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A comparison of multiple intelligence preferences and performance on standardized tests

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A COMPARISON OF MULTIPLE INTELLIGENCE PREFERENCES AND PERFORMANCE ON STANDARDIZED TESTS

by
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ABSTRACT

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The purpose of this study was to look for correlations between levels of preference for multiple intelligences and performance rates on standardized tests, as determined by utilizing the Teele Inventory of Multiple Intelligences and standardized test scores. The research was conducted in small rural elementary school in southern New Jersey where the researcher was the art teacher. The sample consisted of the entire fifth grade class (n= 64) who provided parental consent and had the necessary test scores available. Students completed the Teele Inventory of Multiple Intelligence by viewing a series of paired images of panda bears involved in various activities. Students selected the image that best represented them and from their selections multiple intelligence levels of preference were determined on a scale from 0-8 for each of Howard Gardner's seven multiple intelligence. These scaled scores were correlated with student's standardized test scores on the Reading and Math sections of the New Jersey Ask-4 utilizing a Spearman-Rho nonparametric correlation. There were no correlations between any of the multiple intelligence preferences and standardized testing scores, nor between the multiple intelligences themselves. The major implication of the study was that student preference and ability are not interconnected.

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CHAPTER ONE

INTRODUCTION

Overview

Educational research has gone through many stages of exploration and implementation. A rapidly widening gap has developed between what we as educators and citizens are conditioned and comfortable with and what research has discovered about the human intellect. These are the two major constructs of intelligence that exist for us today, a unified, quantifiable intelligence and an intelligence that is multifaceted and unique to each individual. The purpose of this study is to examine the dichotomy between the ways in which students prefer to learn and the ways in which their learning is currently being assessed through state and federal requirements. The multiple intelligence theory proposed by Gardner (2004) is described as:

> In its strong form, multiple intelligences theory posits a small set of human intellectual potentials, perhaps as few as seven in number, of which all individuals are capable by virtue of their membership in the human species. Owing to heredity, early training, or, in all probability, a constant interaction between these factors, some individuals will develop certain intelligences far more than others; but every normal individual should develop each intelligence to some extent, given but a modest opportunity to do so. (p. 278)

Statement of the Problem

The construct of intelligence that we will first examine is described as having a narrow traditional view of intelligence, which simplifies intelligence to a number and stresses specific core knowledge of classical information. Classical knowledge that is stressed in schools includes reading, writing, mathematics, science, and social studies. Assessment within this construct is based upon answering questions on a worksheet or a test so that a quantifiable grade can be assessed. Lecture style teaching may be employed along with note taking and assessments based upon rote memorization of facts. This concept of intelligence is based upon the idea that all information that is presented to the students will eventually be tested. Presenting students with information and tasks that are easily tested allows for the educator to quantify the student's knowledge or intelligence. This style of education focuses very little upon process, underutilizing higher order thinking and problem solving as techniques to answer a question.

A quantifiable measure of intelligence allows for several things. If intelligence is given a numerical value it can be compared to benchmarks or this data can be used to compare the students to their peers and assess his or her progress within a class. When considering today's current trends, another primary use of this information would be to assess ability, performance, and success of teachers and schools in comparison with one another in order to assess financial need and aid. This information becomes critical later in a student's education when it is time for college entrance, financial aid, and scholarships, and it is difficult to compare one student to another. Part of this concern comes from the difference in student abilities from one school to another, one region to

another, and, finally, one state to another. This legislation, specifically No Child Left Behind, has dictated renewed interest in this style of education and assessment. Unfortunately, this is in direct opposition to many of the current educational trends that have been implemented based on education research in the field today which stress process and higher order thinking abilities.

Our second construct for intelligence is a new and very broad, generalized interpretation of intelligence which describes intelligence as an individuals abilities within an environment completing a task or solving a problem. This concept is based upon individualized strengths and weaknesses. Individual modes of thinking, preferred learning styles, and ways in which individuals show intelligence are not readily quantifiable. Gardner (1999) would posit,

> However, the general message is clear: Intelligence, as a construct to be defined and a capacity to be measured, is no longer the property of a specific group of scholars who view it from a narrowly psychometric perspective. In the future, many disciplines will help define intelligence, and many more interest groups will participate in the measurement and uses of it. (p. 24)

For the purposes of this study, I am referring to Gardner's seven multiple intelligences; logical-mathematical, linguistic, musical, bodily-kinesthetic, spatial, intrapersonal, and interpersonal. Rubrics and portfolio assessment could be utilized as an alternative method for authentic assessment of students work while allowing the students the ability to utilize their specific preferences of learning. These are just two of the methods of alternative assessment that have been developed to identify intelligence and learning in a

more accurate and complete manner. These styles of assessment are not just seeking the rudimentary indicators that a student can spell or regurgitate information memorized. These styles of assessment delve deeper into the hidden aspects of a student's intelligence that make them unique in the areas of higher order thinking and problem solving. It also looks at how they are used within specific situations, environments or areas of study and the processes that are applied to get to the results. For example Gardner developed the Modified Field Spectrum Inventory, which was created to observe preschoolers functioning at a series of tasks and looking for how the students approached the task, processes they went through in the task and how they resolved the task. Did the student come up with a unique and well thought-out solution for the problem? Are they able to explain and justify the steps that they went through in their thought process? Even if they do not arrive at the correct answer, did they learn something along the way? These methods of authentic assessment rely heavily upon the student utilizing thought processes that work for them to provide results to a problem. These are difficult to adapt because they do not necessarily use a numerical grade, and they are not currently the standard for public education which is largely still based upon an A, B, C, D, F scale. Portfolio assessments and authentic assessments rely upon alternative grading styles such as rubrics, which do not readily serve the purpose of standardization, comparison or students, classes, and schools. This makes it difficult for them to be translated into grades on a report card or for a college to accept a student based upon this information because it can be viewed as very subjective and hard to compare students to one another.

There have been two other methods for determining multiple intelligences that have been developed. These are the Teele Inventory of Multiple Intelligences and the MIDAS.

Need for the Study

With recent federal legislation (specifically, No Child Left Behind) looking to standardize education and assessment, educators are faced with a new concern. How can students be assessed in the same way when scientifically there are still many questions about how individuals learn, acquire, and transmit information? How do we know that standardized tests provide us with an accurate idea of what they are actually assessing? Teele (2004) reminds us that current research in the field validates that students learn and think differently. Multiple intelligence theory also suggests that education is not comprehensive when limited to the humanities and science. The heavily linguistic and mathematical context found in most public schools and standardized tests favor students who excel in linguistic intelligence. At the same time, this does not encourage students to utilize other intelligences to problem solve (Walters, 1992). Education should seek to promote student development of strengths and abilities so they are prepared to be a productive member of society. This will prepare them for life after school, as a member of the workforce. Unfortunately this newer, broader construct of intelligence that is being proposed is not easily integrated into the public education system as it is currently structured.

