MULTIPLE INTELLIGENCE THEORY

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Understanding human biology and how it affects the learning of a child is a constant, evolving science. As an educator, it is important to know not only the subject matter and teaching methods but also to know and understand each of my students. That understanding encompasses knowledge of how each of my students thinks and learns. As my teaching career progresses, I am becoming more aware of the differences in my students and the many different needs they have in the classroom. The importance of meeting my student’s needs has lead me to Gardner’s theory of Multiple Intelligences. The theory focuses on the nine intelligences that all humans have. Through understanding the brain and intelligence, educators like myself can offer students opportunities and experiences that match their individual dominant intelligences.

Review of the Literature

The Brain and Intelligence

Brain research.

The study of the brain and human intelligence has given educators much to consider in terms of how to improve classroom instruction. The study of intelligence can be traced back to Binet. Binet conducted research on intelligence during the late 19th and early 20th centuries in which he found that intelligence could be measured with a series of questions (Denig, 2004). The higher the score, it was assumed, the more intelligent the person. The strength of Binet’s test was it could test a large number of people at a low cost. However, the test’s major
weakness was that the questions were all directly related to mathematics and language skills (Denig).

Gardner, of Harvard University, claimed that intelligence assessed by traditional IQ tests, such as Binet’s test, cannot portray the complete intelligence itself. Gardner found that the IQ tests were only related to the ability of academic achievement (Wu, 2004). Gardner also claimed that IQ tests could not predict the achievement of a person’s future career or fulfillment of life (Wu, 2004).

Knowledge of how the human brain performs has helped educators take another look at traditional views on education. According to Bruer (1999), cognitive neuroscientists have studied how the brain works with our mental functions, enabling us to think and learn. Traditionally scientists focused their research on the left and right hemispheres of the brain. Bruer (1999) stated that the left hemisphere was known to be responsible for logic, speech, reading, writing, literal rendering, and sequencing. Individuals who were thought to be left-brain dominant were described at analytical, verbal, and good problem solvers. Bruer also continued to state that the right hemisphere was responsible for creativity and intuitiveness. Individuals who were right brain dominant were said to understand patterns and spatial reasoning.

Scientists also traditionally focused their research of the human brain on brain synapses. According to Bruer (1998), early in life brain synapses form and make connections. Bruer (1999) also stated that newborns had less synapse density than adults, but by age four they had 50% more. During puberty the
number decreased to adult levels. Today, cognitive neuroscientists imply however that intelligence is not directly related to synapse density. They believe that skills do continue to develop after synapses decrease to adult levels during puberty (Bruer, 1999). The cognitive neuroscientists then concluded that having more synapses does not make humans smarter. Scientists also traditionally believed that neurons in the brain did not regenerate like other tissue. For this reason, researchers traditionally believed that the brainpower one was born with was all the brainpower one would have.

**Brain development.**

According to Bruer (1999), time periods of development, environmental stimuli, and emotion all have an important role on human learning. Humans have a critical window of time in which certain abilities form, from birth to 10 years old. During this time a child can learn faster, easier, and with much meaning. Bruer continued to note that the brain depends on specific neurological stimulus through the environment for normal development to occur. The environment has great impact on the ultimate capacity of a brain to perform.

Emotion also plays a role in learning. The more powerful the memory of an experience, the more the brain chemicals signal important information with strong emotion (Wolfe & Brandt, 1998). A stimulating environment allows the human brain to draw conclusions about what it is learning. The brain is constantly seeking information and trying to connect what is new to what is known. According to Sylwester (1997) children can learn more when they are
emotionally engaged, because emotion drives attention, which drives memory and learning.

*What is intelligence.*

While working at the Boston Veterans Administration Medical Center, Gardner began to study the various effects of brain damage on patients. He found that patients would lose different abilities depending on what location of the brain was damaged (Hoerr, 2000). Gardner found that while some patients experienced loss of linguistic abilities they were able to maintain their musical abilities. In *Frames of Mind* (1983), Gardner says, “Other, even more specific linguistic disorders turn out to be linked to particular regions in the brain: these include selective difficulties in repetition, naming, reading, and writing.” Gardner believed that the different ability loss due to brain damage was the basis for specialized intelligences.

Gardner believed that intelligence is the biopsychological potential to solve problems or to create products that are valued within one or more cultural settings (Viens & Kallenbach, 2004). He also believed that there are eight signs that a particular intelligence exists.

1) The existence of potential isolation caused by brain damage. For example, a stroke may cause a person to lose particular linguistic abilities.

