the others, yet all can work together to perform a task (Gardner, 1983). In order for a teacher to implement the MI

theory, they must first know their students' intelligence strengths. Next, teachers can find ways to implement lessons and activities that will allow all students to use their intelligence strengths as well as to strengthen their weaker intelligences. Teachers who have implemented MI in their classroom have found when students are allowed a choice of activities to complete, students tend to pick those activities in which they will use their strongest intelligence area, therefore they are more motivated to complete their work and ultimately, increases their achievement and success (McCoog, 2007).

Critical Analysis

This paper will address three research questions. The following will analyze the literature behind the answers to those questions.

Research question 1.

Is the theory of multiple intelligences an effective method to differentiate styles of learning in the elementary classroom?

Gardner's MI theory is one method to effectively differentiate instruction in the elementary school classroom. It allows teachers to approach a lesson in a variety of ways while attending to the learning needs of each student. According to Tomlinson (2000), teachers can differentiate their instruction in four areas: content, process, products, and learning environment. The following will explore each of the four areas of differentiated instruction and how implementing MI can effectively assist teachers in adapting each of these four areas to accommodate the learning needs of every student.

Content is the curriculum material taught in the classroom. As Tomlinson (2001) stated, content can be modified according to the student characteristics of readiness, interest, and learning profile. When using MI, one possible method to modify content in

all three ways is by using cooperative learning groups. A teacher can assess students and form groups according to student ability or readiness levels. Then, the teacher can modify the material by difficulty level and incorporate different intelligences into each lesson to accommodate the learning needs of each group. Cooperative groups can also be formed according to student interest. Students are grouped according to a topic they would like to study. MI can be incorporated into each topic by targeting each intelligence throughout each lesson or each skill that is taught. Activity centers can be set up by the topics of student interest and each center can also incorporate each of the intelligences. Students can also be grouped by their preferred intelligence. The teacher can choose content that specifically targets each groups' intelligence preference. Activity centers can also be created that focus on each intelligence.

MI can also be used to differentiate process, which is how learners come to understand what is taught (Anderson, 2007). Using Gardner's suggestion of using the multiple entries approach to teach a concept or skill, teachers can select several intelligences to target. When exposed to content material in more than one way, students are given more exposure to the material, thus students have more opportunities from multiple approaches in which to learn the content (Gardner, 2006).

Differentiating the product can also be done using MI. The product is the work each student produces, which could be an assignment, project, or assessment. An example of differentiating product while using MI is by using choice boards. Activities on the choice board can correspond to each intelligence. Students can then choose the activity that correlates with their strong intelligence. This also actively engages students as they are involved through choosing the activity they will complete.

The learning environment can also be differentiated using MI. A student with a strong intrapersonal intelligence may prefer working alone on a task and want to work in a quiet place. Another student with a strong interpersonal intelligence would prefer working with others. An area of the classroom could be designated for these students to work on their task without disrupting others. A student with a strong naturalistic intelligence may prefer working outside when possible.

Research question 2.

Will using multiple intelligences in an elementary classroom lead to greater student achievement?

There is a significant amount of data that indicates using MI in the elementary classroom will lead to greater student achievement. Studies show that when teachers teach to students' strengths, the learning needs of students are more closely matched, students are more engaged in learning, and their achievement levels increase.

As Campbell and Campbell (1999) pointed out, MI offers teachers a new way to look at students. Often, teachers view their students' skills as lacking in one way or another. However, when using MI, teachers view their students as smart or skilled in their stronger intelligence areas and they use those areas of strength to teach students new content. Thinking of students in terms of their strengths also lends to having higher expectations for students which will challenge students to use their strengths for greater academic achievement.

Once students' strengths are identified, a teacher can find ways to better accommodate students' learning needs. As Gardner (2006) explained, using multiple entry points to introduce new material will allow teachers to specifically target several

intelligences. This will activate student interest and get them involved in the learning process and also give students more exposure to the lesson content, giving them more opportunities to connect with the material.

