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Multiple Intelligences: Theory and Application

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Abstract

Howard Gardner's theory of multiple intelligences has challenged the historical view of intelligence as a fixed quantity since he first published *Frames of Mind* in 1983. Gardner prefers to describe cognitive ability as a set of eight *intelligences*. Once merely a theoretical perspective, Gardner's view of intelligence can be seen in a new light with the advances in brain research in the field of neuroscience. The connection between how the mind is organized and the education of students suggests a need for additional classroom teaching and testing applications. A focus on traditional linguistic and logical teaching and testing strategies must broaden to include strategies that meet the needs of diverse learners. Yet, can neuroscience and its implications for education co-exist with the No-Child-Left-Behind classroom?

In 1904 psychologist Alfred Binet was appointed to a commission by the French government and was charged with finding a systematic means of identifying mentally retarded children in order to provide them an appropriate education. As a result Binet developed the Binet-Simon Scale to measure a child's mental abilities as compared with his normal functioning peers. He acknowledged its limitations stating that "intellectual development progressed at variable rates… was malleable (within limits) rather than fixed" (Siegler, 1992, p. 183).

After studying abroad, H.H. Goddard, a devotee of the eugenics movement, introduced the Binet-Simon scale in the United States at the turn of the century. Goddard and Lewis Terman, a psychologist of intelligence, adapted the scale for the purpose of reducing the numbers of intellectually weak members in American society, an act far afield from the theory's original intent. It no longer carried the weight of Binet's caveat about mental testing and its correlation with intelligence.

Binet had "stressed the remarkable diversity of intelligence and the subsequent need to study it using qualitative as opposed to quantitative measures" (Plucker, 2007). In contrast, early twentieth-century psychologists "sought to demonstrate that a group of scores on tests reflected a single underlying factor of 'general intelligence'" (Gardner, 1993, p. xii).

This early view of a pen-and-paper measure of intelligence, or intelligence quotient testing, became the tradition in the United States for nearly a century. In the 1960s psychologists L.L. Thurstone and J.P. Guilford, however, disputed this view arguing that intelligence consisted of numerous components or factors (Gardner, 1993). In the latter part of the twentieth century, Thurstone and Guilford's assertion gained momentum when Howard Gardner published his 1983 book *Frames of Mind* in which he asserted his multiple intelligences theory. In his book, Gardner, the John H. and Elisabeth A. Hobbs Professor of Cognition and Education at the Harvard Graduate School of Education, adjunct

professor of psychology at Harvard, and adjunct professor of neurology at the Boston University School, challenged the notion that intelligence is a "single, general capacity for conceptualization and problem solving" (Gardner, 1993, p. xii). His theory suggests that it is "more fruitful to describe an individual's cognitive ability in terms of several relatively independent but interacting cognitive capacities" (Moran, Kornhaber, & Gardner, 2006).

Gardner's multiple intelligences theory does not parse human intelligence to a single number determined by an intelligence quotient test. "If we are to encompass adequately the realm of human cognition, it is necessary to include a far wider and more universal set of competences than we have ordinarily considered" (Gardner, 1983, p. x). Rather than defining intelligence as a single construct, Gardner conceives of these competences as *intelligences*. According to Gardner's definition, honed over years of study, an intelligence "describes the biopsychological potential to process information in certain ways, in order to solve problems or fashion products that are valued in a culture or community" (Christodoulou, 2009, Some Misconceptions section, para. 2). Gardner originally defined seven intelligences that all normal functioning human beings possess, but they differ in their development and how they combine (Shirley, 1996).

Because Gardner's view contradicts the traditional static notion of a singular intelligence, neither psychologists nor psychometricians have championed his theory in large numbers. That "intelligence can be learned and improved throughout life" (Gardner, 1983, p. 41) is contrary to the prevailing psychological paradigm. According to Gardner, "Why should psychologists – and particularly psychometricians, who make their living giving IQ tests – want to change their idea of how the mind is organized and how its capacities should be assessed?" (Edwards, 2009, Question Number Three section, para. 1).