2) The existence of individuals, idiot savants, prodigies, and other exceptional individuals, who exhibit a high ability. For example, a
person may have an extraordinary ability in a single intelligence such as a musical ability.

3) It must have an identifiable core operation or set of operations. For example, linguistic intelligence consists of sensitivity to structure and syntax, vocabulary, rhythm and cadence and literary tools (Gardner, 1983).

4) It must also have a distinctive developmental history along with a definable set of expert “end-state” performances. For example, expert athletes and poets demonstrate performance characteristics.

5) The intelligence must have an evolutionary history or evolutionary plausibility. For example, animals exhibit forms of spatial intelligence.

6) It must have support from experimental psychological tasks. For example, tests can show how intelligences are discrete or interrelated.

7) The intelligence needs to have support from psychometric findings. For example, tests can reveal which intelligences reflect the same underlying factors.

8) It must have susceptibility to encoding in a symbol system (Hoerr, 2000). For example, codes such as language, maps, numbers and facial expressions capture components of the various intelligences.
Traditionally, the idea and definition of intelligence was based on knowledge and skills traditionally valued in school, Gardner’s view encompassed a far wider view. Traditional curriculum in public schools has heavily focused on two of the nine intelligences, linguistic and logical-mathematical (Gardner, 1983). Gardner states that curriculum developers have not been cognizant of the ways in which basic inclinations of human learning turn out to be ill-matched to the agenda of the modern secular school (Gardner). Curriculum needs to pay attention to the differing cognitive profiles and needs of all students (Schirduan & Case, 2004).

**Gardner’s view on intelligence.**

Dr. Howard Gardner believes that intelligence is pluralistic, encompassing at least nine intelligences which operate in combination of one another. Every individual has a unique profile of intelligences that is manifested as different areas of strength (Kallenbach & Viens, 2004). Gardner identifies nine areas of intelligence in his multiple intelligence (MI) theory: logical/mathematical, visual/spatial, bodily kinesthetic, musical/rhythmic, interpersonal, intrapersonal, verbal/linguistic, naturalistic, and existential.

In researching the MI theory, Haley (2004) reported that Gardner stated that every learner has the capacity to exhibit all of these intelligences, but some are more highly developed than others in certain individuals. Based on Gardner’s MI theory the challenge in education is for teachers to create learning environments that foster the development of all nine intelligences. Gardner’s
theory believes that balancing the instruction to address all of the intelligences benefits all learners. It exposes students to the appropriate means through which they can strengthen their underutilized intelligences (Haley).

In 1997, Oliver wrote that Gardner explained that people are multi-intelligent, rather than singularly intelligent. Gardner did not deny that genetics play a role in intelligence, but that critical influences come from culture and family. People come to know and use the skills, which are valued in their society. In *Frames of Mind* (1983), Gardner identifies many ideas that constitute intelligence. Gardner believes what is seen as a gift in one culture may be a burden in another. Therefore, Gardner does not want to include standardized testing in education but rather concrete applications of tasks that are culturally deemed and are a valued contribution (Gardner). Gardner included that intelligence involves genetic heritage and a psychological make-up ranging from the brain’s abilities to think and the individual’s personality disposition (Gardner).

Gardner also identified in *Frames of Mind* (1983) degrees, or levels, of intelligence. He identified the gifted individual who has advanced biopsychological potential within a domain of a culture. Gifted individuals progress at a rapid rate and success can be predicted within an area or domain. Also, Gardner identified a prodigy’s degree of intelligence. A prodigy has an excessive amount of giftedness within a single domain, for example Mozart’s amazing musical intelligence. Gardner also identified the expert who has mastered skills valued in a particular culture. The expert has obtained the highest
level of mastery for a specific domain. A creative person is capable of producing original, appropriate, and welcomed outcomes for a culture. Creative people solve problems in a consistent manner and their solutions are helpful to the culture and their domain. Finally, Gardner identified the genius who is a creative expert who assumes a universal significance. The genius makes discoveries, which impact the universe and are cross-cultural and cross generational. The work of a genius may be looked at as a reference point or example by which to base conclusions or further research.