When students are engaged in learning, they not only pay attention more, but they also learn more (Lazer, 2004). Using MI allows teachers to incorporate many intelligences into one lesson to teach a new topic and create activities that will allow students to use their strengths to complete the activity. Grouping students with other students of similar or opposite strengths is also a way to engage students. Students can assist each other using their strengths to accomplish a task and further their learning.

Studies have shown when MI is implemented in the elementary classroom, students are academically more successful. The studies included in this review have not only shown an increase in test scores and grades (Campbell and Campbell, 1999; Douglas et al., 2008; Özdemir et al., 2006), but students used a wider range of intelligences (Özdemir et al., 2006), and also improved their “academic, social and emotional well-being” (Douglas et al., 2008, p. 187).

Research question 3.

Will implementing multiple intelligences help close achievement gaps between academic and cultural groups in an elementary classroom?

Resources reviewed for this study have not indicated whether or not the achievement gap between academic and cultural groups were affected after the implementation of MI in the school or classroom. However, Campbell and Campbell (1999) did report that the cultural gap at Russell Elementary between black and white students nearly vanished after the implementation of MI over a four year period.

In order to fully determine if the implementation of MI in the classroom will help close achievement gaps between academic and cultural groups, studies need to be conducted that specifically look at achievement gaps between academic and cultural groups and results need to be reported.

Limitations of the Study

This literature review does have limitations. Results and final conclusions of this study are limited based on the resources available. The data analyzed for this review was data from previous published sources; no new empirical data was collected for this review. Although this review attempted to find cases discussing positive and negative effects from using MI, there was a lack of cases in which a negative effect occurred after using MI in the classroom. Gardner (2006) himself stated “We would not expect individuals who did not like MI approaches to spend much time reporting their failures” (p. 83).

Because there is not one correct way to implement differentiated instruction or MI in the classroom, it is also difficult to find studies that have implemented exactly the same approach. Moreover, there are many different methods to assess student achievement, which makes it difficult to generalize and compare findings.

Implications for Practice

When a teacher is planning to implement MI into their classroom, there are many variables to consider. One variable to keep in mind is not to create eight or nine different lesson plans to accommodate each of the intelligences. Rather, the idea is to choose a few intelligences to target for each lesson (Moran et al., 2006). Using Gardner’s ideas of multiple entries, representations, and connections, a teacher can target a few intelligences

and then have students make representations and connections to other intelligences while bridging ideas and concepts in their learning.

As stated by Eisner (2004), another variable to keep in mind is that the implementation of MI in the classroom makes it harder to compare student achievement levels “across students, classrooms, schools, and school districts” (p. 33). This is due to the fact that there is not one consistent measuring tool for assessment. One teacher may use several different assessments within their own classroom, which may be different than the assessments used by another teacher teaching the same material for the same grade level. When comparing the two classrooms, if there are no common elements among the assessments, comparing each student’s achievement to those of other students is virtually impossible.

When assessing students, it is important to allow them to demonstrate their intelligence strengths. Using a standardized test is not an intelligence-fair way to measure students’ growth in knowledge. Typically, standardized tests are catered to the linguistic and logical-mathematical intelligences. Students who are not strong in these areas of intelligence are therefore at a disadvantage. Instead of using a standardized test, teachers in a MI classroom should consider using alternate forms of assessment such as portfolio reviews, projects, and presentations. Students should be allowed to choose an assessment to complete based on their intelligence strengths to demonstrate their knowledge of the content. Rubrics can be used to assess each student’s mastery of the content, and assign a grade.

Another option to consider is combining MI with other successful teaching methods. For example, using Bloom’s taxonomy of educational objectives would allow

teachers to further challenge students to think on higher levels using their intelligences. As mentioned in the literature review, Bloom's taxonomy is one method that can be used to differentiate instruction. By using MI and Bloom's taxonomy together, teachers can use the educational objectives to create activities that will engage students to use their intelligences at various levels of thought. Giving students experience thinking at higher levels is a skill they will use and apply throughout their lifetime.

As scientists learn more about the brain and how people learn, it makes sense for teachers to incorporate new information about the brain into their teaching. Brain-based teaching is teaching according to the latest research on how the brain works and takes into account authentic learning situations allowing students to relate new information to previously learned information (ASCD, 2011). Using a brain-based approach to teaching allows teachers to consider how students learn new information and commit their new knowledge to their working memory and then retain that knowledge to long-term memory. Using MI along with brain-based learning can be a powerful tool for students to use their intelligence strengths, connect old knowledge with new knowledge, and retain that knowledge for further learning.