In considering intelligence, Gardner's theory does not focus on how smart someone is but, rather, *how* he is smart (Christodolou, 2009). The original seven intelligences are a "set of abilities, talents, or mental skills" (Gardner, 2006, p. 6) to which the human mind can be parsed. Gardner (1998) describes these seven intelligences. Linguistic intelligence involves words and language and one's ability to fancy, master, and delve into them. Logical-mathematical intelligence is characterized by one's ability to confront and assess objects and abstractions and understand their relationships and underlying principles. Musical intelligence involves both composing and performing selections, in addition to listening and discerning. Spatial intelligence embodies perceiving, modifying, transforming, and re-creating visual experiences with or without physical stimuli. Bodily-kinesthetic intelligence involves controlled and orchestrated body motions and the ability to handle objects with skill. Intrapersonal and interpersonal intelligences allow one to recognize feelings, moods, various mental states of both one's self and others and use this knowledge as a behavior guide.

Gardner's argument (2006) for an eighth intelligence emerged in an attempt to characterize Charles Darwin according to the seven intelligences. When none of the existing intelligences could be ascribed to the renowned biologist, Gardner concluded that his theory should be altered to include an eighth, or naturalist, intelligence. The naturalist intelligence is characterized by an inherit ability to "recognize instances as members of a species" (Gardner, 2006, p. 19). Gardner is considering the possibility

of including a ninth intelligence, or existential intelligence, which describes one's ability to conceptualize or take on the deeper, large questions about human existence (Christodoulou, 2009). Although Gardner acknowledges existential thinkers, such as philosophers and religious leaders, he is hesitant to including the existential intelligence because there is a "dearth, so far, of evidence that parts of the brain are concerned with these deep issues of existence" (Gardner, 2006, p. 21). That Gardner is resistant to committing to the development of a ninth intelligence is key to understanding his approach to cognitive ability. In an interview with Gardner, he said, "The 'action' [of multiple intelligences] is no longer in psychology – it is in neuroscience and in genetics" (Edwards, 2009, Question Number Three section, para. 2). Advances in brain research afford an opportunity to view the inner workings of the brain while people are actually thinking. Gardner's theory is an "effort to embed the measurement of individual difference in intelligence within a theory based on neuropsychology" (Posner, 2004, p. 1).

According to Rubenstein (2009), recent brain research confirms that the parts of the brain involved with reading, math, music, and personal relationships are larger or smaller and more or less active in every child. The circuitries surrounding these abilities are independent suggesting that a child who must put forth great effort in one area may have an advantage neurologically in another. "Imaging studies have shown differences in brain architecture and activity that correspond to a host of capabilities: reading, math, music, athletics, and interpersonal relations. If we see all these abilities as aspects of intelligence, then intelligence has no single address in the brain" (Rubenstein, 2009, para. 5). Rubenstein (2009) believes that the new

research does not prove or disprove Gardner's theory, but it shows that "a kaleidoscope of ability is mapped in our brains, and that, with the help of brain-imaging technology, these are variations of 'intelligence' we can actually see" (para. 3).

According to Posner (2004), activation tasks used in neuroimaging studies can be seen engaging all of Gardner's original seven intelligences. Although the neural networks sometimes overlap and communicate with each other, they also seem to have distinct anatomies (Posner, 2004). "These results provide support for Gardner's distinction among domains in terms of the separable anatomical networks they activate" (Posner, 2004, p.2). However, while adding digits written numerically and spelled out, the language network is also activated, thus "draw[ing] upon multiple neural systems and thus related to multiple forms of intelligence" (Posner, 2004, p.3).

When writing *Frames of Mind*, Gardner did not expect a reaction from educators; his fellow psychologists were his intended audience (Lockwood, 1993). Although psychologists have not widely accepted his theory, many educators have embraced his ideas. Educators look at the whole child over a period of time, while psychologists are afforded only a snap-shot view, a single moment in time, from a paper-and-pencil test score. Gardner professes, "I wasn't expecting the amount of attention it received from educators. But often when people are very interested in what you do, you become interested in what they do. So shortly after *Frames of Mind* was published, I began doing more work in the schools than anything I had done before" (Lockwood, 1993, p.4). He maintains, however, that "the theory says nothing about educational practice per se; it is a theory of how the human mind is organized"

(Edwards, 2009, Question Number One section).