Given Gardner's theory of multiple intelligences, the question arises, how does standardized testing effectively measure students' aptitudes regardless of different preferences of intelligence? Gardner proposes that each learner has a different makeup of

intelligence, favoring several of the seven intelligences over the others. Therefore, it is reasonable to question whether standardized tests assess the strengths of all learners or is the focus of the tests primarily upon particular intellectual strengths, specifically reading and math? One way to explore the question is to utilize the *Teele Inventory of Multiple Intelligences*, which is based on Gardener's theory of multiple intelligences, to determine students' preferred intelligences and compare the results to performance on standardized tests. Use of standardized testing to assess student's aptitude has increased with recent federal laws and regulations that hold local schools and teachers accountable for student achievement.

Purpose of the Study

Gardner (1983) initially proposed seven intelligences in the multiple intelligence theory, which Teele sought to measure with her 1992 *Teele Inventory of Multiple Intelligences* (Teele, 2004). The Teele Inventory is used to determine a student's intellectual preferences, based upon Gardner's seven multiple intelligences. The idea of comparing these intellectual preferences is interesting since school systems typically base the majority of instruction on logical-mathematical and linguistic intelligences. A natural assumption would be that groups of students with specific intelligence preferences would demonstrate higher rates of performance on standardized tests than groups favoring other intelligences. The purpose of this study is to look for these correlations. Is there a relationship between preferred intelligences and higher performance rates on standardized tests because standardized tests rely heavily upon linguistic and logical-mathematical intelligences? Do standardized tests accurately measure intelligence or

does a student's response to a test taking environment effect the results? To examine this possibility, a study group will be selected that includes the entire fifth grade class at a small, rural, elementary school in southern New Jersey.

Research Question

The following question guided this study:

Do groups of students with preferences for specific intelligences (as determined by utilizing the *Teele Inventory of Multiple Intelligences*) represent higher performance rates on standardized tests?

Limitations

This study had several limiting factors. Smaller sample size (n=65) limited the reliability of the data. Factors that limited the sample size included students being eliminated from the study because test scores were not available, incomplete inventories, student absence at the time the inventory is conducted, parental consent being denied, or the parental permission slip not being returned. The sample itself limits generalizability because the school where the research was conducted is in a lower socio-economic-status factor grouping, as determined by the State of New Jersey Department of Education (District Factor Grouping System, 2004).

Overview of Method

The method of data analysis that was performed on the data collected was a Spearman-Rho, nonparametric correlation. This was selected due to the size of the sample and the fact that the numerical values for the multiple intelligences on the Teele inventory were interrelated and were not independent samples. Data analysis was used to

find any correlations that exist between each of Gardner's seven intelligences and different rates of performance on standardized tests. The objective was to discover any higher scoring groups of students that have a preference for a specific intelligence.

Operational Definitions

Multiple Intelligences:

In this study, the definition of multiple intelligences is based upon the original theory developed by Gardner in 1983. Gardner maintained that within each learner exists intelligences that are uniquely expressed at specific levels and combinations. Gardner initially identified seven specific intelligences; Linguistic intelligence, Logical-Mathematical intelligence, Spatial intelligence, Musical intelligence, Bodily-Kinesthetic intelligence, Personal intelligences: Intrapersonal and Interpersonal. In 2004, Gardner considered adding two new intelligences; Spiritual and Naturalistic. In 2006, Gardner rejected this idea and came to the decision that these intelligences were not universal and fundamental enough to be formally added (Gardner, 2004, 2006). For the purposes of this study, Teele, creator of the *Teele Inventory of Multiple Intelligences*, only recognizes the original seven intelligences (Teele, 2004).

Standardized Testing:

In this study, standardized testing is defined as any test given to all students (at prescribed grade levels) as determined by the school district. Standardized testing is carried out for the purposes of quantifying student's abilities so that they can be readily compared with each other, as classes to compare teachers, and finally, as schools. For the

purpose of this study, test scores, from the NJ ASK-4 from students' permanent records, were utilized.

Summary

In this study, student levels of preference for each of the seven multiple intelligences were quantified through the use of *Teele's Inventory of Multiple Intelligences.* This information made it possible for students to be placed into groups that represent each of the seven intelligences. These intelligence preference groups were put through correlation data analysis in an effort to correlate preferred intelligences and higher rates of performance on standardized tests.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

The concept of human intelligence has been of interest to many fields of science, such as biology, psychology and, more specifically, educational psychology over the centuries. The questions of how to define identify, and measure human intelligence has challenged many scientists and theorists. Traditionally intelligence has been viewed as a singular entity that can be quantified. The educational system holds this precept as a fact, even today in light of modern science where theories have been explored and subjected to rigorous research, which has uncovered many new possibilities.

Two Constructs of Intelligence

There are two major constructs of intelligence at the heart of this discussion of intelligence and testing. The first construct of intelligence is the traditional idea of intelligence, which has been used through the greater part of the twentieth-century. In this construct intelligence is a singular entity that is easily quantifiable and therefore comparable. The second construct of intelligence is that of a multidimensional entity that is not readily quantifiable. This construct of intelligence is based upon several different theories that posit that there are many different areas of intelligence and ways in which to show intelligence. This includes but is not limited to; acting intelligently, adapting and reacting to an environment, ability to process and produce within certain fields, and so

on. This second construct of intelligence is something that can generally only be ascertained through in-depth analysis or observation.

History of Intelligence and Testing

The development of intelligence measurements has gradually evolved over time. The first approach is a traditional view, which has persisted throughout the majority of the twentieth-century in the United States. This approach is called the psychometric approach, which acknowledges intelligence as single, unitary, and quantitative. This approach focuses primarily upon linguistic and logical-mathematical learning styles, is easily measured and can be compared in a standardized way. Binet and Therman, in their respective countries, developed the first general-purpose intelligence tests. Binet thought that intelligence was compromised of three distinct elements; direction, adaptation, and control. Binet's tests were grounded in competencies that were central to schooling and his primary goal of formulating the test was to protect students from being improperly classified in school. Binet was trying to protect against biases that occurred due to socio-economic levels that would lead to intelligent students not being admitted to schools based upon financial need or class (Sternberg, 2003). Following, were Yerkes and Wechsler who created their own influential instruments. Wechsler's instrument closely followed Binet's lead while arguing for tradition intelligence tests as a predictor of future performance and learning capacity (Sternberg, 2003).

In 1951, Piaget offered a developmentally based concept, which discussed how individuals develop progressively at different stages. Vygotsky (1978) suggested that all intelligence abilities are social in origin and operate within zones of proximal

development. The zones of proximal development are the distance between the development level as determined by independent problem solving and the potential level of development as determined through problem solving done under adult supervision or peer collaboration. The psychobiological approach, promoted by Ceci , argues that there does not exist any one cognitive potential, but rather multiple potentials and that there is no correlation between performance on very complex tasks and intelligence test scores (Sternberg, 2003). A recent approach to intelligence is the theory of multiple intelligence, proposed in 1983 by Gardner, and in 1985 by Sternberg (Sternberg & Grigorenko, 2004). Gardner became disturbed by the nearly exclusive emphasis in schools on the primary usage of linguistic and logical-mathematical symbolization. This realization moved him to investigate intelligences and their nature. Gardner felt that along with a one-dimensional way of assessing people's minds comes a corresponding view of school, which he calls the "uniform school". A uniform school features a core curriculum, which emphasizes a set of facts that everyone should know and offers very few elective subjects (Gardner, 2006). He felt that other varieties of symbol use are integral in human cognition within and more importantly outside of school (Gardner & Hatch, 1990).