The research studies examined in this literature review suggest there are more benefits than drawbacks for implementing MI as a way to differentiate instruction. As with any new method of teaching, if it is implemented and students are successful, it is recommended to continue using the method. If students are not more successful or if they continue to struggle, another method should be implemented.

Implications for Further Research

Gardner's MI theory would appeal to more educators and psychologists if there was actual original empirical evidence which proved every person had several distinct intelligences. The empirical evidence Gardner did use was based on previously completed case studies by other researchers and scientists. Gardner did not use any original studies to prove his work and there have not been any studies since his theory was introduced to prove the existence of several intelligences. Proving this would make Gardner's MI theory more credible and thus, compel more teachers to implement the theory into their own teaching practice.

Another area of research that would be beneficial is to determine a consistent way to measure student achievement when MI is implemented in the classroom. Gardner believed it is possible to have intelligence-fair assessments (Gardner and Moran, 2006); however, he is not interested in spending time creating them. Developing intelligence-fair assessments would eliminate the ongoing dilemma many MI teachers face of not being able to compare student achievement.

Teachers want their students to be successful, however, teachers thinking of implementing MI in their own classroom may face a number of challenges. One challenge is not knowing in advance what impact the MI theory will have on students. Another challenge is not knowing how best to apply the MI theory into their teaching practice. Therefore, it would be beneficial for written studies and articles to include the thoughts and reflections of the teachers who have implemented MI in their classroom. This could help the reader make a more informed decision on whether or not to

implement MI into their own classroom and provide helpful advice on how to go about getting started to ensure that all students are successful in their learning.

It would also be beneficial for school districts and schools of higher education, to offer teachers classes to learn more about MI. With the tools and knowledge to successfully implement MI, teachers can find success in applying this method to their classroom. Özdemir et al. (2006) suggested that teachers should “broaden their instructional and assessment repertoires to include strategies drawing on a wider variety of intelligence types” (p. 77). Workshops and classes will offer new ideas on how teachers can incorporate MI into their classroom.

While many studies reviewed included the results of student achievement after the implementation of differentiated instruction, more data needs to be collected comparing differentiated instruction classrooms to non-differentiated instruction classrooms. The same can be said for MI. More research and studies need to be reported to further the progression on successful student learning and achievement and specifically at the elementary education level. Comparing MI classroom data to non-MI classroom data will be a powerful example of how implementing MI can have a positive effect on student achievement.

As time progresses, it will be interesting to see further development and research on incorporating the MI theory into the elementary classroom. Over the past 28 years, the MI theory has made significant changes in how teachers view and assist students in learning. These changes have led to advances in student achievement as students use their intelligence strengths to learn. With even more research, exposure, and

implementation of the MI theory to differentiate instruction, we can look forward to even more success and greater achievement for students in the elementary classroom.

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Appendix
 Checklist For Intelligence Strengths
 Adapted from Armstrong (2009).

Name of Student: _____

Check items that apply:

Linguistic Intelligence

- _____ writes better than average for age
- _____ spins tall tales or tells jokes and stories
- _____ has a good memory for names, places, dates, or trivia
- _____ enjoys word games
- _____ enjoys reading books
- _____ spells words accurately
- _____ appreciates nonsense rhymes, puns, tongue twisters
- _____ enjoys listening to the spoken work (stories, commentary on the radio, talking books)
- _____ has good vocabulary for age
- _____ communicates to others in a highly verbal way

Other Linguistic Abilities:

Logical-Mathematical Intelligence

- _____ asks a lot of questions about how things work
- _____ enjoys working or playing with numbers
- _____ enjoys math class
- _____ finds math and computer games interesting (or if no exposure to computers, enjoys other math or science games)
- _____ enjoys working on logic puzzles or brainteasers
- _____ enjoys putting things in categories, hierarchies, or other logical patterns
- _____ likes to do experiments in science class or in free play
- _____ shows interest in science-related subjects
- _____ does well on Piagetian-type assessments of logical thinking

