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A Comparative Study: Ericsson's Theory of Expertise and  
Gardner's Theory of Multiple Intelligences

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## **A Comparative Study: Ericsson's Theory of Expertise and Gardner's Theory of Multiple Intelligences**

The educational climate of this nation has become increasingly charged during the past decade. A focus on meeting the needs of all learners has amplified the pressure for all educators, as their classrooms daily experience growing diversity while simultaneously being inundated with intense pressures in terms of mandated testing and accountability. The Individuals with Disabilities Educational Act (IDEA) of 1997 aimed to heighten academic expectations and accountability for the nation's 5.4 million children with disabilities (OSEP, n.d.). IDEA promised to bridge the gap of achievement between learners with disabilities and their peers through reception of the same content knowledge and through participation in state assessments to the greatest extent possible (OSEP, n.d.; Dieker, 2001). The pressure for educators further increased with the introduction of the No Child Left Behind Act by President George W. Bush in 2001. This act promised reform for the national system of education, this time with four basic principles: "stronger accountability for results, increased flexibility and local control, expanded options for parents, and an emphasis on teaching methods that have been proven to work" (OSEP, 2002).

Each of these transformations in this nation's educational system presents a need for adaptations of teaching and assessment methodologies. This need for adaptations can be seen as a catalyst for adoption of new educational concepts. Indeed, one need only browse through recent educational journals to be enlightened by the latest theories promising "true reform" and "miraculous results" in the search for meeting the needs of all students and ensuring that all achieve success.

While these theories often present fine points which are highly worthy of discussion, it has been my unfortunate experience that many in the educational world blindly accept these newly presented theories without truly understanding everything involved, delving into the underlying messages, or analyzing the research methodologies. The short-lived run with whole-language methodology in the teaching of reading is a prime example of a theory that promised a revolution for acquisition of reading skills yet often did not produce the desired results for a number of reasons.

In light of this need to be critical of the many promise-laden theories that daily bombard educators, it is the purpose of this paper to analyze two theories that have emerged in relatively recent years. One of these theories has been accepted almost universally in the educational world as bearing great promise, while the other has received less time in the glorifying spotlight. These theories will be analyzed in a comparative manner in terms of general theory components, assumptions about intelligence, views regarding cognitive structures, critiques issued concerning the theories, and their relative implications for the educational community. With this progression set forth, it naturally follows to introduce the first of the two theories: Howard Gardner's Theory of Multiple Intelligences.

### **Gardner's Theory of Multiple Intelligences: Theory Components**

According to Gardner (1995), much of what educators do is based on student weaknesses. Educators know a lot about what their students do not know. They test and observe a child to discover what his or her weaknesses and strengths are, and they subsequently attempt to fill in the gaps which exist due to weaknesses in order to help a student compensate for those weaknesses.

*A new perspective*

Part of this focus on deficiencies, according to Gardner (1995), is due to a generally accepted belief of what defines intelligence. Much of the testing for IQ and teaching methodology in this nation's educational world is designed based on concepts stemming from Spearman's theory of "g", or a "general overriding factor of intelligence" (Gardner, 1983, p. 16). According to Daniel Fasko Jr. (2001), Spearman's theory looks primarily at the logical mathematical and linguistic aspects of a student's abilities. Gardner (1995) proposes that, in reality, only a minority of our nation's youth possess true potential in these limited domains.

"The heart of Multiple Intelligences lies in taking human differences seriously" (Gardner, 1995, p. 7). Gardner's theory of Multiple Intelligences rejects the narrow scope of intelligence proposed by Spearman's "g" factor. Instead, Gardner (1995) states "An 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. 2).

While this definition of intelligence may not, in itself, present immediate and blatant differences from Spearman's view of intelligence, Gardner's theory becomes distinct when the "multiple" aspect is added. The "multiple" refers to Gardner's proposal that there does not exist one general "g" intelligence as in the theory of Spearman; in fact, Gardner proposes the existence of eight separate intelligences and does not deny the possibility of many more that have yet to be identified. The basis for the existence of multiple forms of intelligence is derived from many sources which will be addressed to a certain extent in this paper's discussion of Gardner's view of cognition. In referring to the

existence of multiple intelligences, Gardner states "Individuals have a number of domains of potential intellectual competencies which they are in the position to develop if they are normal and if the appropriate stimulating factors are available" ( 1983, p. 284).

### *Defining the intelligences*

One might immediately ask how Gardner decided upon these particular eight intelligences when, given the opportunity to create random intelligences, it would seem possible to produce endless possibilities. Gardner (1983) set forth a criterion list which provides the eight signs denoting the existence of an intelligence. He asserts that the necessary components are: "potential isolation of the intelligence by brain damage, existence of idiot savants, prodigies, and other exceptional individuals in the particular domain, an identifiable core operation or set of operations involved in the intelligence, a distinctive developmental history, along with a definable set of expert "end-state" performances, an evolutionary history and evolutionary plausibility, support from experimental psychological tasks, support from psychometric findings, and susceptibility to encoding in a symbol system" (p. 63-66).

It is based upon this list of restrictions, according to Gardner, that he has arrived upon eight intelligences, though he is considering additional possibilities. In order to address each of the eight intelligences in a brief manner, the relative definitions of Multiple Intelligences of Gibson and Govendo (1999), Fasko (2001), and O'Brien (2000) have been synthesized to produce the following diagram:

<b>Intelligence</b>	<b>Identifying characteristics</b>	<b>Preferred activities</b>	<b>Possible preferred careers</b>
<b>Bodily-Kinesthetic</b>	use whole body or parts to solve a problem; exhibit much physical movement and knowledge of body and how it functions	anything involving bodily movement, i.e. dance, sports, mime, use of manipulatives	athlete, dancer, actor
<b>Interpersonal</b>	comfortable in person-to-person relationships; ability to communicate with others and be empathetic	interactive tasks, group work, cooperative learning	teacher, salesperson, politician
<b>Intrapersonal</b>	introspective; metacognitively aware	reflection tasks and anything requiring analysis of self	writer
<b>Logical-Mathematical</b>	high level of inductive and deductive reasoning; able to manipulate numbers, quantities and operations	problem solving, experiments, logic games and puzzles	mathematician, scientist
<b>Musical</b>	ability to recognize, remember, and sometimes produce tonal patterns, rhythm, and beat	application of rhythm and melody, tapping, rapping, singing	musician
<b>Naturalistic</b>	ability to discriminate among living things; aware of existing relationships; sensitivity to natural world	interaction with natural and environmental materials and concepts; organizational tasks	farmer, botanist, chef
<b>Verbal-Linguistic</b>	capacity to use language to express oneself and understand others	reading, writing, speaking, language games and puzzles	poet, writer, lawyer
<b>Visual-Spatial</b>	ability to visualize objects and create mental images	spatial media tasks, creating puzzles, maps, designs, models, and graphics	painter, architect, topologist

\*Information compiled from Gibson and Govendo (1999), Fasko (2001), and O'Brien (2000).