Sternberg proposed a theory that posits that there is no one definition of intelligence. He theorizes that people are successfully intelligent by virtue of recognizing their strengths and making the most of them while, at the same time identifying their weaknesses and developing ways to compensate or correct for them. He also emphasizes the necessity of being able to adapt to the environment that you are in as it changes or

you travel from one environment to another. Sternberg values teaching and assessment that exhibit a balance between analytical, creative, and practical thinking. Students who are taught to use these methods of thinking tend to perform better on assessments, with no apparent regard to the form of the assessment. In Sternberg's work he contemplates the idea of whether or not conventional education in schools systematically discriminates against students who have creative and practical strengths (Sternberg & Grigorenko, 2004).

Shearer lists nuances of intelligence. Shearer considers there to be two that are widely displayed, first is intelligence as a universal trait and second in intelligence as an individual difference. The third, which he has recently added to the list, is to act intelligently. Shearer thinks that what is deemed to be an intelligent act can only be determined by the goals and values of the society that are imposed upon the individual (Gardner, 2004). This is certainly a consideration amongst populations where survival is an issue, the actions of the members of this population would act very differently than one in which safety and survival wasn't a concern.

The multiple intelligence theories proposed by each of these scholars focus on individual differences among students. They endeavor to match a student's ability profile with educational methods so that every student can succeed to the best of their ability in school (Teele, 2000). Gardner's Multiple Intelligence theory suggests that all students learn differently through varied intellectual strengths. Gardner called this an individual's "profile of intelligence" that could be used to enhance instruction on learning (Gardner, 1999). One student may need to see a physical model of the solar system to learn the

planet's positions (spatial intelligence) while another student may learn better if the planet's names were in a song (musical intelligence).

The Origins of Multiple Intelligences Theory

Eisner described an alternative view of intelligence, which did not follow convention wisdom about intelligence at the time. In his 1994 *Cognition and Curriculum Reconsidered,* he explains some of his ideas about intelligences as a function of an individual's abilities to problem solve within a field of study or context of life. He felt that an individual's intelligence could be determined by what abilities an individual demonstrated within contextual situations. This view of intelligence was innovative in that it did not view intelligences as unitary and readily quantifiable, instead it viewed intelligences as many individual facets that make up a unique and very personal variety of intelligence (Eisner, 1994).

Gardner formulated a revolutionary approach to intelligence when he published *Frames of Mind* in 1983. In *Frames of Mind*, Gardner describes his conceptualization of human intelligence as, "Thus a prerequisite for a theory of multiple intelligence, as a whole, is that it captures a reasonably complete gamut of the kinds of abilities valued by human cultures" (Gardner, 1983). In this quote Gardner is explaining the premise of selecting specific intelligences that comprise his seven multiple intelligences. The intelligences that he selected had to meet the stringent criteria of being valued by the majority of cultures over time as something that is an essential component or ability in order for an individual to survive (Gardner, 2006). To arrive at a list of intelligences, Gardner and his colleagues examined literature in several areas looking at the

development of cognitive capacities in normal individuals, the breakdown of cognitive capacities under organic patheology, and existence of abilities in special populations. From these studies Gardner was able to decide upon the intelligences that were necessary for an individual to thrive (Gardner & Hatch, 1990). Included in his findings were that specific forms of symbol usage may be compromised under certain types of brain damage without other areas of the brain being affected (Gardner & Hatch, 1990).

At the time of multiple intelligence theory development, empirical studies indicated that students learn in different ways (Emig, 1997). These studies revealed that each individual has a different makeup of learning styles that are unique to them and therefore it would be difficult to have all individuals learn in a uniform way. Gardner's theory is based on the idea that individuals have differing intellectual strengths or preferences and learn best when these strengths come into play in the education process (Emig, 1997).

Gardner began his own studies of development and symbol usage in children and came to the conclusion that there were flaws in Piaget's view of intellect. Gardner & Hatch (1990) discovered empirical evidence that the mind may be precocious with symbol usage, specifically within one domain without this ability carrying over to the other areas, which is contradictory to Piaget's idea that symbol usage only occurs at specific stages of development. Gardner developed his own definition of intelligence that theorizes intelligence as the capacity to solve problems or to fashion products that are valued in one or more cultural settings. From this idea he established criteria for what constitutes human intelligence. Gardner's definition and criteria were significantly

different from other established ideas in the field of intelligence (Gardner & Hatch, 1990). Piaget's theory of cognitive development was based upon a structured series of stages of development that a child progresses through. "If we examine the intellectual development of the individual or of the whole humanity, we shall find that the human spirit goes through a certain number of stages, each different from the other..." (Piaget 1969). Piaget's theory was accepting of the idea that there may be slight variation in the rate at which individual children pass through the different stages however, his theory does not take into consideration children who may spontaneously perform several stages ahead of what is expected for their age. Gardner's theory would consider this child to have a special strength or predilection for this intelligence. At this time all previous theories, models, or instruments were based on older, previously accepted instruments. Gardner knew that his concept of multiple intelligences might be rightly seen as a critique of the notion of a single intelligence, and of a school currently tailored almost exclusively to linguistic and logical capacities and concerns (Gardner, 1999). Gardner also realized that he was stretching the idea of intelligence well beyond its traditional applications in educational psychology with this proposition of a number of relatively separate human intelligences combined within an individual (Gardner & Hatch, 1990).

Gardner initially identified seven autonomous intelligences, they are as follows: a) linguistic – sensitivity to spoken and written language, b) logical-mathematical – capacity to analyze problems logically, carry out mathematical operations, and investigate issues scientifically, c) spatial – potential to recognize and manipulate the patterns of both wide and confined spaces, d) musical – skills to perform, compose, and

appreciate musical patterns, e) bodily-kinesthetic – potential of using one's whole or parts of body to solve problems or fashion products, f) intrapersonal – capacity to understand oneself and have effective working model of oneself, and g) interpersonal – capacity to understand the intentions, motivations, and desires of other people and to work effectively with others. In his 1999 book, *The Disciplined Mind*, Gardner considered three additional intelligences, naturalist, spiritual, and existential (Gardner, 1999). Later, in 2006, *Multiple Intelligence; New Horizons*, Gardner relinquishes his additional intelligences, suggesting that they are not universally important enough to all cultures in order for them to be a necessary intelligence to possess (Gardner, 2006).