Other Logical-Mathematical Abilities:

Spatial Intelligence

- _____ reports clear visual images
- _____ reads, maps, charts, and diagrams more easily than text
- _____ daydreams a lot
- _____ enjoys art activities
- _____ good at drawing
- _____ likes to view movie, slides, or other visual presentations
- _____ enjoys doing puzzles, mazes, or similar visual activities
- _____ builds interesting three-dimensional constructions (e.g. LEGO buildings)
- _____ gets more out of pictures than words while reading
- _____ doodles on workbooks, worksheets, or other materials

Other Spatial Abilities:**Bodily-Kinesthetic Intelligence**

- _____ excels in one or more sports
- _____ moves, twitches, taps, or fidgets while seated for a long time in one spot
- _____ cleverly mimics other people's gestures or mannerisms
- _____ loves to take things apart and put them back together again
- _____ puts his/her hands all over something he/she's just seen
- _____ enjoys running, jumping, wrestling, or similar activities
- _____ shows skill in a craft (Woodworking, sewing, mechanics) or good fine-motor coordination in other ways
- _____ has a dramatic way of expressing himself/herself
- _____ reports different physical sensations while thinking or working
- _____ enjoys working with clay or other tactile experiences (e.g., finger-painting)

Other Bodily-Kinesthetic Intelligence Abilities:

Musical Intelligence

- _____ tells you when music sounds off-key or disturbing in some other way
- _____ remembers melodies of songs
- _____ has a good singing voice
- _____ plays a musical instrument or sings in a choir or other group
- _____ has a rhythmic way of speaking and/or moving
- _____ unconsciously hums to himself/herself
- _____ taps rhythmically on the table or desk as he/she works
- _____ sensitive to environmental noises (e.g. rain on the roof)
- _____ responds favorably when a piece of music is put on
- _____ sings songs that he/she has learned outside of the classroom

Other Musical Abilities:

Interpersonal Intelligence

- _____ enjoys socializing with peers
- _____ seems to be a natural leader
- _____ gives advice to friends who have problems
- _____ seems to be street-smart
- _____ belongs to clubs, committees, organizations, or informal peer groups
- _____ enjoys informally teaching other kids
- _____ has two or more close friends
- _____ has a good sense of empathy or concern for others
- _____ is sought out for company by others

Other Interpersonal Abilities:

Intrapersonal Intelligence

- _____ displays a sense of independence or a strong will
- _____ has a realistic sense of his/her abilities and weaknesses
- _____ does well when left alone to play or study
- _____ marches to the beat of a different drummer in his/her style of living and learning
- _____ has an interest or hobby that he/she doesn't talk much about
- _____ has a good sense of self-direction
- _____ prefers working alone to working with others
- _____ accurately expresses how he/she is feeling
- _____ is able to learn from his/her failures and successes in life
- _____ has good self-esteem

Other Intrapersonal Abilities:

Naturalistic Intelligences

- _____ talks a lot about favorite pets, or preferred spots in nature, during class sharing
- _____ likes field trips in nature, to the zoo, or to a natural history museum
- _____ shows sensitivity to natural formation (e.g. while walking outside with the class, will notice mountains, clouds; or if in an urban environment, may show this ability in sensitivity to popular culture “formations” such as sneakers, or automobile styles)
- _____ likes to water and tend to the plants in the classroom
- _____ likes to hand around the gerbil cage, the aquarium, or the terrarium in class
- _____ gets excited when studying about ecology, nature, plants, or animals
- _____ speaks out in class for the rights o animals, or the preservation of planet earth
- _____ enjoys doing nature projects, such as bird watching, butterfly or insect collections, tree study, or raising animals
- _____ brings to school bugs, flowers, leaves, or other natural things to share with classmates or teachers
- _____ does well in topics at school that involves living systems (e.g. biological topics in science, environmental issues in social studies)

Other Naturalist Abilities:

Armstrong, T. (2009). *Multiple intelligences in the classroom, 3rd edition*. Alexandria, VA: Association for Supervision and Curriculum Development.