### *Multiple Intelligences inclusion in education*

Gardner professes that the inclusion of Multiple Intelligences-centered curriculum, materials, and activities in the educational world will provide three major outcomes. More students will be reached as instructional strategies encompass something other than solely mathematical-logical and linguistic domains. Students will secure a sense of what it means to be an expert as they witness an instructor professing a new meaning of intelligence. Finally, learners will explore understanding and difficulties in ways that are comfortable for them (Gardner, 1995).

Although the approach for actual inclusion and implementation of Multiple Intelligences in the educational world is not addressed in a prescriptive manner by Gardner, his is very suggestive of what an ideal educational situation would be according to Multiple Intelligences Theory. This view, its basis and its propositions will be addressed at great length in the educational implications section of this paper.

### **Ericsson's Theory of Expertise: Theory Components**

Ericsson's theory places its focus upon the experts of our world. "Expert performance reflects the mastery of the available knowledge or current performance standards and relates to skills that master teachers and coaches know how to train" (Ericsson, Krampe, & Tesch-Romer, 1993, p. 392). The finding that expert performers in very different domains reflect the acquisition of similar mediating mechanisms for their performance presumes that there are specific components necessary for the acquisition of any form of expert performance or knowledge (Ericsson, 1996). Ericsson delved into this possibility and discovered what he has determined to be the general characteristics contributing to expert performance.

*Phases of expertise*

Before discussing the characteristics specific to experts, it might be of use to address the phases of expertise as proposed by Ericsson. According to Ericsson, it takes roughly ten years to attain expert performance, and there are a variety of stages involved in the development of an elite performer. All those who become experts traverse these stages, and the progression occurs in a determined fashion. Phase one includes a certain but not specific period of playful interaction within a certain domain. The second phase is initiated when an individual reveals "talent" or "promise" in a that domain. Following this diagnosis of "promise", the individual begins participating in structured lessons and minimal amounts of practice as encouraged by parents. Parents help the child to acquire regular practice habits and repeatedly stress the value of practice as evidenced by improvement in performance. Throughout the second phase, parents help their child to find coaches best fit to progressing performance levels and practice continually increases. Phase three begins with a major commitment being made to reaching the top levels possible in the domain. The best coaches possible are sought as are optimal training conditions. This phase ends when an individual is able to make a living based on his or her performances. Whether or not an individual enters the fourth and final stage determines whether he or she reaches a state of eminent performance, which entails going beyond available knowledge in the domain to produce a unique contribution to the domain. Major innovations required for this fourth phase go beyond skills and knowledge that even the master teachers know and could possibly offer to the student (Ericsson & Charness, 1994; Ericsson, 1996; Ericsson, Krampe & Tesch-Romer, 1993).

*Characteristics contributing to expert performance*

The majority of the components for attaining expert performance are mentioned briefly in the above description. To more fully understand Ericsson's theory, however, it will be necessary to address each element at greater length. The component primarily focused upon by Ericsson is that of deliberate practice, though additional factors, all intrinsically related to deliberate practice, are also involved. These factors include parental influence, motivation, coach/teacher role, feedback, age of initiation and performance.

*Deliberate practice*

Deliberate practice is a very different construct from the practice undertaken by those not seeking to be experts in an area. For practice to be coined "deliberate" the activity must be effortful, intense, and involve full concentration. The task which is to be completed must take into account preexisting knowledge and abilities, thus offering an appropriate difficulty level for the aspiring student. Immediate and informative feedback must be made available via the practice activity, and this feedback must be received and attended to in order to make accurate adjustments and correct errors, leading to the improvement of performance on the repeated tasks (Ericsson, 1996; Ericsson, Krampe, & Tesch-Romer, 1993).

According to Ericsson (1996), the quantity of quality deliberate practice accumulated by a person in a specific domain is directly related to the attained level of performance. What was addressed in the previous paragraph was the quality of deliberate practice. The quantity of deliberate practice, however, is equally important to attaining expert levels of performance. When an individual begins to pursue an activity within a

domain, deliberate practice begins in small quantities. This is due to the fact that sustaining productive deliberate practice for extended amounts of time is not possible, due to cognitive and physical constraints, and can actually prove to be harmful. With continued practice, performance improves, and cognitive structures adjust due to acquired knowledge and skills while certain physical structure may adjust in order to adapt to the increased levels of performance. As this continues, quantities of deliberate practice slowly increase, but even those at the peak of deliberate practice can rarely sustain this draining activity for more than four hours a day without suffering negative effects (Ericsson, 1996, p. 24). This rigid and determined progression of deliberate practice provides little flexibility. In fact, the necessity for all aspiring experts to follow this similar progression is emphasized when Ericsson Krampe, & Tesch-Romer (1993) state that not even individuals perceived to be the "most talented" can attain expertise in less than ten years.

#### *Age of initiation*

This importance of the accumulated quantity of deliberate practice may illuminate the importance for early onset of practice. As previously mentioned, Ericsson, Krampe, & Tesch-Romer (1993) state that one's accumulated deliberate practice is directly related to level of performance, and the amount of deliberate practice in which one can partake is limited due to cognitive and physical constraints. Considering this, one can imply that, if practice begins late, it is impossible to reach the level of performance demonstrated by those of the same age group. This, of course, is more pronounced due to the fact that many of the utilized evaluations of performance are based on the age of the individual. Thus, those that start practice earlier will have acquired more deliberate practice and, as a

result, will present more advanced levels of performance. Those that start later will not be able to achieve the same level of performance as their peers since they are bound by the demands of deliberate practice and cannot accumulate quantities equal to that of their earlier starting peers.

### *Parental influence*

While the role of deliberate practice is the most influential factor involved in achieving expert performance, parental influence was also mentioned by Ericsson, Krampe, & Tesch-Romer (1993). Parents exert influence in the child's initial attempts with the domain by encouraging regular, scheduled and productive practice. They emphasize the value of practice as evidenced by improved performance, and they seek coaches appropriate for the child's developmental level.