Development of Methods for Measuring Multiple Intelligences

Gardner's theories have been criticized because while they examine possible shortcomings in the education system, Gardner has yet to develop published methods for assessing or measuring his multiple intelligences. In 2004, he wrote that he has never considered it his assignment to create new tests or carry out crucial experiments (Gardner, 2004). Work is in progress to develop an inventory to measure multiple intelligences, but there is little evidence of strong results. Gardner & Hatch, in 1990, began to create the *Modified Spectrum Field Inventory*, which samples several intelligences over the course of two, one-hour sessions with preschoolers (Gardener and Hatch, 1990). This inventory included a battery, which included 15 tasks, which spanned the range of domains. The cognitive areas that are explored in the spectrum inventory are numbers, science, music, language, visual arts, movements, and social. The benefits of the spectrum assessment include; students being engaged in games that are meaningful

and contextual, it blurs the line between curriculum and assessment, allows the assessor to actually watch the intelligence in the process of being utilized, and suggests how student strengths may provide for more challenges (Gardner, 2006). The drawback to this style of inventory is the intense amounts of one-on-one time that is required to carry out the entire inventory on each individual.

The inventory currently being widely used for multiple intelligence theory is the *Teele Inventory of Multiple Intelligences*. This inventory is utilized for any age level because it is pictorial in nature and thus allows the subject to respond without it being necessary for them to be able to read or write. This is ideal to use with younger children, illiterate individuals, and non-English speakers.

Another method of inventory widely used is the MIDAS or Multiple Intelligence Developmental Assessment Scales. The MIDAS was developed in 1996, and is based on Gardner's theory of multiple intelligences. Gardner reviewed and mad suggestions for improvement on the assessment himself. The assessment is administered in four stages. First, the individuals' abilities in each on the seven constructs of intelligence are estimated. Second, the individual is judged on their abilities in the 25 skills that are associated with each of the seven constructs. Third, additional scales assess the individual for innovation, general logic, and leadership. Finally, the individual provides qualitative information. This information will deepen the understanding of data gathered through the quantitative portion of the assessment. This assessment is usually performed on individual's aged 14 on up with a minimum of a sixth grade reading level. The assessment can be done in two ways, it can be self completed or done in a structured

interview. The assessment is comprised of 106 five -point Likert scaled questions. If the assessment is group administered the duration is approximately 25-35 minutes, if it is completed as an interview it takes approximately one hour. The assessment has met requirements to establish reliability and validity. One considerable drawback to the assessment, however, is that there are requirements on who should administer it and someone can only interpret it with a degree in psychology (Packard, A. & Trevisan, M. S., 1996).

In 2006, Özdemir *et al* conducted a study investigating if there was a significant difference between traditional science instruction and multiple intelligence based science instruction. This study utilized a fourth grade sample, which took the Teele Inventory of Multiple Intelligences at the beginning and end of the study to identify student's intelligence types and see if they changed after the instruction occurred. The fourth grade group (n=70) was broken into experimental and control groups. Both groups were instructed by the same teacher for the same amount of classes, and were exposed to the same content, however, the experimental group was instructed utilizing the multiple intelligence teaching strategy. There was a pre- and post-test administered to determine difference that occurred during instruction. The experimental group showed (though a t-test) a significant improvement over the control group (t=3.65). In addition the test was readministered two months later to check for retention of material with the experimental group showing an even higher rate than before (t=5.21). The significant implication of the study was that multiple intelligence instruction led to better acquisition and retention of knowledge. (Özdemir, Güneysu, & Tekkaya 2006)

Development and Implementation of the *Teele Inventory of Multiple Intelligences*

The *Teele Inventory of Multiple Intelligences* was developed in 1992 to assess how students learn in accordance with the theory of multiple intelligences (Teele, 2004). Teele wanted to design an inventory that could be utilized by all age groups, illiterate, and non-English speaking individuals (Teele, 1997). The *Teele Inventory of Multiple Intelligences* is a forced-choice pictorial inventory that consists of 56 pictures of panda bears involved in activities that represent the characteristics of the seven intelligences. The panda bear pictures are grouped into pairs so the learner has 28 opportunities to select the picture that best represents them. Overall, students have eight different chances to select any one of the seven intelligences (Teele, 2004).

The instrument was designed to discover students' dominant intelligences. Use of the inventory has revealed that students possess different intelligences at different age levels. The *Teele Inventory of Multiple Intelligences* is currently used in over 10,000 private and public school settings in the United States as well as in over 25 other countries (Teele, 2004). The *Teele Inventory of Multiple Intelligences* is based on Gardner's 1983 theory of multiple intelligences, which represents seven intelligences; linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal. Teele does not acknowledge Gardner's revised intelligences because she does not regard them to be primary intelligences (Teele, 2004).

Once adequate materials have been developed the education system will be better equipped to address some of the theoretical claims that grow out of multiple intelligence theory (Gardner & Hatch, 1990). Gardner notes that a goal of schools should be not only

to assess students along a variety of potentially individual dimensions, but also to encourage the students to develop along these dimensions (Gardner, 2006). The earlier student's understand how they learn, the more time they have to develop their cognitive and creative capacities and emotional intelligence. Additionally, when students become involved in education and see themselves as part of the education process, they are more motivated and have a deeper appreciation for knowledge (Teele, 2000). Gardner notes that one drawback to assessment scores in general is the effect that it may have on the students. If a student sees that they have scored low on an assessment, the student's idea of failure has the potential to discourage them instead of encouraging or helping them to improve (Gardner, 2006).

One important way to optimize student intelligence is to create an environment that encourages and nurtures students to develop to their individual potential (Teele, 2000). Dr. Teele (2000) writes that,

> The theory of multiple intelligences is a vehicle that can be applied in schools to create learning environments where every student has an opportunity to achieve success. When students are allowed to develop, demonstrate, and strengthen their unique gifts, talents, and abilities, they believe they can learn and are encouraged to try harder to achieve. (p.25)

Through analysis of over 6,000 responses to the inventory, some interesting data has surfaced. Based on results, students at the elementary level have responded with much higher preference rates for linguistic and logical-mathematical intellectual activities depicted in the TIMI than students at middle and high school levels. The sharp decline in

student preference for these intelligences is in conflict with the fact that linguistic and logical-mathematical intelligences are the predominantly emphasized intelligences throughout the educational system, particularly at upper levels (Teele, 2004). Gardner explained this phenomenon by proposing that the configuration of intelligences and the relationships between them will shift over time. This shift will be in response to individual's experiences and the sense that they make out of the experience, or fail to make (Gardner, 1999).

The Mental Measurement Yearbook, which reviews instruments to be used in research included two reviews of the Teele Inventory of Multiple Intelligences, the reviewers were; Hess and Kuhlenschmidt. The reviewers cited some strengths of the Teele as having a simple user manual, clear instructions for implementation, a straightforward scoring system, and clear connection to the theory of multiple intelligences. The criticism of the inventory included that it is lacking in a technical manual, there is little or no validity or reliability information available, is supposed to work with grades K-12 but seems to be to childish for that large of an age range, and finally, that it fails to meet minimum psychometric, formal or conceptual standards to warrant it's use as an inventory (Hess & Kuhlenschmidt, 2004).