The linking of how the mind is organized with the education of students has great implications for the school setting. According to Shearer (2004),

> If our schools are to be led wisely into the new millennium they need to be organized according to the most up-to-date and valid 'facts' about human intelligence. If academia is to educate future teachers and school administrators effectively then theories assumed to be true for 100 years need to be reconsidered in light of disconfirming perspectives and evidence. (p. 2)

When *Frames of Mind* was published "it emerged and provided answers for veteran teachers. All teachers had students who didn't fit the mold; they knew their students were bright, but these students didn't excel on their tests" (Mbuva, 2003, p. 4). Traditional teaching and testing in schools has not been broad in scope. Multiple intelligences provides a way for teachers to "expand the repertoire of techniques, tools, and strategies beyond the typical linguistic and logical ones predominately used in the U.S. classroom" (Stanford, 2003, p. 82).

In meeting the needs of a diverse population of learners, teachers must vary both the opportunities for how students learn and how they are assessed to show what they have learned (Pociask and Settles, 2007). Multiple intelligences theory is not just an alternative way of thinking about students' cognitive abilities independent of classroom application. It is "a mentality with which to approach learning and teaching" (Christodoulou, 2009, A New Lens section, para. 2). Gardner's theory provides a chance for teachers to help all learners achieve, not just those students who excel in linguistic and logical-mathematical intelligences, those intelligences most associated with academic accomplishment (Shearer, 2004).

Teachers seeking to utilize multiple intelligences theory in their classrooms must determine their students' strengths, weaknesses, and their combination of intelligences in order to provide meaningful learning experiences for them. "The challenge is to figure out what these combinations are and how to best engage them" (Christodoulou, 2009, Some Misconceptions section, para. 7). There is no one, right tool for assessing a student's intelligences (Christodoulou, 2009). A linear approach, however, via a linguistic-based paper-and-pencil test, is not the appropriate route (Moran et al., 2006). Rather, a holistic approach to assessment provides the best scenario. Students need to be immersed in rich activities, and through observations, teachers can see "which intelligences come to the fore and which are relegated to the background" (Moran et al, 2006, Provide Rich Experiences section, para. 4).

The determination of the myriad of intelligences students possess is only one application of Gardner's theory in schools. Hopefully, "the unique intellectual profiles of all students will be recognized, supported, and developed" (Shearer, 2004, An MI Symposium section, para. 10). Because the model is flexible, how it is applied in schools will vary depending on the beliefs and goals of educators (Lockwood, 1993). Gardner is "adamant that the theory is not a collection of rigid, prescribed scripts that schools must enact in the same way in all settings and contexts; nor is it a simplistic cookbook for school improvement" (Lockwood, 1993, p.3). Its use in schools should reflect a teaching and learning goal that strives to "not to leave any student out of the learning loop like the traditional schooling has done" (Mbuva, 2003, p. 11).

Gardner admits that "the idea of a number of relatively independent cognitive abilities is not in itself daunting. What is daunting is the notion that one should therefore change one's pedagogy, curriculum, or means of assessment" (Edwards, 2009, Question Number One section). While he eschews any attempt to tell educators specifically how to use multiple intelligences theory in schools, there are broad recommendations in the areas of pedagogy, curriculum, and assessment (Christodolou, 2009). First, teachers should avoid uniform teaching and assessing by focusing on individualizing instruction and curricula. Next, more students can be reached by teaching concepts in a variety of ways. Finally, frame assessment so that students can demonstrate their knowledge using their stronger intelligences.