### *Coach influence*

More important than the role of the parent, however, is the role of the coach or teacher. A coach enables training (deliberate practice) to be more effective by setting up rigorous practice schedules appropriate for the learner's development. Coaches provide explicit instruction about the best and current methodologies available, monitor and compare current performance to that of other individuals of the same age in the domain, diagnose errors, offer informative feedback and are able to offer correctional training when necessary (Ericsson, 1996; Ericsson, & Charness, 1994; Ericsson, Krampe, & Tesch-Romer, 1993).

Interestingly, there are some findings that suggest that the value of coaches or teachers may be higher during the early stages of deliberate practice. Initially, learning involves a significant amount of external support, as an individual is unsure of how to

schedule and maintain deliberate practice, attend to feedback, and make corrections based on feedback. If however, one is better able to manage these aspects of deliberate practice due to acquired abilities, the need for a coach or teacher decreases. In fact, Ericsson (1996) found that elite musicians have fewer coaches than less elite musicians. This could be due to the elite musicians' possession of sufficiently advanced cognitive abilities which allowed them to attend fully to deliberate practice and related factors while maintaining sufficient quantities of the practice.

### *Feedback*

The role of feedback has been repeatedly stressed throughout this discussion of deliberate practice. It is, hopefully, now obvious that lack of feedback would negate the effectiveness of deliberate practice. For deliberate practice to be of use, individuals must improve their performance. Without feedback, there would be no information offering guidance for an individual hoping to improve performance. Feedback, undoubtedly, drives an individual's practice. It informs one of whether or not a goal is being achieved, and if this goal is not achieved, the feedback offers insight as to what errors need to be corrected in order to strive to reach that goal.

### *Performance*

Ericsson does not stress the importance of performance for reaching expert levels, as he would like the focus of the attainment of expertise to lie on deliberate practice. It seems obvious, however, that performance does play a role in the attainment of expertise. According to Ericsson (1996) expert performers are constantly attempting to improve their level of performance in relation to the best performance for their current level. As those on the road to expertise are also constantly striving to improve their performance, it

would be helpful for them to occasionally participate in competitive performance in order to assess their progression and placement in relation to their peers. Thus, while errors or shortcomings cannot be attended to during a performance, the performance may pave the road for goals of future deliberate practice. It seems as if performance, then, could play an integral role in the progression of deliberate practice and the attainment of expert performance. It could be argued, though, that an objective coach capable of offering such assessment and information offered through performance might enable one to forgo performance.

### *Motivation*

A final factor to be addressed is that of the motivation necessary for one to engage in and maintain deliberate practice. Because of the demands of deliberate practice, one must possess a significant quantity of motivation in order to maintain these activities, especially when one considers that experts accumulate approximately ten years of deliberate practice in a domain. Ericsson, Krampe, and Tesch-Romer (1993) claim that this extreme level of motivation is a rarity when they state "this commitment to deliberate practice distinguishes the expert performer from the vast majority of children and adults who seem to have remarkable difficulty meeting the much lower demands on practice in schools, adult education, and in physical exercise programs" (p. 400). This argument may be seen as one for a heritable motivational factor, and Ericsson & Charness (1994) do not deny this possibility, while not necessarily taking a position regarding whether motivation is innate or acquired. Either could easily be argued, though that point will be better served during the next section of this paper, in which each theory will be assessed regarding its position on innate talent versus acquired abilities.

### **Abilities and Intelligence: Innate or acquired?**

There are four different approaches for viewing the attainment of outstanding performance (Ericsson & Smith, 1991). Two of these approaches reflect a perspective of intelligence being innate. The *general abilities* approach professes that general yet innate abilities such as intelligence and personality allow one to achieve at different rates or levels than others in most, if not all, areas. This approach is consistent with Spearman's view of a general intelligence and its role in education and learning. The *specific abilities* view places its focus on innate abilities as well, but this point of view does not generalize abilities to all areas. Instead, the specific abilities view states that a person possesses innate abilities in a certain domain or domains. For example, Mozart, according to this perspective, possessed innate abilities in the domain of music, however he may not have possessed equal nor basic innate capabilities in other realms.

The remaining two approaches reject the role of innate abilities in the acquisition of outstanding performance. These approaches, instead, state that outstanding performance is acquired. What differs between the two approaches is the manner in which they view the performance to be acquired. The *general learning and experience* view states that the increased learning and experience that one has with regard to an activity will increase his or her general knowledge and cognitive structures and ultimately may lead to outstanding performance. The *domain-specific training and practice* perspective requires that a person concentrate on a particular area, and domain or task specific knowledge acquired may ultimately lead to outstanding performance.

The approaches assumed by Gardner and Ericsson attest to their views of the role of intelligence. Repeatedly, Gardner emphasizes a view of achievement which reflects

the specific abilities approach as addressed above. Ericsson, however, would vehemently oppose this view and consistently professes the importance of a domain-specific training and practice perspective. What follows is a delving into the reasoning of these theorists for adopting such approaches.

### **Gardner's stance on intelligence and abilities**

Gardner questions the importance of traditional views of intelligence, specifically those focused on Spearman's "g" factor. Although he does not question the existence of "g", he posits the probability that "it has little explanatory importance outside the narrow environment of schooling" (Gardner, 1993, p. 39). Gardner claims that the uniform treatment of students induced by a narrow view of intelligence is highly harmful. With a broader view of intelligence, or Multiple Intelligences in the words of Gardner, students would receive a more equitable and just education. While this sounds ideal and without fault, after delving into Gardner's underlying views of intelligence, one begins to question whether Gardner's theory is not equally as restrictive as traditional views.

#### *Individual "potential"*

Gardner (1995) defines intelligence as a "biological and psychological potential which 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. 3). His definition of intelligence does not initially appear to reflect a belief in innate abilities or talents, because he disguises this view in using the word "potential". In further defining what a biopsychological potential is, Gardner (1993) states that it involves a "product of genetic heritage and psychological properties, ranging from cognitive powers to personality disposition" (p. 51). Thus, Gardner presents himself as a follower of the innate abilities

point of view, though he coins his innate intelligence a "potential" to give the impression that this form of innate capabilities involves more flexibility. Upon further research, however, Gardner seems to present the opposite case. In fact, his theory seems to be based upon a view that intelligence is not only heritable, but the "potential" is also incapable of change.

When presenting a case for the heritability of his "potential", Gardner (1993) cites the proven genetic proclivity for diseases and extrapolates this heritability to intelligence, and he then emphasizes assumptions of many scientists that intelligence is heritable by as high as 80 percent based on IQ tests (p. 36, 36). Gardner (1993) also looks to embryonic development and points to the fixed and well canalized avenues which this development follows (p. 55). He seems to claim that it logically follows that intelligence should obviously follow a similar path pre-determined by the human genome.