Assessment Options in Education Today

When considering the impact of multiple intelligence theory, it would be useful to know to what extent multiple intelligence relates to academic achievement, as achievement is the primary way in which schools currently assess learning (McMahon, Rose, & Parks, 2004). Multiple intelligence theory suggests that standardized testing is

an ineffective measure of student progress, which is in direct conflict with current educational policies that emphasize standards, achieving benchmarks, and predictable outcomes (Eisner, 2004). Proponents of multiple intelligence theories feel that in order to give all students an opportunity to succeed we must move away from a one-size-fits-all approach (Teele, 2005). Gardner feels that there is a single way to gage success, students must be given many opportunities to perform their understanding under varying conditions and to receive regular, useful feedback (Gardner, 1999). Education needs to be anchored by two core ideas, 1. what is known about the human condition, in its timeless aspects, and 2. what is known of the pressures of what is to come. Without this duality the education system is doomed to be dated, naive, and inadequate (Gardner, 1999). An alternative approach to schooling would produce an entirely different set of outcomes from children whose intelligence is different (Eisner, 2004). Assessments should include standardized testing but should also utilize alternative assessments in order to accurately measure the multiple ways students learn (Teele, 2000).

In education today standardized testing has been become the primary means of assessment and comparison of students. This is especially prevalent as an annual measure of assessment and student readiness to exit a grade level. Intelligence tests, originally developed to assess student need for specialized instruction, are now being used annually or even biannually as an efficient way to compare school districts, classrooms, and even students (Eisner, 1999).

Although authentic assessments appear to offer a more comprehensive approach to assessing student progress they are considerably more time consuming and not easily

comparable (Eisner, 1999). Researchers argue that alternative assessments may help to correct for biases that occur in standardized testing, despite other criticisms (McMahon, Rose, & Parks, 2004). Overall dissatisfaction with standardized tests along with the new conceptualization of human intelligence and giftedness warrants the use of measures with a more adequate fit between theory and application (Sarouphim, 1999). Do standardized tests that are currently in use actually reveal the thinking that underlies the responses to the questions (Gardner, 1999)?

Educational Reform in Regards to Assessment

Educational reform is a hot topic in today's society. Citizens are more aware of a local school district's progress, as test scores and annual yearly progress information is being publicized. Standardized test scores make statistical data about school districts very easy to understand and comparable from district to district. Statistical data can also easily be manipulated to be misleading. In a period of reform, when many educators are attempting to change the ways in which they present information to learners, standardized testing has remained largely unchanged.

The National Forum on Assessment has defined seven principles for new assessments,... (a) improve student learning (b) supports student learning (c) fair to all students (d) professional collaboration and development support assessment (e) the community participates in assessment development (f) communication about assessment is clear (g) assessments are regularly reviewed and improved (Cutshall, 2001). When considering these principals described and supported among professional educators, I am reminded that the goal of assessment is obtaining information about the skills and

potentials of individuals with the dual purpose of providing useful feedback to the individual and useful data to the surrounding community (Shearer, 2004). Types of assessment may include; student portfolios; scientific investigations, open-ended questions, self-assessment, and standardized testing that involve independent problem solving and combine instruction with assessment (Teele, 1994).

Standardized tests are merely an indication of student performance on subsequent tests (Eisner, 1999). Once students leave the education setting they may never again encounter a multiple-choice test (Walters, 1992). Traditionally, education and assessment have been directed towards linguistic and logical-mathematical intelligences (Emig, 1997). As stated by Diaz-Lefebvre in 2004,

> Too many of our brightest and most capable students are sometimes caught in a system that places too much emphasis on linguistic, word smart intelligence, or mathematical, number smart intelligence, students at all levels of academic readiness are affected by the rigidity of this way of thinking. (p.1)

Although problem-solving contexts are developed in school, they are uniquely structured and largely linguistic. A consequence of such an approach is that students often fail to effectively transfer these skills outside of the school setting and into other realms such as the workplace (Walters, 1992).

Summary of Literature Review

The theory of multiple intelligences and the possibilities of its practical uses remains a complex and controversial topic. While research and development of instruments and theories have continued, there is still much more to be done.

Chapter Two examined definitions of intelligence, history of intelligence and testing, origins of multiple intelligence theory, as developed by Gardner, development and implementation of a multiple intelligences inventory (specifically the *Teele Inventory of Multiple Intelligences*), standardized testing practices, and a critique of these practices in light of current knowledge about intelligences.

In an era of intense reform and accountability, theory, practice, and assessment are in a state of disarray and misalignment. While the federal government seeks to ensure adequate educational opportunity and progress for students, continued investigation of alternative assessment procedures will assure that the education system offers the best to our children who will become the leaders of tomorrow.

CHAPTER THREE

METHODOLOGY

Introduction

In Chapter Three, the methodology utilized in the study is described in detail. The study looked at each individual student's intelligence preference profile as determined by their participation in the Teele inventory. These preference levels were, through statistical analysis, compared with their performance on the NJ ASK-4 standardized test to see if there were any corresponding trends. The Teele inventory was utilized to see if any of these intelligence preferences correlated with higher performance rates on standardized tests. The idea for the study stems from personal interest, experiences, and observations that I have made as an educator in several public schools. The study was conducted between the months of January and March of 2007 and I utilized students at the school where I currently teach as my subjects.

Population and Sample Selection

The sample population was selected from a small, rural school district in southern New Jersey. The total population of the district is approximately 1,300 students between one elementary school and a middle school/ high school building. The elementary building houses 780 students in preschool through sixth grade. The district is of low socio-economic status, having a district factor grouping of CD in the 2000 census. The CD group designation is on a eight part scale with the lowest designation being that of an

A, then B, CD, DF, FG, GH, I, and finally, J. District Factor Grouping is used by the New Jersey Department of Education to approximately measure a community's relative socio-economic status. Grouping was first developed in 1975 so students' performance on statewide assessments could be compared among districts that were demographically similar (District Factor Grouping System, 2004).

The sample was selected due to convenience, maturity level, and accessibility to standardized testing scores that additionally have reliability and validity information available. The sample initially consisted of the entire fifth grade class of 95 students. Once parental consent forms and testing data were gathered and examined, the number of participants decreased. Of the initial 95 students, one moved out of district and another student moved in, 23 students either did not bring their permission slips back or decided not to participate in the study, another nine students did not have test scores available, one student was absent on the day that the inventory was conducted, and two students made serious errors in filling out the inventory and their scores could not be tabulated. Once all these factors were taken into consideration, the sample size decreased to 64 students.

Attaining Permission to Conduct the Study

To obtain permission to conduct the study it was necessary to present a packet of information on the study to the principal of the elementary school. The packet established the purpose and procedures that were to guide the study. I also met with the principal to clarify information provided in the packet and to determine other guidelines that might be necessary. The packet consisted of an explanation of the proposed study, a

letter asking for permission to conduct the study, IRB paperwork, proposed parental consent form, researcher certification of completion for the on-line course in Human Participants Protection Education for Research Teams, administrative acknowledgement letter, and a copy of the instrument to be used, the *Teele Inventory of Multiple Intelligences*. The principal reviewed the packet, and, in turn, the principal discussed the proposed study with the superintendent to determine if school board approval must be obtained. During the meeting with the principal, it was determined that I had to ask the parents for permission to utilize individual test scores, so the parental permission form was revised. The principal was also interested in how the school, teachers, and students might benefit from the information that would be gathered by the study. I explained to her that I planned to share the individual intelligence preference profiles with the students and their parents after the inventories were conducted. The principal and I further discussed how the individual profiles might be shared with the teachers so as to benefit each classroom as a learning community while maintaining confidentiality of test score information. It was decided that I would meet with each teacher in the fifth grade team and share the individual student profiles of multiple intelligence as well as the class profiles. The goal of this would be to determine if there are any predominant intellectual preferences in the class so that information could be utilized for better instructional practice.

