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Using a Multiple Intelligence Checklist in Determining Multiple Intelligence

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USING A MULTIPLE INTELLIGENCE CHECKLIST IN DETERMINING MULTIPLE INTELLIGENCE

Rebecca Vee Ralston, M.A.T., MA,

An Abstract Presented to the Faculty of the Graduate School of Lindenwood University in Partial Fulfillment of the Requirements for the Degree of Masters of Art

August, 2000

Abstract

Multiple Intelligence Theory was introduced in 1983 by Howard Gardner in his book *Frames of Mind*. Since the book was introduced, many educators who were searching for new methods to reach their students have utilized the theory of Multiple Intelligences in their classes. To assist in determining students' areas of strength in Multiple Intelligence. The Multiple Intelligence Checklist (MIC) was used in this study. Students, seven hundred seventy-seven, from a suburban elementary school were asked to complete the MIC. Data was collected from students in grades 2 through 5. A factor analysis was completed to determine if the checklist would be a reliable method to assess a student's strengths. The factor analysis concluded that no common factors could be explained by the inter correlation among the seven areas of intelligence using the MIC.

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COMMITTEE IN CHARGE OF CANDIDACY

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Dedication

This thesis is dedicated to my husband, Rob, without whom I would not have had the desire to pursue my dream of counseling. My mother, Vee, and my father, Bill, who have always believed in me and my abilities and continue to do so today. My feline family, Tobi, Stephen, Ariel, Opal, Savannah, and Sabrina that spent many hours researching, reading, and typing with me while I completed my thesis.

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Preface

During my 20 years in the education field I have attempted to provide learning experiences that would not only be important to the students, but also engage their curiosity. I have been attempting to accomplish this long before I knew anything about Multiple Intelligence Theory. I have always learned best when I had more than one learning modalities in place at one time. While listening to tapes while I'm driving, I recall more of the information later because I am doing something physically while I'm listening to the tapes. I have since trained myself to read and retain information, but that is by far not my learning style of preference or the area of intelligence in which I learn best. Over the years, I have observed many students get discouraged in their academic lives because they have not been able to find how they learn best. All students should have the opportunity to increase their awareness regarding their personal area of multiple intelligence as it relates to them as a unique individual.

> Do not then train youth to learning by force and harshness, but direct them to it by what amuses their minds so that you may be better able to discover with accuracy the peculiar bent of genius of each.
>
> Plato

Chapter One

Introduction

Many different definitions of intelligence exist today. David Wechsler (1981) defined intelligence as: the global capacity of an individual to act purposely, think rationally, and deal effectively with their environment. He also believed affect and emotions affect cognition (Wechsler, 1981). Plucker (1997) indicated that Aristotle believed that intellect consists of 2 parts: passive intellect and active intellect. In combination with these parts he believed that knowledge is obtained through the psyche's capability of intelligence; although the senses are necessary to obtain knowledge.

These definitions indicate the vast differences throughout the ages from Aristotle's very early definition of intellect to Wechsler's definition of intelligence. Defining intelligence has been a task that many psychologists have pursued. Galton, a British psychologist, and Binet, a French psychologist, in the last half of the 19th century worked toward determining a clear, universally recognized understanding of intelligence (Shobris, 1996). Unfortunately a clear, universally recognized understanding of intelligence has not yet been determined. However, the formation of intelligence tests and the success of those tests, such as the Wechsler Intelligence Scale for Children 3rd Edition (WISC-III) and the Standford-Binet Intelligence Scale 4th Edition, often define intelligence by what the tests measure (Shobis, 1996).

To date, measured intelligence has been found to reflect past experiences in school as well as predicting future school success (Hillel,1977). Traditional IQ tests such as Wechsler's WISC-III and the Standford-Binet primarily measure the functioning of the postrolandra cerebrum, especially the prefrontal cortex (Shobris,1996). However, Shobris' (1996) research indicates that studies completed in the mid '80's regarding the WISC-R and factor equivalence show that Hispanic American and Native Americans both have differences in the numbers of factors and factor patterns. To date no research has been done to corelate Shobris' research with the WISC-III. Thus the construct validity when applied across

different groups universally seems in question (Shobris, 1996; Dana, 1993; Hersey, Kazdiz & Bellack, 1991).

Even though there are questions regarding the validity concerning Intelligence Quotient (IQ) testing, IQ tests are still widely used in the education field to diagnose students with a variety of educational disabilities. Shobrig (1996) believes a credible theory of intelligence must demonstrate consistencies with neuropsycholgical data and current models of brain processing. Such theories as Gardner's (1983) theory of Multiple Intelligence and Sternberg's (1985) Triachic model may lead to a more realistic definition of intelligence.