While Gardner does not deny the possible influences of environment on the development of intelligence, his theory does not paint a promising picture for those hoping to surpass the boundaries of their "potential". Gardner (1983) offers little hope for those born with "less potential" when he states, "I confess difficulty to being persuaded that there are not inborn differences, sometimes ones of great moment, and that at least some of them can never be erased" (316). He emphasizes the bleak possibility that potentials can be changed when he states "it is of paramount importance to assess the particular combination of skills that may earmark an individual for a certain vocational or avocational niche" (Gardner, 1993, p. 27). According to this point of view, not only are an individuals' proclivities resistant to change, but these inflexible proclivities should be used to determine the route of one's life. This suggestion seems

entirely restrictive, yet Gardner maintains his profession to the educational world that this theory will provide more equitable and beneficial education for all involved.

### **Ericsson's stance on intelligence and abilities**

Ericsson provides a refreshing and promising view in comparison to Gardner's limited and controlling view of "potentials". While Gardner focuses on the determining qualities of innate abilities, Ericsson rejects the role of innate capacities in the acquisition of expert performance. Instead, Ericsson's domain specific training and practice viewpoint offers the possibility that all individuals, regardless of perceived talent, have the potential to achieve expert performance if they are sufficiently motivated to endure a significant amount of time engaged in intense deliberate practice.

Due to a general societal acceptance in the existence of innate abilities, Ericsson's theory of the acquisition of expertise via deliberate practice necessitates that he explain why intelligence should not be considered innate. His approach to this dilemma involves demonstrating the continual increases in expert performance levels, cognitive as well as anatomical adaptations to practice levels, and the existence of perceived innate talent.

#### *Increases in expert performance levels*

In all major domains there has been a steady accumulation of knowledge about the domain and about skills and techniques that assist in the acquisition of superior performance. This vast supply of enhanced knowledge and techniques has enabled experts to perform at increasingly greater levels as time passes. Ericsson and Charness (1994) present the fact that, during the last centuries, the levels of performance have increased, in some domains dramatically so. Ericsson (1996) further emphasizes this point by citing that the time of the winning marathon runner in the first Olympic games

can now be reached by many amateur runners (p. 12). He uses this continual improvement of expert performance to demonstrate that the true indicator for expert performance is the quality and quantity of deliberate practice, as many "normal" individuals today are able to achieve what only experts could achieve in the past. If achievement of expert performance were solely attributed to innate abilities, such acquisition by "normal" individuals should not be possible.

#### *Adaptations to practice levels*

Most supporters of the view of innate abilities as the primary determinant of ultimate performance perceive intelligence to be a fixed construct which proves resistant to change. It is because of this, they state, that only certain individuals who are fortunate to be blessed with innate talents will be able to reach the highest levels of performance. Those who are "less gifted" or even "at-risk" are restricted and will never be able to achieve levels similar to those of their more fortunate peers. Because Ericsson places deliberate practice at the center of reaching those supreme levels of performance, he is responsible for convincing others that abilities are not fixed and determined from birth. He does so by demonstrating that cognitive and physical characteristics can be influenced and, with progressive acquisition of continually improving knowledge and skills, all can attain expertise.

When future experts train intensely, the activities in which they participate are designed to maximize the improvement of performance. As they concentrate fully on the task at hand, focusing on goals and performance, they receive and attend to feedback and make accurate adjustments. Ericsson (1996) states that evidence suggests that

participation in such deliberate practice yields acquired memory skills and expanded working memory capacity. While this concept will be addressed in further detail in the following section on cognition, it is now suffice to state that, according to the expertise view, knowledge and cognitive abilities are progressively acquired during deliberate practice. They are not a result of pre-determined innate talents.

This view of acquired knowledge and cognitive skills does not account for the physical differences in many elite and novice athletes. Many supporters of innate abilities use this fact as proof for the view that expert performance cannot truly be a simple result of deliberate practice, as physical traits are undoubtedly inherited. While Ericsson does not disagree that physical traits are inherited, he does contend that physical attributes, except for height, can be significantly altered through appropriate deliberate practice. Ericsson & Charness (1994) present that lung and heart size, the flexibility of joints, and the strength of bones increase as the result of training. As a result, even those who are not perceived as having the physical attributes for expertise in an area may be hopeful of developing the necessary equipment through intense training (deliberate practice).

#### *Perceived talent*

Ericsson's final argument against the role of innate talent is a simple one. He contends that often the ability determined to be a natural and innate talent is simply a perceived talent. A perceived domain specific talent, as presented by Ericsson, Krampe, & Tesch-Romer (1993), is simply the result of an early short period of exposure to the domain. Increased practice at a young age, due to this early exposure, leads to the perception that one possesses innate abilities, while the "talent" is really due to

accumulated practice. This perceived talent, in turn, leads to early initiation of deliberate practice, supervised by a qualified coach. An increased opportunity to accumulate greater quantities of deliberate practice as compared to those of the same age group leads to continual comparatively better performance than peers, perpetuating the perception that the child was initially talented and continues to be so. Thus, once again, Ericsson is able to argue the plausibility that the truly influential factor in attaining expert performance is not innate ability, but the accumulation of deliberate practice.

### *Motivation*

Before moving on to cognitive differences between the two theories, it would be wise to address the possibility that motivation might be an innate characteristic. As motivation is an integral component to the maintenance of deliberate practice, an individual lacking proper motivation would have no hope of attaining expert levels of performance if motivation were shown to be innate. Ericsson & Charness (1995) express their consideration of motivation as possibly being innate with the words "motivational factors are more likely to be the locus of heritable influences than is innate talent." Ericsson and Smith (1991), however, issue the hope that motivation is acquired with a plausible argument for this viewpoint. "Motivation and striving for excellence are often focused on a small number of domains or even a single domain, suggesting that aspects of motivation may well be acquired" (p. 6). The conceptualization of motivation as acquired is definitely a more liberating one for those who do not appear to be innately motivated, as they would be excluded from expert performance if motivation were to be innate. It seems, however, that presently this debate remains highly unresolved, even in

the mind of Ericsson.

*A guarantee for all?*

Finally, it remains to be said that the rejection of innate limits on acquired performance will not necessarily guarantee that everyone can easily attain high levels of skills. One must consider all of the necessary components of acquiring expertise in order to understand the complexity of the process. In order to truly pursue expert performance, one must undergo early involvement in the domain, participate in deliberate practice, receive continual support, and maintain a high level of motivation for a minimum of ten years. In addition, all of this must continue while avoiding disease and serious injury, which could sabotage the dreams of anyone hopeful of becoming an expert.