*MI Theory*

Howard Gardner’s multiple intelligences theory brings a pragmatic approach to how we define intelligence and allows educators to use the student’s strengths to help them learn. According to Gardner, being smart is not determined how an individual scores on an IQ test but rather is determined by how well an individual learns in a variety of ways (Hoerr, 2000). MI is a student-centered model in which curriculum is often modified to fit the individual. MI allows individuals to utilize their personal intellectual strengths to demonstrate what they have learned, instead of relying solely on the traditional linguistic intelligence for all. MI theory identifies that each identified intelligence has a different developmental path and a different core processing operation (Gardner, 1983). This implies that students generally may engage higher order thinking and problem solving in an area of strength and lower order thinking in an area of weakness (Noble, 2004).
Multiple intelligence theory strengthens the learning process in several ways. It serves as motivation of reform in schools to increase evaluation of traditional school subjects and increase emphasis on the arts, nature, physical culture and other topics (Denig, 2004). MI allows students to grow and develop their potential. MI also challenges educators to find and use appropriate methods of teaching individuals a particular topic (Gardner, 1983).

*Linguistic intelligence.*

Verbal-Linguistic intelligence, or book smart, involves knowing which comes through the language. It involves understanding the order and meaning of words in both speech and writing. Linguistic intelligence includes understanding the cultural aspects of a language including idioms, play on words, and linguistically based humor (Lazear, 2003-2004). A person with high linguistic intelligence has vast skills for reading, writing and speaking. A linguistic person likes various kinds of literature, playing word games, making up poetry and stories, debating, formal speaking, and creative writing (Lazear).

*Logical-mathematical intelligence.*

Logical-Mathematical intelligence uses numbers, math, and logic to understand patterns that occur in our lives; thought patterns, number patterns, visual patterns, and color patterns (Lazear, 2003-2004). It encompasses patterns that exist anywhere from the real world to abstract. People with high logical-mathematical intelligence tend to think conceptually and abstractly and are often able to see patterns and relationships that others miss (Lazear). Logical-
mathematical people often like to conduct experiments, solve puzzles or problems, ask questions, and analyze. They like to work with numbers and mathematical formulas and operations. They are often systematic and organized people who like logical rationale.

*Visual-spatial intelligence.*

Visual-spatial intelligence represents the knowing that occurs through the shapes, images, patterns, designs, and textures we see with our external eyes. It also includes all of the images we are able to conjure inside our heads (Lazear, 2003-2004). A person with a strong visual-spatial intelligence will often tend to think in images and pictures. They are aware of objects, shapes, colors, textures, and patterns in the surrounding environment (Lazear). Visual-spatial people often like to draw, paint, make designs and patterns, work with clay and fabric. Also, they are often good at visualizing, pretending, imagining, and forming mental images.

*Musical intelligence.*

Musical intelligence is the knowing and understanding that that happens through sound and vibration. It includes the whole realm of sound, tones, beats, and vibration patterns as well as music (Lazear, 2003-2004). Individuals who have a strong musical intelligence are likely to have a love of music and rhythmic patterns. They are sensitive to sounds in the environment and may study and work better with music in the background. Also, they can often reproduce a melody or rhythmic pattern after hearing it only once. Musical people like to
create music, mimic sounds and speech patterns, and probably recognize different musical instruments in a composition.

*Bodily-kinesthetic intelligence.*

Bodily-Kinesthetic intelligence is the way of knowing through physical movement and through the knowing of our physical body, or learning by doing (Lazear, 2003-2004). Individuals with strength in bodily-kinesthetic intelligence tend to have a keen sense of body awareness. They like physical movement, dancing, making and inventing things with their hands and role-playing. They are likely to communicate well through their body language and other physical gestures and can often perform a task after seeing someone else do it first. Bodily-kinesthetic people like physical games, have difficulty sitting still for long periods of time, and are easily bored or distracted if not actively involved in what is going on around them.

*Interpersonal intelligence.*

Interpersonal intelligence is the person-to-person way of knowing when we work with and relate to other people. It often utilizes social skills in a team setting (Lazear, 2003-2004). A person with a strong interpersonal intelligence learns through personal interactions, has many friends, and is capable of showing empathy for others. They are sensitive to other people’s feelings and ideas, are skilled in conflict resolution, mediation, and compromise.

*Intrapersonal intelligence.*
Intrapersonal intelligence is an introspective intelligence in which the individual is self-reflective and searching for the meaning, purpose, and significance of others (Lazear, 2003-2004). It involves an awareness of emotions, self, values, beliefs, and spirituality. A person with a strong intrapersonal intelligence may like to work alone and shy away from others. They are self-reflective and self-aware which makes them in tune with their inner feelings, values, beliefs, and thinking process. Intrapersonal people are inwardly motivated, strong willed, self-confident, and have well thought out opinions.