The Theory of Multiple Intelligence was conceptualized by Howard Gardner (1983), a Harvard theorist. Gardner (1983) believes the current view of intelligence, the global capacity of an individual to act purposely, think rationally, and deal effectively with their environment (Wechsler, 1981), needs to be expanded and reformulated to devise a more appropriate and effective method of educating all students. Gardner (1983) proposed a new definition of intelligence after hundreds of research studies had been completed by himself and others. Gardner's (1983) definition of intelligence is the ability to solve problems or to fashion products that are valued in one or more cultural or community settings (Gray & Viens, 1994). Following that definition, Gardner (1983) identified seven primary intelligences: Linguistic, Musical, Logical/Mathematical, Spatial, Bodily/Kinesthetic, Interpersonal, and Intrapersonal.

The seven primary intelligence areas appeal to the educators desire to have all students learn and succeed. Thomas Hoerr, after visiting the Key School in Indianapolis assisted the New City School, by creating a philosophy regarding the incorporation of the Multiple Intelligence (MI) Theory into how children learn, and how teachers teach (Hoerr, 1994). Using the MI Theory the teachers have developed a system of observations to assist in the identification of student's multiple intelligence strengths.

While the New City School and Harvard Project Zero believe the best method for identifying a youngsters' intelligence strengths is through trained

teacher observations over extended periods of time (Appendices A, B,C) (Hoerr, 1994, Gray & Veins, 1994); others have developed checklists and scales to detrmine student preferences. Many different instruments exist such as Lazear (1994) Self-Analysis (Appendices D,E,F), Robert Taylor's (1997) Teacher Checklists (Appendix G), Armstrong (1994) Assessing How Your Child Learns/Assessing How Your Student Learns; to determine the preference of the individual student's intellectual strengths and/or weaknesses. Lazear's (1994) Self-Analysis is a Likert Scale, to be completed by the students, with a separate form for elementary, middle school, and high school. The other checklists, including Taylor's (1997) and Armstrong's (1994) are completed by parents or teachers. Hoerr (1994) advocates the most accurate determination is the compilation of observations of student choices over a period of time. While this method may be accurate, a method to develop a foundation for observation of the individual student's personal interest would assist the educator and parent in offering the best possible learning environment. Sternberg (1994) stated that psychologists reflected desires for tests, experimental or otherwise, be given in an attempt to test Gardner's theory. To date most of the determination of MI preferences is derived by observation of instructors, parents using checklists and/or activity based instruction.

The Multiple Intelligence Checklist was introduced, to allow for another possible method of determining a student's MI from the student's perspective. The Multiple Intelligence Checklist (MIC) (Appendix H) was presented at a workshop entitled: "How are You Smart"? Integrating the Multiple Intelligences into the Curriculum and Classroom by Carolyn, Rakotz (1997).

Because teachers often seek new techniques which can assist them in helping students, the MIC appeared to be a welcomed new instrument to assist in understanding the best way to approach student learning. Consequently when Gardner (1983) introduced the Theory of Multiple Intelligence the educational profession rallied around the theory in hopes of finding a method which can assist educators in discovering each student's strength thereby capitalizing on the

student's strengths and developing the weaknesses or at least compensating for them (Sternberg 1994). Each person has a unique configuration of his/her personal abilities. The MIC may allow educators a technique to identify the student's strength and focusing on those strengths while developing their weaknesses. Consequently, the students may excel in their educational endeavor and in life in general (Sternberg, 1994).

Statement of Purpose

Teachers and administrators have a difficult task. That task is to attempt to determine how each student learns best. This procedure can be very difficult because teachers do not always have the tools to assess the students' strengths. To assist teachers in discovering an instrument that accurately assesses a student's strengths and weakness the MIC was analyzed using the SYSTAT program to determine if seven factors actually exist within the MIC and whether an intercorrelation exists among the seven areas of intelligence using the MIC.

Hypothesis

Null Hypothesis: No common factors can be explained by the intercorrelation among the seven areas of intelligence on the Multiple Intelligence Checklist ($p < .05$).

Alternate Hypothesis: The factors are sufficient to explain the inter correlation among the seven areas of intelligence on the Multiple Intelligence Checklist ($p > .05$)

Chapter Two

Literature Review

Intelligence: Historical Background

Historically, the nature of human intellect has made scholars inquisitive with regard to the foundation of intelligence for many years (Plucker, 1997). Plucker (1997) detailed a Time Period Index (Appendix 7) of the history of influence in the development of intelligence theory and testing. The list contains many contributors and persons who influenced scholars, philosophers, mathematicians, and psychologists. Some of the most famous and influential were Plato and Aristotle from 425BC-1838 who began the exploration.