**The role of cognition in performance**

Ericsson & Charness (1994) present two dominant approaches to cognition in the studying of expert performance. While Gardner does not necessarily direct his theory at the acquisition of expert performance, one of the two approaches very closely reflects his views of cognition, thus the two will be briefly addressed below.

The *human information processing approach* to cognition focuses on the acquisition of expert performance as a result of accumulated knowledge and skills through experience. The basic information processing system serves the individual throughout skill acquisition, and outstanding performance results from periodic increases in knowledge and skill due to the effects of experience. This approach assumes that a long period of experience is necessary for the attainment of expert performance which has discouraged empirical studies. Finally, individual differences with controlled experience have been assumed to reflect original abilities.

In the other approach to cognition, individual differences allow people to succeed in certain domains. This approach is based on the identification of neural mechanisms and localization of brain activity. Exceptional performance, according to this approach, is a result of a close match between an individual's intellectual propensities and the domain. According to this point of view, the early identification of proclivities is necessary, so that proper nurturing can be provided for those with high levels of intelligence in a particular domain. Due to this reliance on early intellectual promise, this approach has limited implications for those who are perceived as lacking such talent.

While these approaches are not assumed exactly by the two theoretical views addressed in this paper, they do reflect many similarities and offer a general and simplified approach to what will be explored to a greater extent in what follows. Ultimately, as one might guess, Ericsson's opinion of cognition reflects the first approach, while Gardner's theory is based on a view of cognition which closely relates to the second approach.

### **Cognition: Gardner's perspective**

Gardner's conceptualization of cognitive structures and processes is based on views on which he also bases his theory for the existence of multiple intelligences. Stated quite generally, Gardner believes in the modularity of the mind. He cites Fodor (1983) who professed that "mental phenomena have been discovered that some researchers construe as evidence for mental modules - fast operating, reflex-like, information-processing devices that seem impervious to the influence of other modules" (Gardner, 1993, p. 169). Gardner (1983) provides what he considers to be valid biological evidence at microscopic and molar levels which could attest to the existence of

these mental modules.

*Evidence of mental modules*

At the microscopic level, Gardner (1983) declares the existence of physical structures in the cerebral cortex organized in 3 millimeter x 1 millimeter modules (p. 49). Gardner continues by speculating about larger molar areas of the cerebral cortex and asserts that there is a high specificity of this tissue. Certain areas of the cerebral cortex correspond to specific functions, posits Gardner. To support this statement, Gardner (1983) begins by citing widely accepted medical findings, such as the dominance of the hemispheres of the brain and its correlation to whether one is right or left handed. He continues by delving into less accepted terrain and proposes that the "specificity of cognitive function can be tied much more precisely to finer regions (modules) of the human cerebral cortex" (p. 51). Gardner (1983) cites as support for this statement the specific disorders that can occur as a result of damage to particular regions of the brain, such as pronounced and specific linguistic disorders (p. 50).

*Unique processing devices*

It is partially the existence of these cerebral modules and their correlation with specific functions which leads Gardner to hypothesize the existence of multiple and independent intelligences. While this may seem to be a fairly simple concept, in terms of cognition Gardner's theory become highly complicated. Due to the specificity and independence of these modules, Gardner speculates that there exists not one central processing mechanism for cognition, but several unique processing devices. "At the core of each intelligence there exists a computational capacity, or information-processing device, which is unique to that particular intelligence, and upon which are based the more

complex realizations and embodiments of that intelligence - phonological and grammatical processing in the case of linguistic intelligence, tonal and rhythmic processing in the case of music" (Gardner, 1983, p. 278). He continues by stating that each intellectual mechanism functions independently of others and does not need to borrow from other modules. When a particular form of information is presented, various mechanisms in the nervous system respond and carry out operations specific to their domain. It is Gardner's (1983) view that "from the repeated use of, elaboration of, and interaction among these various computational devices eventually flow forms of knowledge that we would readily term 'intelligent'" (p. 278).

By proposing such a perspective of cognition, Gardner is able to support his theory that individuals might show "promise" in certain intelligences while proving "weak" in other domains. If each intelligence possesses a unique and independent processing system, and the potential of these systems is fixed, then the implications for the cognitive development of an individual is limited to those domains in which there is "potential", and those "weak" domains will need to be circumvented. This view poses restrictive implications for the educational experience of an individual, which will be discussed in future sections.

### **Cognition: Ericsson's perspective**

The information processing system concept also plays a dominant role in Ericsson's view of cognition. He proposes the traditional view of a general processing system consisting of working memory and long-term memory which governs all cognitive processes. With extended training, according to Ericsson and Charness (1994), the cognitive processes within this general processing system are altered to allow for

increased performance. There are, however, a few twists to Ericsson's view of the information processing system. Ericsson's first proposal is that the processing capabilities of experts are obviously more advanced, though these abilities are achieved with incredible domain specificity. In addition, Ericsson proposes a skilled-memory theory which addresses capability of long-term memory to serve a working memory purpose, which he terms long-term-working memory.

#### *Domain specificity*

According to Ericsson and Charness (1994), the central mechanisms controlling superior performance are acquired, however this performance does not transfer to other domains. It is a commonly accepted fact that experts are able to accomplish feats unachievable for non-experts. What is not necessarily accepted with such ease, however, that this ability to accomplish amazing feats is generally restricted to the domain of expertise. Ericsson claims that this is the case in terms of physical as well as cognitive accomplishments. Elite athletes, for example, presented high reactions when tested within their domain but much lower reactions (those elicited by normal achievers) when tested outside of their domain (p. 730). Another example might be the specificity of cognitive capacity for chess masters. These experts can play chess games without being able to see or manipulate a chess board. They are able to maintain the positions of all relevant pieces in an accessible form in their memory (Ericsson & Kintsch, 1995, p. 211). At the same time, if they are asked to recall the random placement of figures on a chess board, their accuracy is equal to that of a non-expert (Ericsson & Charness, 1994, p. 730). Both of these examples support the view that experts' cognitive capacities are domain specific. Thus, because experts have accumulated thousands of hours of

deliberate practice only in a particular domain, their cognitive processes, via the information processing system, have adapted for performance in that domain, not for other domains.