The principal meet with the superintendent about the project and informed me that I had to meet with the superintendent and propose the study to him myself. I met with the superintendent and further explained the project. We determined what information

could be shared with the teachers and agreed that no paper copies of inventory results or test scores would be given to the teachers or put in any permanent files. Coding of students was also discussed to protect confidentiality, and the destruction of all recordings of test scores after the completion of the study was decided upon. The superintendent also requested that I present my thesis to the entire faculty upon completion. Finally, the superintendent required that the study be school board approved, so I further presented a copy of the proposal to go before the school board that included a finalized copy of the parental permission slip and the IRB proposal that had been submitted.

On December 5th, 2006, the IRB application was submitted for review and permission for research was granted on December 13th. Meanwhile, the study went before the school board on December 11th, and permission was granted pending IRB approval and paperwork submitted to the superintendent. I received IRB approval paperwork January 2nd and submitted the letter to the superintendent on the following day.

I began handing out parental consent forms on January 5th during normally scheduled art class time. Before handing out the slips, I explained to the students that the study and inventory would have bearing upon neither their grade in art class nor in any other class and also that the information about their intellectual preferences would be shared with the students, their parents, and their classroom teachers once inventories were tabulated. I also explained that their participation was entirely voluntary and that I would like to have the permission slips back whether the answer was yes or no. Either way was

acceptable. The days that were selected for the completion of the inventory were February 8th, 9th, 12th, and 13th, 2007. The inventory was conducted during the students' normally scheduled art class, and students who had not returned slips or who had chosen not to participate were sent to another special area class while the inventory was being conducted.

Instrumentation

Teele Inventory

The Teele Inventory of Multiple Intelligences (TIMI), developed in 1992 by Teele, was used to determine a subject's primary intelligence. The inventory uses a series of forced-choice images depicting pandas performing certain activities that represent the individual intelligences. Subjects look at pairs of images and have 28 opportunities to select the image that best represents activities that they would prefer to take part in. The students have eight chances to select each of the seven intelligences. The inventory itself had no time constraints, but was conducted with groups of students therefore; group pace dictated time limits. The inventory was conducted during the student's normally scheduled art class period. The inventory was preceded by directions and a brief explanation of what the inventory was, along with a verbal example of how to answer the questions and was followed by a question and answer session that included a more in-depth explanation of what the inventory was actually quantifying.

Establishing reliability and validity for the *Teele Inventory of Multiple Intelligences* (TIMI) is an on-going process (Teele, 1995). When the instrument was created, field-testing was conducted at an elementary school in California to examine

content validity. An item-by-item analysis of images was done and many corrections were made to the inventory to ensure that the images were as valid as possible in representing each specific intelligence (Teele, 2005). Teachers were asked to validate the information provided from inventories their students completed. The teachers agreed that the findings were an accurate portrayal of their student's intellectual profiles (Walters, 1992). A perusal of standardized test scores compared with TIMI results suggests that more formal validity studies would be supportive (Teele, 1995). Test-retest studies have been conducted and results indicate that there is a higher reliability of results over a shorter period of time. The short period of retest reliability could be the result of shifts in intellectual preferences shown to occur over time (Teele, 1995). Teele also examined reliability by correlating MAT 6 (a California standardized test) scores with TIMI results and found correlations. Specifically two students scores were examined and convergent validity was established (Teele, 1995). In regards to validity, over 20 doctoral students have used the inventory in the development of their dissertation, which may contain additional validity documentation (Teele, 2005).

NJ ASK-4

The NJ ASK-4 (New Jersey Assessment of Skills and Knowledge) consists of two content areas: language arts literacy and mathematics. The NJ ASK was designed to give an early indication of student progress in mastering knowledge and skills outlined in the Core Curriculum Content Standards. The scores within each content area receive a scaled score and corresponding performance level. These are as follows, (a) 100-199 Partially Proficient, (b) 200-249 Proficient, and (c) 250-300 Advanced Proficient. The

reliability estimates for the NJ ASK 4 are as follows, 0.85 for language arts literacy and 0.89 for mathematics. NJ ASK assessment validity is based upon alignment with the core curriculum content standards, no specific numerical data was offered (Grade 3 and 4 New Jersey Assessment of Skills and Knowledge Technical Report, 2004).

Data Collection

While permission slips were being collected, NJ ASK-4 test scores were acquired from the students' permanent files and entered into a coded table. Once inventories were conducted, they were scored and each student received a score of zero through eight in each of the seven multiple intelligence categories. These scores were also entered into the coded table.

Inventories were conducted during normal art class time of 40 minutes, from 10:00 to 10:40 a.m., and the duration of the inventory did not exceed 30 minutes. I explained to the subjects that their participation would not in any way affect their grade. I explained how the subjects would view 28 pairs of images that are marked A and B. To make tabulation of choices easier and more accurate, I had the students fill the A or B box in with a highlighter so that I could better see when I placed the overlay on their inventory and counted up the selections. For each of the pairs, the subjects highlighted the image, A or B that best represented them or the activity that they preferred. I explained that the student must select one answer for each question and cannot select both boxes or select neither box. I held up an example of a filled out answer sheet so that the students would understand how to highlight inside each of the squares. I also explained to the students that sometimes they would not really like either of the activities,

and that they would have to select the one that is less distasteful to them. For example, if I had to choose between doing math (A) or playing baseball with my friends (B), I really don't like either, but math is worse than baseball for me, so I would select B. Conversely, I explained that they may like both choices, for example (A) painting, (B) sculpting, both of which are artistic in nature, but as a three-dimensional artist, I would have chosen (B).

I asked if there are any questions and reminded students that once the inventory began there must be no talking or discussions as it may affect peoples' answers. I also reassured the students that they would be able to ask questions once the inventory was completed and handed in and to save their questions for then. I directed the subjects to fill in their names, genders, and ages with a pencil. I also asked them to put a large X through their answer if they make an error in their selection. I began after a moment by putting the first set of images on the overhead. I put the images on the overhead in succession until the subjects had answered all 28 questions. I read the overheads to the students when there was text or thought bubbles in either the A or B selection. Once the inventories are completed, I asked the students to turn their inventories over while I collect all materials, and then I took a moment to better explain what the inventory results should reveal. I let the subjects know that once the inventories are scored, I will provide results for them, their parents or guardians, and their homeroom teachers.

Methodology

Data was complied in a table within the following columns: student identification number, permission, teacher, gender, age, ASK-4 reading score number, ASK-4 math score number, and a scaled score from zero through eight in each of the seven

intelligence columns (linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, intrapersonal, and interpersonal). This data was later being entered into the SPSS program to be manipulated.