Plato, a Greek Philosopher, founded a school of science and philosophy which was called the Academy or the first university. Plato's philosophical theory of a soul included three components: will, reason, and appetite (Plucker, 1998) Plato envisioned that a soul requires reason, the highest part, to control the appetite, the lowest part, with assistance from the will (Plucker, 1998). Plato believed the soul was reincarnated after the body dies, where in the soul had dim recollections of what it had learned previously (Zusne, 1957). Plato concluded from his philosophy that learning consists of reliving what the soul experienced in the realm of other forms (World Book). Therefore, ... "knowledge is not given by the senses, but acquired through them as reason organizes and makes sense out of what is perceived" (Zusne, p.6 1957).

Aristotle followed Plato's ideas and was often referred to as the Father of psychology. Aristotle suggested that intellect consists of two parts: passive intellect, similar to matter, and active intellect, similar to form. Aristotle states that intellect "is separate, unmixed and impassible, since it is in its essential nature active" (Britannica Online, 1997). He believed that thinking requires that use of images, and only man thinks even though animals can imagine (Zusne, 1957, Plucker, 1998).

From Philosophy, Mathematics and Biology emerged. Psychology

followed during the time period 1690-1869, which Plucker (1997) calls Time Period 1 or Modern Foundations. Schools of psychology in Europe and the United States quickened the development of the areas of psychological sciences. Some of the contributors during this time period were: Galton, Charcot, Binet, Freud, Wundt.

Francis Galton, a British Psychologist, developed the correlation method as applied to behavioral and mental phenomena. He opposed the psychologist who stressed the environment's impact on character or intelligence and was convinced that success was due to heredity (Plucker, 1998, 1997). Another contributor, Jean Charcot, a neurologist created neurology as a discipline. Binet and Freud were students of Charcot (Plucker, 1998, 1997).

The school of psychology yielded Wilhem Wundt, a German Philosopher and Psychologist and Sigmund Freud, an Austrian psychoanalyst. Wundt was known as the Founder of Modern Psychology. He moved psychological study from philosophy to utilizing physiological experimental techniques in his laboratory (Sheehy, Chapman, & Conroy, 1997; Plucker 1998). Sigmund Freud, a student of Charcot helped to establish the Vienna Psychoanalytical Society (Plucker, 1998).

From the era of Modern Foundations came the time frame of 1832-1901 which yielded The Great Schools and the Great Schools influence during 1904-1936. These schools were instrumental in the development of the United States Army's intelligence testing. Major contributions from Pearson, Spearman, Binet, Yerkes, Goodenough, and Piaget were among the talents (Plucker, 1998, 1997).

Alfred Binet, a French Psychologist and a student of Charcot (Plucker, 1998) developed the Standford-Binet Intelligence Scale. Binet argued that intelligence could not be isolated from circumstances, true experiences and personal association of the individual (Plucker, 1998; Francher, 1985). Eventually he began to study suggestibility in children's experiments. A student, Theodore Simon, attempted to develop a test to measure intelligence. This was the first Test of Intelligence that was published in 1905. Binet believed that intellectual levels could change over time (Plucker, 1998; Francher, 1985). Binet's testing discoveries

began with a trial of all kinds of puzzles and tests that he tried out on his daughters. Through this study he discovered the importance of attention span on adult intellectual development (Plucker, 1998; Francher, 1985).

Florence Goodenough, an American Psychologist developed the Goodenough Draw-A-Man and the Minnesota Preschool Scale test. She believed that an Intelligence Quotient (IQ) could be reliably measured in preschools (Shurkin, 1992; Plucker, 1998). She questioned the use of IQ and felt percentage would be easier to understand by lay people and believed intelligence is a stable entity (Shurkin, 1992; Plucker, 1998, 1997).

Karl Pearson a British Mathematician, had an influence led that led to the development of some central techniques of modern statistics (Plucker, 1998). Pearson's research assisted in laying the groundwork for statistics. He defined correlating regression analysis and standard deviation. Other principles included: Chi-Square, Kurtosis, multiple correlation and partial correlation (Shurkin, 1992; Plucker, 1998).

Charles Spearman, an English Psychologist, developed the theory of two-factor intelligence: specific factoring "s" and general intelligence "g". He studied under Wundt, but was influenced by Galton (Francher, 1985; Plucker, 1998). The two-factor intelligence theory relates that the performance of any intellectual act requires some combination of General Intelligence or g. Spearman believed the individual has available to him some amount of g for all intellectual acts. The s or specific factors are specific to an act and can vary from task to task (Francher, 1985; Plucker, 1998).