*Skilled-memory theory*

Baddeley, as cited by Ericsson and Kintsch (1995), offers a standard definition of working memory referring to "temporary storage of information that is being processed in any of a range of cognitive tasks", or to "information maintained in a readily accessible store for only a short period without rehearsal or activation" (p. 211). Because this definition of working memory in the information processing system view of cognition imposes limits on the complexity and amount of information that one can process at any given moment, Ericsson proposes a skilled-memory theory. This theory accounts for how memory performance can be improved within the constraints of the human information processing system. Basically, this theory allows experts, with their advanced cognitive abilities, to utilize long-term memory to rapidly store and retrieve small amounts of information in their domain of expertise. This form of long-term memory is called "long term-working memory", and information can be stored in stable form within this structure, though it is encoded into LT-WM in a retrievable form (Ericsson, & Lehmann, 1996, p. 290). Again, as previously mentioned, because the advanced cognitive abilities of experts represent themselves with domain specificity, this phenomenon of skilled memory and LT-WM will also suffer the constraints of domain specificity.

## **Critiques**

No well-designed theory is exempt from being critiqued, and the theories proposed by Ericsson and Gardner are no exception to this tendency. While each theory has experienced its fair share of criticism, the critiques are unique to theory content and necessitate individual attention. Thus, what follows is a brief overview of the common criticisms confronting each of the theories addressed in this paper.

### **Criticism: Gardner's theory of multiple intelligences**

The major criticism facing Gardner's theory is an apparent lack of valid, reliable and generalizable empirical data touting the significant impact that Multiple Intelligence could have for student achievement. This is not to say that researchers have not attempted to provide such numerical support. When researchers attempted to gather this crucial empirical data, although significant results may have been presented, experimental processes invalidated the data. For example, Strahan, Summery, and Bowles (1996) observed 129 middle school students in a school whose curriculum was based heavily on Multiple Intelligence-centered activities, and they quantified results. Although their results showed significant increases on math and reading scores, they used no control groups, negating the possibility of forming general conclusions. Gardner's personal endeavor "Project Spectrum", sponsored by Harvard University, employs 50 ongoing research projects on a regular basis, however none is aimed at nor has produced empirical data supporting a positive effect of Multiple Intelligences for student achievement. (Harvard University, 2003). Sternberg (1994) clearly expresses his disapproval of the lack of research done on Multiple Intelligences when he states "To date, not only are tests not well underway, but they have not yet been initiated. To my

knowledge, there is not even one empirical test of the theory" (p. 561). Until such data can be produced, this criticism will remain a strong force confronting the validity of Gardner's theory of Multiple Intelligences.

Another criticism facing Gardner's theory has to do with the emphasis away from the mathematical-logical and linguistic domains of performance. Again, Sternberg (1994) criticizes Gardner by emphasizing that students in the United States repeatedly score near the bottom of the educational barrel on a comparative basis broader than solely within this nation. While Gardner's theory might produce better dancers, athletes, and musicians, according to Sternberg (1994), this theory does not address why the students of this nation are weak in a domain which is not necessarily equally difficult for students in educational systems of other nations. Thus, Gardner's emphasis should be focused toward rather than away from the traditional domains in which our students struggle.

### **Criticism: Ericsson's theory of expertise**

The criticisms of Ericsson's theory are of greater quantity mainly due to his controversial view of deliberate practice as the determining factor for the achievement of expert performance. Most of these criticisms deny that Ericsson's studies provide decisive evidence supporting his contention that deliberate practice is the sole determinant of expert performance. Ericsson and Charness (1994) themselves issue a similar concern with the research on expertise when they state "Efforts to specify and measure characteristics that allow early identification and successful prediction of adult performance have failed. More plausible loci of individual differences are factors that predispose individuals toward engaging in deliberate practice and enable them to sustain

high levels of practice for many years" (744). While this statement is gleaned from an argument against innate talents, it is applicable at this point as Ericsson and Charness admit that there is a high probability that there are factors other than sole deliberate practice that may cause one to be more likely to engage in deliberate practice. These factors, which are presumably differences in motivation, support, and guidance of a qualified coach, are addressed by Ericsson throughout his theory, but these are not the factors stressed by other critics of the theory of expertise. The most prominent criticisms issued are directed toward the assumed undeniable role of innate talent in the acquisition of expert performance.

#### *Subject flaws*

There are various arguments supporting the concern that Ericsson's studies do not rule out the role of innate talent in the acquisition of expertise. Winner, in a chapter of Ericsson's (1996) book on excellence, pointed out that often the individuals studied are high intellectuals in the first place, and the fact that they are hard working, committed, and motivated does not rule out talent as a possible factor. Thus, Ericsson's studies allow us to imply that high ability cannot alone guide one toward expertise, but they don't allow us to say that hard work alone can lead anyone to achieve an expert level of performance. Ericsson does not deny that this argument has some validity and admits that the problem with research focused on the life-long efforts of expert performers is that, "as children, future international-level performers are not randomly assigned to their training condition. Hence one cannot rule out the possibility that there is something different about those individuals who ultimately reach expert-level performance" (Ericsson, 2000, p. 744). It is important to note, with this admission, that Ericsson does not state that this

"something different" is innate talent. Most likely he would assert that the differences are due to early introduction to the domain, high levels of motivation, intense parental support, or coach involvement.

*Performance variance*

Others have argued that the marked diversity of performance levels among performers of similar ages is a clear indication that innate talent plays a role in expert performers' lives. Most likely, Ericsson would reply that the difference in performance levels is simply due to different quantities of accumulated deliberate practice resulting from different ages at the initiation of practice or introduction to the domain.

Knowing the predominant position of the view of innate abilities in this society, Ericsson understands the reluctance of many to accept this new conceptualization of expert acquisition primarily through deliberate practice. Thus, he proposes general research objectives which could ultimately solve the debate of the role of innate talents in the acquisition of expert performance. Ericsson (1996) states that three things need to happen to rule out talent as a determinant for expertise. Research needs to demonstrate that "all children can eventually achieve the same levels of expertise with the same levels of work, and, with sufficient work and time, the levels reached by the children must be as high as those we consider truly exceptional" (p. 298). He adds that, within this study, all children would have to learn in the same manner and not deviate and invent their own techniques in order to eliminate factors other than deliberate practice from playing a part in the acquisition process.

### **Educational implications**

As alluded to throughout the progression of this paper, each of these theories has particular implications for the educational domain. Because Gardner has directly addressed the application of his theory in the educational system, there is a significant level of current utilization of methodology based on his theory in the public school classroom. Interestingly, as will be discussed, those that are incorporating this theory often are not aware of the true core of Gardner's beliefs. On the other hand, while Ericsson's theory is rarely addressed in the educational realm, the possible implications of implementation of facets of this theory in the classroom presents hope for the educational system of this society. What follows is a general overview of what each theory might offer for the world of education.