One of the best and the earliest documented examples of theory meeting practical application is the efforts of the group dubbed the *Indianapolis Eight* (Kunkel, 2009). This group of teachers had students who were capable but did not perform well on tests. In the wake of the report of the National Commission on Excellence in Education (1983), "A Nation at Risk", these eight teachers were frustrated with the emphasis on testing and decided that enough was enough. After reading *Frames of Mind,* they worked with Gardner based on their desire to apply multiple intelligences theory to an educational framework.

The *Indianapolis Eight* helped establish Key Learning Community (formerly Key School), the first school in the world based on Gardner's theory now in its twenty-second year of existence (Kunkel, 2009). Key Learning Community is a magnet/option program in the Indianapolis Public Schools serving students in kindergarten through twelfth grade. The school boasts a multiple intelligences curriculum supported by a focus on theme-based and project-focused learning and a dedication to equal time in physical education, Spanish, social studies, music, art, math, English, and science. The theme-based focus "provides an important organizing center from which learning grows" (Kunkel, 2009, A Popular Option section, para. 4). "Student project development cultivates personal leadership capacity through real-world experience by taking an idea, developing it through research and collaboration" (Kunkel, 2009, A Popular Option section, para. 5).

Meaningful learning experiences involve student interaction, and multiple intelligences theory encourages collaboration naturally (Moran et al., 2006). Using rich ideas and materials, students can work together using their particular combinations of strengths and weaknesses. Students with compatible profiles seek to solidify and build on strengths while students with complementary profiles strive to compensate for one another (Moran et al., 2006). "In ideal multiple intelligences instruction, rich experiences and collaboration provide a context for students to become aware of their own intelligence profiles, to develop self-regulations, and to participate more actively in their own learning" (Moran et al., 2006, Building Active Learners section, para. 2).

If one's goal or beliefs about how multiple intelligences should be applied in the classroom includes the individualization of education, Gardner recognizes that this can appear daunting given the large numbers of students teachers are charged with educating. With the multitude of different intelligences teachers must address, the idea of a learner-centered curriculum seems improbable if not impossible. "Education policymakers…mistakenly believe that teachers must group students for instruction

according to eight or nine different intelligence scores. Or they grapple with the unwieldy notion of requiring teachers to prepare eight or nine separate entry points for every lesson" (Moran et al., 2006, p. 22).

Gardner stresses that a learner-centered curriculum is more readily attained because the availability of software in an era of digital media has made an individualized approach more practical (Edwards, 2009). "With the increasing integration of computer technology in education settings comes a practical way to present or teach the same topics via the activation of several intelligences" (Christodoulou, 2009, Future Use section, para. 2). Whatever the avenue, teachers must present material in numerous ways and provide a curriculum full of choices in order to maintain a learner-centered teaching approach in keeping with multiple intelligences theory. For struggling students, "The learning specialist must mobilize the students' spared intelligences so that they can learn, and can demonstrate that learning in ways that make sense to them" (Gardner, 1999, p. 152).

Because students must at some point demonstrate their knowledge in a formal manner, consideration must be given to the implications of Gardner's theory on assessment. Assessment opportunities should engage students' areas of strength. While traditional measures address linguistic and logical-mathematical skills, an over-reliance upon assessments that cater to these skills favors students strong in these areas (Christodoulou, 2009). "Testing approaches that fairly capture the diverse types of intelligence with a focus on individuals rather than the average student can account for the diverse intellectual capabilities of children in a classroom" (Christodoulou, 2009, A New Lens section, para. 6).

Standardized testing required by *No Child Left Behind* may derail educators' efforts to align curricula, pedagogy, and

assessment with Gardner's theory. Schools like Key Learning Community that emphasize a multiple intelligences approach may "soon become a legacy of historic importance in the field of innovative public education, rather than a legacy that serves hundreds of students daily in ways that prepare students to make important contributions in our world" (Kunkel, 2009, Proving Worth section, para. 4). Ultimately, society must decide what it values in the educational setting. The deluge of information in the new millennium and the need for the United States to compete globally call for Americans to ponder what type of education will produce creative thinkers and resourceful problems solver. If standardized tests only measure a limited number of the intelligences, perhaps our students are much more capable than the statistics reveal. Without a systematic change, however, how will we ever know?

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