*Naturalist intelligence.*

Naturalist intelligence involves the full range of knowing that occurs in human encounters with the natural world (Lazear, 2003-2004). This includes encounters such as recognition, appreciation, and understanding of the natural environment such as species discernment, communion with the natural world and the ability to recognize and classify various plants and animals (Lazear). Those people with a strong naturalist intelligence have profound love for the outdoors, animals, plants, and any natural object. They are intrigued and affected by the weather, changing leaves in the fall, the sound of the wind, the warm sun or lack thereof. They are likely to be nature collectors and have a fond respect for all living beings (Lazear).

*Existential intelligence.*

The most recent intelligence to be added to the MI theory is the existential intelligence. Existential intelligence is the knowledge of those who pose
questions about life, death, and ultimate realities (Carlson-Pickering, 1994). Those individuals who have a strong existential intelligence enjoy thinking and questioning. They often show a curiosity about what the Earth was like years ago, life after death, ghosts or spirits, or the existence of another dimension.

*Application of the Theory*

High-quality teachers provide opportunities for their students to use different intelligences to learn. They also offer students opportunities to share what they learn by altering their curriculum and instruction. Using the MI theory in the classroom allows students to gain confidence with the various intelligences to solve problems and display their learned knowledge. The application of the MI theory in the pre-K-12 classroom has also been found to improve behavior, aid in the inclusion of students with special needs, encourage parent participation, and create a learning environment supportive of critical thinking and problem-solving skills (Shore, 2004). Teachers establish a classroom climate with the MI theory when the students feel free to take risks and use different intelligences. Multiple intelligence classrooms foster the idea that there are many different ways to learn, the arts are important, and who you are is more important than what you know (Hoerr, 2004). MI is about different intelligences, different ways to solve problems. (Hoerr). Hoerr stated, in 2004, that good teachers work from their student’s needs and are always seeking ways to tailor the curriculum and help students learn.
The application of the MI theory in the classroom can be implemented in many ways. The implementation begins with instruction. The instruction in a MI classroom focuses on a teacher using the various intelligences in presenting information (Hoerr, 2004). At New City School, in the city of St. Louis, MI theory is the core of the school mission. At the school, teacher’s instruction utilizes the various intelligences and enables the students to use scholastic, as well as non-scholastic intelligences, to learn and show what they know. Giving the students choices enables them to use their dominant intelligences. The students at New City are, however, required to branch out and use intelligences in which they are less comfortable. At New City School, centers enable teachers to divide the curriculum into smaller units, allowing students to work at their own level and pace. Curriculum-based learning centers use a specific intelligence to address a skill or understanding (Hoerr). The centers address a particular aspect of the curriculum by offering the students reinforcement, extension, and assessment. In the MI classroom projects, exhibitions, and presentations allow students with high intelligence to use performance to learn or show what they know. At New City School, where MI is used throughout the curriculum and instruction of every classroom, students on average score above grade level on standardized tests (Hoerr). With MI playing a role in student’s lives, graduates of New City School have been found to take leadership in their communities, seek complex problems, seek extra credit options, and see themselves as learners in and beyond the classroom (Hoerr).
In research conducted by Hickey on the application of MI theory (2004), five teachers were followed as they implemented the theory into their classroom instruction. One teacher who was working with her students on the Middle Ages used the theory by providing her students with project choices. She found that her students came alive with enthusiasm and motivation. MI theory allowed the students to find their own area(s) of learning strength, show excitement and pride as they work (Hickey, 2004). Another teacher in Hickey’s research found that the students were not only more actively engaged in the lessons, but they also remembered the information for a longer period of time. With the MI theory, students thought to be low achievers in traditional academic subjects were able to integrate their dominant intelligence to learn or show what they learned successfully (Hickey).

In a pilot study, conducted by Haley in 2001, the MI theory was tested to identify, document, and promote effective real-world applications of the theory in foreign and second language classrooms. The study showed that students demonstrated keen interest in MI concepts and showed more positive responses to the increased variety of instructional strategies used in their foreign language/ESL classrooms (Haley, 2004). Results of the study showed that students in the experimental group, receiving MI-based instruction, outperformed those in the control group, receiving more traditional instructional models. Students in the experimental group were found to be more enthusiastic about learning and behavior problems were held to a minimum (Haley).
MI theory has also been applied to improve the self-concept and positive learning outcomes of students with attention deficit hyperactivity disorder (ADHD) (Case & Schirduan, 2004). Although students with ADHD are believed to be only a small population of students within the classroom, curriculum leaders and teachers need to be mindful of the learning needs all students including those with ADHD. Students with ADHD often experience academic and social difficulties within the regular classroom (Case & Schirduan). They are often at increased risk for school failure, poor social relationships, auto accidents, delinquency, substance abuse and poor vocational outcome (Case & Schirduan).