#### **Gardner's theory: Educational implications**

This section will begin with the interpretation of Multiple Intelligence's educational implications understood by most teachers utilizing MI-based instruction in the classroom. Following this generalization, there will be a short commentary regarding the probable lack of understanding that these instructors have of Gardner's theory. Finally, the true implications of Gardner's theory for the educational world will be addressed.

#### *Embracing the intelligences*

Countless educators have embraced Gardner's Multiple Intelligences as a new and liberating approach to education in a society which traditionally views intelligence in only two domains. Most educators implementing Gardner's Intelligences base their curriculum on his concept of concentrating on strengths rather than differences. Gardner

(1993) states, "Individuals have quite different minds from one another. Education ought to be sculpted that it remains responsive to these differences" (p. 71). He expands upon this by suggesting that "education would be more properly carried out if it is tailored to the abilities and the needs of the particular individual involved" (Gardner, 1983, p. 385).

Typically, when teachers accept this view of education, what results is the teaching of traditional subject areas in nontraditional manners. Lessons are planned which maximize the number of intelligences relied upon for the format of presentation or assessment of a concept. It is educators' belief that, by preparing educational experiences in this manner, they are allowing students to rely more on their strengths as opposed to their weaknesses.

#### *Errant interpretation*

This conceptual picture of an educational situation presents what many view to be a positive and effective learning environment. Instructors incorporating Gardner's Multiple Intelligences profess offering an education more inclusive of diversity. This profession reflects the likelihood that they do not understand the central focus of Gardner's theory. If one truly believes in Gardner's theory, it follows that he or she accepts the restrictions imposed by innate abilities as well as Gardner's cognitive view of multiple information processing systems, as these processing systems are at the root of the existence of the independent and varied intelligences. It is highly doubtful that those utilizing MI-based curriculum are aware of these views of innate abilities and cognition as being components of MI theory, because such views rarely surface in discussions of how to achieve truly effective instruction. Thus, educators that implement MI-based

curriculum often express that these "diverse" methods are producing positive effects on the knowledge and skill acquisition of their students, although they do not necessarily profess the view of cognition that Gardner possesses. According to Gardner, the reason for the effectiveness of MI-based instruction is rooted in the fact that individual processing devices receive and process specific information. Thus, for example, certain devices receive and process only mathematical and logical knowledge and others receive and process only linguistic knowledge. Because capabilities are innate for these individual processing systems (intelligences), individuals are able to process at different and pre-determined levels depending upon the information being presented.

Theoretically, by varying forms of instruction, one allows those with strengths (i.e. more advanced processing capabilities) in certain intelligences to take advantage of those processing systems in which they have been fortunate enough to be "gifted". Unless one truly accepts this view of cognition and intelligence, it does not logically follow to profess the effectiveness of MI-based curriculum. As this view of cognition and intelligence does not seem prominent in the educational realm, any benefits perceived due to MI-based instruction are more likely a result other factors involved.

#### *Dismal implications*

Although the low probability that Gardner's view of cognition will be highly accepted has been briefly addressed, it is necessary to discuss the true educational implications presented by Multiple Intelligence theory for those who do accept Gardner's underlying beliefs. "Multiple Intelligence theory does not incorporate a 'position' on tracking", states Gardner (1995, p. 8). This statement is hard to accept when one closely examines what Gardner repeatedly suggests for the educational system of this nation.

Although what was addressed at the beginning of this section offers a relatively positive view of Gardner's theory, true implementation of MI views results in a much more grim reality. In effect, the educational experience becomes one that is very restricted for students of lesser innate abilities, while those with greater "potentials" reap multitudes of benefits.

Gardner (1995) asserts that the goal of education in this society is to develop Intelligences and help individuals "reach vocational and avocational goals that are appropriate for their particular spectrum of intelligences" (p. 9). This definition of the role of schools yields two immediate implications for learners. First, individual proclivities (or weaknesses) must be assessed. Second, an individual's vocational and avocational goals should be determined based on this assessment of intelligences. While this alone might not seem too outlandish, Gardner (1993) continues along this thought by claiming that a narrow specialization based on identified strengths should begin by age eight (p. 197). Thus, a child's probable future should be determined before this young age, since weaknesses and strengths in the intelligences can be measured early, are innate, and would assist in producing a life focused on the individual's strengths rather than weaknesses. In fact, Gardner (1983) speculates that a smoothly functioning society most likely is composed of individuals whose roles in life closely correspond to their intelligence spectrum. Thus, in the opinion of Gardner, this offering of a decisive life path to a child of only eight years of age is in the best interest of the youth as well as for society as a whole. This view, unlike the liberating version professed by many educators, is confining and dismal for anyone (and this would be the majority of us) who unfortunately lacks "advanced potential" in this society.

### **Ericsson's theory: Educational implications**

While Ericsson does not directly address the application of his theory in the traditional view of the educational environment, he does admit that there are implications of his theory for the educational world. "What we learn about expert performance and its acquisition is applicable to understanding and improving competence in the skills and knowledge learned in school and the workplace. The objective is for more people to attain competence and higher levels than ever before" (Ericsson, 1996, p. 304).

#### *Optimal learning environment*

Research on expert performance allows insights into the general mechanisms of normal adaptation and learning that govern development and skill acquisition in everyday life (Ericsson, Kintsch, & Patel, 2000). Inferences based in the insights gathered from research on expertise might produce a general list of conditions which would offer optimal learning. Components of this list would include careful construction of a task and continual adjustment of the task with the students' existing knowledge and cognitive capabilities in mind, student motivation to attend to the task and exert a significant amount of effort while doing so, production of informative feedback throughout the course of the task, and student capability and willingness to analyze the feedback and improve performance based on the feedback.

#### *Age of initiation*

A condition of Ericsson's theory which cannot be ignored by the educational world is the age of onset of deliberate practice which is recommended. "Individuals who start early and practice at higher levels will have a higher level of performance throughout development than those who practice equally hard but start later" (Ericsson,

Krampe, & Tesch-Romer, 1993, p. 392). This statement can be interpreted in two manners depending on how one views the goal of education. If one is trying to produce experts, which is rarely a goal of education but could be professed as a goal, it is imperative that "education" (deliberate practice) begin at as early an age as possible. Because performance is measured according to age group, if one begins late, he or she will never catch up to his or her competitors. If one views education more generally as the acquisition of knowledge and skills, then Ericsson's emphasis on early onset of deliberate practice must be interpreted in a very different manner, as educators cannot necessarily control this factor. Thus, what one must keep in mind is that all students enter the classroom with different amounts of acquired knowledge and skills depending on the level of experience (vs. deliberate practice) that they have had in a certain domain. Though this is not a debated phenomenon in the educational realm, it is, nonetheless, an important factor to consider when preparing to educate the masses.