Data was examined using a non-parametric, Spearman-Rho correlation. This compared the student's score of preference for each intelligence with their performance on each of the two areas of the ASK-4 standardized test. Each of the seven intelligence groups was manipulated in this way in search of interesting relationships.

Summary

Chapter Three described the sample population of the study, how it was selected, and how it would be used. The steps taken to attain permission to conduct the study were described at length. The process of attaining parental consent for test scores and to participate in the inventory was explained. Finally, the process of conducting the inventory itself, what scores would be attained, how the scores were to be compiled, and what will be done with the scores was revealed.

CHAPTER FOUR

FINDINGS

Introduction

In Chapter Four, I examined the information revealed by running correlations of test scores in SPSS. The data to be correlated were the 64 students' ASK-4 Reading and Math scores and levels of preference for each of the intelligences measured within the Teele inventory. This data will be correlated with SPSS utilizing a Spearman-Rho nonparametric correlation.

Data Entry for SPSS

Once all the data on the students was collected, I was able to finish filling out the data tables by hand. The format for the data collection table was developed keeping in mind that the next step would be to enter the data into SPSS. When transposing data from the data collection tables into SPSS, the majority of the data stayed exactly the same. It was only converted into a numerical value. The only changes that occurred while entering the data into SPSS was the addition of a variable to represent general education versus special education and the omission of grouping of the ASK-4 test scores (AP, P, and PP).

Once all data was entered into SPSS, I determined which students had data missing that would affect my ability to use them as subjects. At this point, I eliminated several of the subjects because of missing data thus reducing my sample size from n=95

to n=64. Once data was finalized, a Spearman-Rho nonparametric correlation was run on the data. This type of treatment was selected because the Teele inventory scores are interrelated, and so they are not independent samples. Once the correlations were run, output tables were formed, see Table 1.

Table 1

Spearman-Rho Nonparametric Correlation Between ASK-4 Reading, Math, and Teele Inventory Intelligence Preference Results.

	ASK-4 Reading	ASK-4 Math	Ling.	Logical-Math.	Spatial	Musical	Bodily-Kin.	Intra.	Inter.
				Students (n = 64)					
ASK-4 Reading	___	.619**	.294*	.110	-.187	.186	-.023	-.420**	.005
ASK-4 Math		___	.299*	.303*	-.057	.078	-.070	-.369**	-.205
Linguistic			___	.334**	-.199	-.238	-.185	-.284*	-.448**
Logical-Mathematical				___	-.242	-.258*	-.177	-.383**	-.499**
Spatial					___	-.173	-.142	.107	-.198
Musical						___	-.359**	-.039	.129
Bodily-Kinesthetic							___	-.131	.124
Intrapersonal								____	-.088
Interpersonal									___

** is significant at the 0.01 level, two-tailed
* is significant at the 0.05 level, two-tailed

Findings

Of the correlations only one showed a level of correspondence above a .6. This correlation was between the ASK-4 Reading and Math scores which were related at a r=.619 correlational coefficient and a significance level of p=<.001. There were no

significant correlations found between ASK-4 test scores and intelligences or between the multiple intelligences themselves.

Summary

In Chapter Four, I described the findings of the study. The major point of interest was that there were no correlations between preferred intelligence modes and performance on standardized tests. This finding, or lack thereof, was very thought provoking. Several possibilities were briefly discussed in Chapter Four and will be further elaborated on in Chapter Five, areas of further study and discussion of the findings.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

Introduction

Chapter Five focuses on discussing the findings of the study, examining options for areas of further study, and discussing the implications of the study for practitioners. In examining the results of the study many other options for how the study could have been conducted differently arose. The use of different instruments, different sample size, age of the sample, or a different comparison of scores were several of the options. It also brought to light some assumptions that were made that could have affected the study. For example, is there really a connection between student preferences and abilities, how much does test taking ability effect standardized testing results, are we able to accurately gauge student preferences for intelligences?

Discussion of the Findings

The primary finding of the study was that there were no correlations between fifth grade student's preference for multiple intelligences and performance levels on standardized tests. This could be the result of several different factors. There could be no link between preference and performance in regards to intelligence. This presents the possibility that more often than not just because an individual has a preference for something does not indicate that they have an ability for it, and conversely just because they are good at it does not mean they prefer it. Possibly students at this age are

incapable of accurately gauging their strengths and weaknesses are and how they relate to their preferences of intelligence. One would reasonably expect that an individual would become better able to gauge their abilities and preferences over time, finding this out would be an area for further study. Perhaps abilities and preference are dictated or skewed by other factors such as mindset, I thought about this when considering myself as a student. In school and now as an adult I avoid doing math and view it as a weakness, when in reality on standardized tests and the SAT's I scored very well in the areas of math.

All other correlations between ASK-4 scores and multiple intelligence preferences showed no correlations either negative or positive. This finding is interesting in that at a minimum I would have expected to find a weak correlation between ASK-4 Math and Logical-Mathematical intelligence preference and ASK-4 Reading and Linguistic intelligence preference. These levels of correspondence were r=.303 for Math and r=.294 for Reading which are not high correlations. One supposition is that students who showed a higher preference for Musical, Spatial, Bodily-Kinesthetic, Intrapersonal, and Interpersonal intelligences would have preformed poorly on the ASK-4 tests. This would have showed up as a strong negative correlation, which also did not happen. The correlation for Spatial was r=-.187 for Reading, r=-.057 for Math, Musical was r=.186 for Reading, r=.078 for Math, Bodily-Kinesthetic r=-.023 for Reading, r=- r=.057 for Math, Intrapersonal was r=-.420 for Reading, r=-.369 for Math, and Interpersonal was r=-.023 for Reading, r=-.070 for Math. The highest of these correlations that is negative is for Intrapersonal. While the correlation is not at a significant level, it is interesting

because these students are described by Teele in the technical manual (that explains the inventory) as being aware of their own strengths and weaknesses, having a deep sense of self-worth, confidence, independence, strong will, and motivate themselves to do well on independent things. From this description I would expect this group of students to do well on standardized tests, as it is a very independent task. This leads us to question weather or not student really are aware of their own strengths and weaknesses at this age (10, 11, and 12) and if they are able to capitalize upon their knowledge of their strengths and weaknesses.

In looking at resulting correlations, there appeared to be no relationship between student's abilities, for example in math, and their preference for that intelligence. This takes us back to our construct of intelligence and how narrow a construct of intelligence standardized tests measure. Perhaps a student exhibits a preference for math intelligence and enjoys problem solving and is able to reason through the majority of more advanced math problems but does not necessarily arrive at an answer in the prescribed way. This student's intelligence would not be accurately reflected in standardized tests scores because that style of test is incapable of assessing the creativity that went into that student's problem solving abilities.

Another consideration is the idea of student's abilities when it comes to taking tests. Individuals exhibit different levels of stress when it comes to performance situations such as standardized tests. Individuals also may react to the environment that is expected during a standardized test. The environment during a test is often quite different than a typical day in the classroom when groups work together on projects,

discuss ideas and participation is encouraged. In a testing environment you would expect absolute quiet, nothing on their desks, specific time constraints, and the physical look of the test booklet and answer blank would be different than what a student is used to. Personally, I think that the standardized testing environment made it easier for me to focus and give a better performance on a standardized test, however the experience is different for each child.

