Gardner's Multiple Intelligences [MI] as Foundation for Psychoneuroeducation

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Abstract

Special education is good education. Gardner presented a theory about different learning styles, which he called *Multiple Intelligences.* Viewing Multiple Intelligences from a PsychoNeuroEducational Perspective provides insight about effective ways to differentiate instruction to meet the unique needs and tendencies of the learner. This approach is an ultimate form of UDL, or Universal Design for Learning.

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Gardner's theory of multiple intelligences is an introduction to a potential future study of Psychoneuroeducation. The brain's complex approach to information processing allows for continuous and never ending parallel processing of simultaneous processes (Fogarty & Stoehr, 2008). The various domains of Gardner's multiple intelligences take place in discrete locations within the brain, representing distinct capacities of the human organism. The advent of the functional MRI [fMRI] has led to the identification of these cerebral processing centers for various specific mental activities. Recent fMRI research is pointing to the fact that learning and cognition are inextricably bound to bodily experiences of the individual (Domahs, Moeller, Huber, Willmes, & Kuerk, 2010). Domahs et al. (2010) conducted a study of cognitive tendencies and hand-based counting habits; the results of the study revealed that habits of counting on their fingers caused permanent changes in the way individuals' brains engaged in mathematical cognitive functioning. This research is some of the first solid proof that at least two of Gardner's multiple intelligences are inextricably bound in the way they impact the brain's neuroplasticity.

The implications of multiple intelligences in the field of teaching are extraordinary. Teachers are bound to practice differentiation of instruction to address the learning needs and tendencies of each student. The potential for exquisite differentiation rests upon a multiple intelligences approach to classroom instruction (Fogarty & Stoehr, 2008). Since different types of brain activity take place in discrete locations of the brain, teaching to an individual type of intelligence is a neurological corollary to exercising an isolated muscle in the body. For example, squats exercise the quadriceps, while curls exercise the biceps. In the same way, traditional classroom instruction teaches to only one or two types of intelligence; students are required to learn by listening to the teacher's voice and by reading the teacher's notes or a textbook. These isolated activities related to single forms of intelligence are likely to stimulate isolated regions in the brain. Just as the body creates larger muscles to handle increased strength and ability of individual muscles, so does the brain create new neural connections to support increased mental activity in the various centers of the brain. Focusing on a single area of development, however, leads to limited performance of the individual.

Recently, a more balanced fitness trend has been a phenomenon called cross-training. The concept is that the individual is able to exercise multiple muscles and body regions through complex and integrated activities, leading to greater athletic potential. Similarly, instruction in multiple intelligences stimulates multiple processing centers of the brain, further creating interconnections between various centers. Preliminary research indicates the likelihood that the greater the extent of the web of neural activity in the brain, the deeper and more profound the learning of the individual. The type of classroom teaching that promotes this type of brain development and learning is the integrated lesson that draws from strategies to address the various multiple intelligence learning styles (Fogarty & Stoehr, 2008).

The implications for the classroom are far reaching. Traditional linear curriculum and instruction presents information in a fragmented fashion (Fogarty & Stoehr, 2008). Students learn about DNA, geometric calculations, and ancient Greece in fragmented lessons that represent isolated cells of learning and instruction. The implication for students is that the brain will create a simple web of neural connections to support this linear type of instruction. The integrated approach to instruction, however, might present the same curricular content within an integrated lesson that allows students to explore Archimedes, the Greek scientist, who discovered the mathematical relationship between surface area and volume of a sphere, which led to the identification of the mathematical formulae for spherical surface area and volume, as well as the Archimedes screw, which in turn mirrors the geometry of DNA strands. This type of integrated learning is likely to cause the brain to simultaneously utilize multiple regions of the brain for learning and cognition, and to create a complex web of interconnections to support that learning. The more intricate the web of neural connections that are associated with the learning of a lesson, the greater is the likelihood that the learner will be able to recall that information at a later date, and that deeper and connected understanding of the information will be attained.

Teaching complex integrated lessons requires much more of teachers than lecturing, giving notes, and assigning textbook chapters. Instead, teachers must pull from their souls, integrating the many forms of students' intelligences, causing them to acquire profound and complex knowledge, capacity, and insight. Students must be challenged through all the intelligences, to allow optimal learning and growth.

The difference between traditional teaching and teaching to the multiple intelligences is like the difference between riding a tricycle and a bicycle; the differences are profound, but once the skill as been mastered, it can never be lost. Spangler (2010) prepared a 10th grade lesson plan on propaganda techniques, and then embedded instructional components to address the various intelligences. Following is a chart from Spangler's lesson plan indicating the strategies for achieving the eight areas of individual multiple intelligence-oriented instruction:

- **Bodily-Kinesthetic**: acting out television commercials
- **Visual-Spatial**: make collages

- **Verbal-Linguistic**: writing jingles and advertisements
- **Social-Interpersonal**: surveying students and relatives
- **Musical-Rhythmic**: composing jingles
- **Logical-Mathematical**: explaining why the product is a good choice
- **Environmental-Naturalist**: explaining what is good for conservation of resources
- **Introspective-Intrapersonal**: testimonials: All will use this product because it helps me in this way (Spangler, 2010, para. 7)

Spangler (2010) presented a multiple intelligence-oriented lesson plan that promotes the pluripotentiality of the developmental and learning capacities of students. The lesson plan can be found at this url: http://www.igs.net/~cmorris/gr_10_histroy_lesson_plan.html. While Spangler's example of a lesson is relatively simplistic, the lesson represents the first step in mastering integrated and multiple intelligence-oriented instruction. Teachers must first master such simple approaches in order to support future complexity, similar to a child graduating from a tricycle to a bicycle with training wheels.

What takes place in most classrooms today, however, is abysmal in comparison to this rich and exciting approach to learning – that literally lights up the brain like a Christmas tree every time a student approaches a new integrated lesson plan. Teachers have an obligation to adopt integrated curriculum and utilize strategies to promote learning for all types of Gardner's multiple intelligences. Students with exceptionalities are likely to receive exceptional benefit from instruction for multiple intelligences, as the increased neural networking associated with learning may increase the student's capacities for learning, recall, and cognition.

Ancillary benefit from teaching to multiple intelligences may involve avoidance of a phenomenon of the brain called downshifting (Beamish, 1995; Sandoz , 2007). When an individual is stressed, the brain may redirect a portion of blood flow away from the cerebrum, where higher order thinking takes place, to the limbic system, where emotional memories are processed (Beamish, 1995; Sandoz, 2007). The impacting on learning and cognition are significant; students may experience a reduction in learning to as little as 10% as compared to pre-downshifting learning (Beamish, 1995).

In addition, students who are in distress or even bored may experience a dramatic loss in learning potential. According to Beamish (1995), students who are happy and in an attentive and engaged mental state tend to produce special neurotransmitters that promote a super-learning state. When these special learning neurotransmitters are present, students may learn up to 400% as compared to learning without these special neurotransmitters (Beamish, 1995). The mathematical implications of these facts are extraordinary; students may learn ten times more by avoiding downshifting, and may learn four times as much again by producing special learning-supportive neurotransmitters, for a 40 to 1 ration of learning. Teaching to multiple intelligences tends to engage and enthrall students, creating the likelihood of creating special learning-supportive neurotransmitters, while avoiding downshifting (Beamish, 1995).

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