#### *Role of coach*

The role of the coach could also have educational implications when interpreted in light of Ericsson's theory of expertise. As previously mentioned, coaches construct effective deliberate practice, ensure proper feedback as well as proper use of feedback and compare current performance of the individual to that of other individuals of the same age in the domain. While researchers have found the role of deliberate practice to be more important than the influence of a coach (Ericsson, 1996), it has been determined that coaches are responsible for helping set up rigorous practice schedules and providing more effective learning (Ericsson, Krampe, & Tesch-Romer, 1993; Ericsson, 1996.). If the goal is effective learning, which it undoubtedly is, then a coach, or teacher in his case,

is necessary. Interestingly, it might be noted that the studies of expertise did not focus on group educational settings, and the mention of a coach was most often on an exclusive basis with one student. Can truly effective learning be achieved in group settings, as the public educational system provides? Ericsson, Krampe, & Tesch-Romer (1993) state that individual supervision is superior, though group instruction is possible. Thus, the educational world may not need to completely cast aside its system of group instruction.

#### *Role of parent*

Another interesting aspect of Ericsson's theory of expertise is the role of parental support. Strongly emphasized is the importance of commitments made by parents to their child's achievement, assistance provided with continuation of practice, insistence in the value of instruction, and the aid offered in searching for the best fit coach (Ericsson, Krampe, & Tesch-Romer, 1993). This view seems to imply a less than ideal situation for individuals without parental involvement or from families offering little support. It must be hoped, therefore, that these students are able to receive support from elsewhere in order to accommodate for this lack of important support.

#### *Role of motivation*

Finally, one must address the role of motivation in the educational sphere. Because Ericsson has not come to a final conclusion regarding whether or not motivation is a heritable trait, motivation must remain a point of contention. Because motivation plays an integral role in the acquisition of expertise, it must also be assumed that this drive would be a necessary component for effective education to occur in the classroom. Should someone find empirical evidence that motivation is not innate, it will be imperative to address methods by which the highest levels of motivation can be

encouraged from students in order to produce the most effective educational experience.

Ultimately, when one understands the overall implications of Ericsson's theory of expertise, it becomes a very liberating concept for the educational world. When innate talents are not the center of achievement, those that enter a classroom at different levels are not seen to be incapable of eventual comprehension of the same knowledge and skills. The ultimate solution to this situation is being aware of a student's accumulated base of knowledge and skills in order to progressively build upon this foundation with the goal of reaching a certain level of achievement. Taking into account all of the components of Ericsson's theory could make this acquisition of certain levels of achievement possible for all individuals, assuming that motivation is acquired. This, in effect, liberates the currently restrictive and confining educational world which tends to place students into labeled spheres such as "gifted" or "challenged". The reality of the situation, therefore, is not found in decisive factors such as innate skills and knowledge but rather in the existence of varying levels of accumulated knowledge and skills.

### **Personal Reflection**

The ultimate result of this project has been a very different one from that which I expected. I entered this explorative study of these two theories with a very positive and supportive perspective of curriculum based on Gardner's Multiple Intelligences. After the completion of research necessary for this paper, I find myself dumbfounded by the almost unanimous acceptance of this theory in the public school system.

While I admit that I have been very critical of Gardner's theory in this paper, (and there are many interpretations possible which would be less harsh) if one truly accepts Gardner's vision of innate abilities and cognition, there seem to be few alternatives to the

picture I have presented. It is probable, I propose, that there are benefits to the implementation of varied activities in a curriculum, however I deny that these benefits are due to the concepts underlying Gardner's theory of Multiple Intelligences. For example, students may be motivated by the novelty of performing nontraditional activities in the classroom. They may be intrigued by the variety and less prone to boredom, as many of the activities could be considered almost "entertaining". Students may be equally motivated simply by being told "you're smart", as the traditional view of intelligence may have labeled them as "challenged", a label which rarely induces motivation. Ultimately, there may be motivational benefits reaped from the implementation of diverse activities in a classroom, though this is simply a pontification, and these benefits are almost surely not due to the concepts serving as a foundation for Gardner's theory of Multiple Intelligences.

My reactions to Ericsson's theory have not dramatically changed as a result of this paper. I consider it to be a wonderfully liberating theory, though the motivation required for the true achievement of expertise will pose obstacles for the majority of society's members. My fundamental concern with Ericsson's theory is associated with innate abilities. I would like to see a longitudinal study which has a controlled learning environment and random selection of subjects in order to exclude the role of innate talent in acquisition of expertise. Although the concept of deliberate practice as the main determinant of expert performance is one that is very tempting, I find it difficult to have complete confidence in the assertion that innate talent does not play at least a minute role. It is highly likely that society's views of intelligence have influenced my resistance to accept Ericsson's view without question, which is why I would be more convinced with

empirical and longitudinal studies to support the view of deliberate practice.

Additionally, such a study might aid in presenting whether motivation is innate or acquired, as expertise can certainly not be acquired in the absence of significant quantities of motivation.

### **Conclusion**

This paper initially addressed the necessity that teachers analyze and reflect upon educational theories before accepting them and implementing them into the curriculum. I cannot claim immunity to this tendency to embrace any promising theory that presents itself, as I have faithfully based most lessons that I have presented in my career with at least a partial focus on Gardner's theory of Multiple Intelligences. Upon completion of the research necessary for this project, I was almost sickened by the thought that I have professed the effectiveness of a theory with such a harmful core of beliefs. If I had only questioned the value of this theory or the suppositions upon which this theory is based upon initial introduction to the concept, I may not have held this errant point of view for such a significant period of time.

Teachers should be trained to question and analyze, not silently accept that which is handed to them. Only when this perspective is prominent and encouraged in the educational world will we see more productive classrooms and increasingly efficient learning. A critical and rational position is necessary. Educators, who are daily witnesses to effective as well as ineffective learning, must question whether methodologies truly produce the desired results. Simply going through the motions and maintaining a silent presence in the classroom is not sufficient, as the declining state of our educational system clearly demonstrates. The time for action has arrived, the

students in our classrooms are begging for help, and sitting by silently will achieve nothing.

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