In a research study, studying MI theory and students with ADHD, over half of the students with ADHD attending a school whose instructional model was the MI theory, possessed the naturalist (30.8%) and spatial intelligence (21.8%) (Case & Schirduan). The same students reported having an average self-concept and average achievement, disconfirming reports that students with ADHD have a low self-concept and often fall below grade level (Case & Schirduan). In this study, students with ADHD demonstrated a pattern of intelligence which is notably different from ADHD students in a traditional school setting where linguistic and logical-mathematical intelligences dominate (Case & Schirduan). “Provided with a curriculum that taught to their strengths, these students expressed a higher level of competence and self-assuredness across a wide range of cognitive and interpersonal situations that has been found among students with ADHD in more traditional curricular settings” (Case & Schirduan, 2004, p. 91).
Another successful application of the MI theory can be found with teachers as adult learners. A clear purpose or real-world application for learning is a necessity for adult learners (Shore, 2004). MI theory focuses on achievement of skills directly applicable to life and the reaching of life goals (Shore). In teacher preparation courses, it is important to demonstrate a clear and applicable purpose for each lesson or learning activity and incorporate elements of self-reflection. Research on adult learning shows self-guided projects, which allows for self-direction and personal responsibility, are important for learning to take place (Shore). The application of MI in the classroom gives students a major responsibility in the identification of their learning goals and provides greater choice in terms of demonstrating the knowledge learned. Also, adult learners need self-evaluation. Adult learners need to be given the opportunity to self-evaluate and evaluate their peers frequently. Adult learners, in teacher preparation courses, have reported that the application of MI allows them to grow as educators because MI enables them to receive, and give, feedback and self-reflect (Shore). Applying the MI theory to adult learning could lead to more effective teacher preparation.

Critique of the Theory

There are various criticisms of, and problems around, Gardner’s multiple intelligence concept. Although many teachers agree with and like the idea of multiple intelligence theory, there are few examples of individual teacher’s applying the theory, regularly, within the context of an instructional unit (Hickey,
According to Smith (2002), there are several areas of concern with Gardner’s theory. The first being the criteria that Gardner employs for each intelligence. He also questions the conceptualization of the intelligences and why Gardner identified some intelligences such as musical and bodily-kinesthetic as an intelligence and not a talent. Also, the multiple intelligence theory is criticized because there is no properly worked-through set of tests to identify and measure the different intelligences (Smith, 2002).

Classroom teachers who have implemented the MI theory into their classroom instruction also have critiqued the theory.

MI has had the greatest influence on educator’s beliefs and talk about differences in children’s intelligence, moderate to high influence on the formal curriculum and instructional materials, and least influence on mainstream teaching and assessment practices (Cuban, 2004, p. 141). Teachers have found that “given opportunities to try alternative activities, students chose to complete the more familiar verbal/linguistic or visual/artistic assignments” (Hickey, 2004, p.82). Students frequently showed that they feared change (Hickey). They also have found that students did not always choose to use an individual dominant intelligence. Often this was thought to be caused by peer pressure or not wanting to try something different. Students often feel the pressure to conform, rather than using their dominant intelligences.

Summary
Gardner’s theory of multiple intelligences has validated what teachers already know, which is people learn in a variety of ways. Gardner’s theory has validated their experiences. It offers teachers a way of organizing and categorizing the many instructional strategies and methods for teaching all students (Kornhaber, 2004). Knowing about multiple intelligences helps teachers and students understand how they learn best and see that each person has a unique set of strengths and abilities. The theory has had a major impact on educator’s beliefs but they have found that few educators have successfully implemented it into a curriculum unit on a regular basis. There is no right way to apply the theory, however with new understandings and applications, multiple intelligences will continue to offer students with opportunities and experiences which match their individual dominant intelligences and therefore help humans to be more successful beings.
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Biographical Sketch

Melissa Zapf was born in Columbus, Ohio. She graduated from Pickerington High School and then moved on to study education at Ashland University. She received a Bachelor of Science in Education in 1998 from Ashland University. Melissa began her teaching career as a fifth grade classroom teacher in Lancaster, Ohio at St. Mary’s School. She is currently a fifth grade math and science classroom teacher at Harmon Middle School in Pickerington, Ohio. She has also returned to Ashland University where she is currently working on finishing her Master’s degree in classroom instruction.