When the correlations were run there was a significant correlation between the students ASK-4 Reading and Math scores which were related at a r=.619 correlational coefficient and a significance level of p=<.001. This finding is very interesting and leads us to speculate if it is reflective of the individual's abilities in Reading and Math or of something else, perhaps the structure of the test itself. There was no correlation, whither positive or negative, between each of the multiple intelligence preferences and each other. You would expect to find some variety of trends somewhere, and yet there was none. The implication of this finding is that individuals are even more complex and dynamic than I had perhaps thought leaving us with virtually no guidelines to follow to figure their preferences and abilities out. This also is a possible reason for why I was unable to map their preferences on their standardized test scores. Perhaps most importantly in the finding are the implications that it holds for teachers. Mainly it implies that students are all individuals and they can't rely on generalized information and trends because it does not accurately apply to each student as a dynamic individual.

Recommendations for Further Practice and Research

The results of this study brought about many areas of interest for further study. These include; how are standardized test scores affected by student's reaction to the standardized testing environment? Do standardized test scores accurately reflect the entire intellectual makeup of the individual? Are we able to accurately gauge multiple intelligences? Are we able to accurately gauge preference for intelligences? Are students aware of their preferences? Are student's abilities to gauge their preferences developed over time? Are their other extraneous variables that may alter their view of their preferences and abilities? Does this effect the ways in which students are able to capitalize upon their strengths and weaknesses? Are students able to gauge their abilities, strengths and weaknesses?

One possible area for further study would be to conduct a longitudinal study. To conduct this type of study the sample size would have to be very large to allow for sample mortality, due to the length of the study. The study should be conducted for an extended period of time, preferably the duration of the student's school experience. Inventories would be conducted intermittently, perhaps every three years (kindergarten, third, sixth, ninth, and twelfth grades), to see if student's preferences for intelligence modes change over time and if student's abilities to gauge their own abilities and utilize this knowledge change over time.

I would also be interested in replicating this study while utilizing another instrument. One of the limitations of this study was the subject's age, which dictated the instrument utilized. If I had older students I would have found a way to use the MIDAS,

an instrument developed by Shearer and reviewed and revised by Gardner. The drawback to this instrument is that the results can only be read by an individual with a psychology degree and is quite lengthy to administer. I would be interested in seeing if the intelligence profile that it produces could be compared with standardized testing scores and if there would be a difference in the results because the MIDAS is a much more in depth assessment of a child's intelligence profile. I would also be interested in pursuing studies into student's predicted preferences of intelligence, student's preference compared with abilities, or a complete assessment of multiple intelligence profiles utilizing different instruments and comparing the results.

Implications for Practitioners

The results of this study had some implications that should be noted for practitioners. Perhaps most importantly is the idea that each student is highly individualized in their preferences for multiple intelligences and their combinations of them. With each student bringing such a unique makeup into the classroom how can teachers best reach each student? I believe that most conscientious educators already instinctively know that in order to effectively instruct all students, there needs to be a degree of individualization that is incorporated into all aspects of schooling. This concept has serious implications for the public educations system as it is currently structured, however. Individualization is practically impossible at this time when heterogeneous grouping and classes of 25 to 35 students or more are the norm.

Summary

In Chapter Five the findings of the study were discussed, recommendations for areas of further study, and implications for practitioners were described. The study found that there were no correlations between student preferences for multiple intelligences, as determined by the Teele Inventory of Multiple Intelligence and higher performance rates on the NJ ASK-4 standardized test. There were also no correlations between student preferences for intelligences within the seven multiple intelligences. The only correlation discovered was between the two sections of the ASK-4, the reading and math sections, where there was a correlation of r=.619. The findings of this study were very thought provoking and lead to a lengthy discussion of possible considerations. These considerations included, Are students preferences and abilities related? Are students able to gauge their abilities? Does a student's capacity to gauge their ability depend upon their age? Are standardized tests an accurate representation of all student abilities? Does a preference signify ability or is it simply a preference? How much of an effect does environment have upon test takers ability to complete and be successful in taking a standardized test? Are we able to gauge multiple intelligences? These questions arose as well as many others. From these questions several areas of further study were derived. Could a longitudinal study of multiple intelligence preferences compared with standardized test taking results shed further light upon the ability versus preference? Could the use of another instrument in determining multiple intelligences in a study provide a better sense of ability versus preference? Finally, this study had implications for practitioners. The significant finding of the study was that each student has a unique

and individual makeup of intelligences that are not readily predictable and does not correlate with performance on standardized tests. Therefore, teachers need to look closer at the ways in which they instruct and transmit information to their students since their student's preferences and abilities are not necessarily the same.

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APPENDIX

Simmons Elementary School
Clayton Public Schools
300 West Chestnut Street
Clayton, NJ 08312
Phone: (856) 881-8704
Fax: (856) 307-0924

Mrs. Patrice Taylor
Principal

Ms. Maureen Czbas
Assistant Principal

December 13, 2006

Dear Parents or Guardians,

My name is Suzanne White. I am the art teacher at Herma Simmons Elementary School. I am also a student at Rowan University pursuing my master's degree in art education. I am working on my thesis, which studies what strengths of intelligence (Ex; mathematical, linguistic, special, musical etc.) students have and how this relates to their performance on standardized tests. I am asking for your help collecting information so I can complete my research.

This letter is to ask for your permission to allow me to have your 5th grade student complete a picture inventory and for me to access their standardized test scores. The inventory will be conducted during one art class period. This inventory will help me to understand what their strength of intelligence is. After the inventories are scored and student strengths are calculated you and your student's homeroom teacher will receive a detailed explanation of the scores so as to enhance instruction. The results of this inventory may offer incites into how your child learns. *All information collected in this study will be kept confidential and no student name will be used in the final report. Your student's participation in this study is not required, and will have no effect upon their grade, standing in class, or any other status. If you have any questions regarding this project or it's results please feel free to contact me at school or to contact my faculty thesis advisor, Mr. Richard Dammers. (Phone: 856-256-4500 ext. 3720 or e-mail: dammers@rowan.edu)*

Thank you for your time and consideration!

Sincerely,

Suzanne M. White

Please complete and return the following page.

Simmons Elementary School
Clayton Public Schools
300 West Chestnut Street
Clayton, NJ 08312
Phone: (856) 881-8704
Fax: (856) 307-0924

Mrs. Patrice Taylor
Principal

Ms. Maureen Czbas
Assistant Principal

Parental Permission Slip

Student Name: _____

Homeroom Teacher: _____

Parent and / or Guardian Signature: _____

Please Check One:

____I give Ms. White permission to have my student complete the inventory of intelligences and share the results with my student's homeroom teacher. Ms. White may also access my students test scores for her research. (You will also receive a detailed copy of the results of the intelligence inventory.)

____I do not wish for my student to participate.

____Check here if you wish to receive a signed copy of your consent letter back.