Jean Piaget, a Swiss Child Psychologist identified four stages of mental growth in children. The stages include sensory motor, from birth to 2 years in which time a baby begins gaining motor control. The preoperational stage takes place between the ages of 2 and 7 when verbal skills begin to emerge and the toddler begins to name objects and use reason ability. The third stage, concrete operational, takes place from ages 7-12 during which time the child begins to understand abstract concepts, numbers, and relationships. The formal operational

stage begins between in the ages of 12-15 when the youngster begins reasoning logically and systematically (Robach & Kiernkin, 1969; Plucker, 1998).

Yerkers, an American Psychologist, developed group intelligence testing. Yerkers worked in comparative psychology with chimpanzees and apes. One of his students was instrumental in teaching gorillas to use sign language. He cross referenced the intellect from chimp to child. Yerkers in 1917 began proposals for the military to develop group testing for recruits (Francher, 1985). Intelligence testing was broadened due to these proposals because large numbers of recruits had to be tested at the same time (Sheehy, 1997). These new tests also had to determine a difference and a range of superior through mentally retarded ability to enable the military to train properly (Sheehy, 1997; Plucker, 1998).

After the Great Schools, the next time period Plucker (1998) refers to is Contemporary Explorations in which contributors were: L. L. Thurstone, and Wechsler (Plucker 1998 & 1997). One of the contributors during this period, David Wechsler, who worked with C. Spearman and K. Pearson at the University of London (Plucker, 1998). Wechsler believed Spearman's theory of intelligence, the Two-Factor theory, was too simple. Consequently, Wechsler interpreted intelligence more of an effect than a cause (Plucker, 1998). He also believed intelligence to be a multifaceted aggregate and an aspect of the total personality, not an isolated entity (Francher, 1985; Sheehy, 1997). Contemplating other contributors previous ideas, L.L. Thustone, a psychometrician, believed lower intelligence is characterized by acting on impulses without reflection, while high intelligence deflect less than optimal impulses in an attempt to reach a goal (Francher, 1985; Plucker, 1998; Sternberg, 1994).

The 5th Time Period Plucker (1997) identifies current efforts, taking place from 1969-1985 which includes contributions from R. Catell and Gardner (Plucker, 1997). During this period there appeared to be a deemphasis on standardized testing and much more focus on multiple intelligence as well as concentration in many areas such as the "environmental, biological, and psychological aspects of intelligence studied simultaneously." (p.1)

Raymond Cattell, a British Psychologist searched by way of multi factor analysis for a comprehensive theory of human behavior. (Plucker, 1997; Stills, 1989). Catell's relentless drive for research led to the development of the scree test for number factors (Envoy, 1981). Using the scree test the successive eigenvalues are plotted and the number of factors are determined by the point at which the plot abruptly levels out.

Howard Gardner, an American psychologist and educator developed the theory of Multiple Intelligences. Gardner believes that intelligence is made up of seven intelligences. In the book *Frames of Mind* (1983), Gardner related that these intelligences can be divided into 3 main groups: object-related, object-free and personal or the psychological perception of individuals. Gardner (1983) bases his theory on the diverse ways cultures utilize different intelligences such as a sailor's use of visual-spatial intelligence to navigate.

Similarly, Eisner (1994) refers to Spranger who wrote *Types of Men* a published work which indicated differences in intelligences and the diversity in the ways people function in the world function. However, the "intellectually constipated conception of human ability" (Eisner, 1994 p. 562) has driven universities and public schools across the ages. Eisner (1994) believes that the time is upon educators to blaze a trail by letting go of the "assumption that skills in mathematics and language" are the primary components of a students cognitive ability. By maintaining this "assumption," educators are neglecting the recognition and development of the individual's potential. Consequently the educational world, human culture, and the individual are missing out on the great diversity of other intelligences (Eisner, 1994).

All of the contributors to the study of intelligence have developed different definitions, theories, and approaches to the study of intelligence in an attempt to understand and measure intelligence. Gardner studied these different approaches and theories and appears to be influenced most by L. L. Thurstone and Piaget (Plucker, 1998; 1997).

Multiple Intelligence Theory

Gardner (1983) describes human cognitive competence in terms of a set of talents, abilities, or mental skills or intelligences. All normal individuals possess each of these skills to some extent, however individuals differ in the degree of skill and in the nature of their combination. Howard Gardner developed the theory of Multiple Intelligences that challenges educators and psychologists to expand their view of intelligence beyond the work of Alfred Binet and Sir Francis Galton at the turn of the century (Shobris, 1996) to the belief that every individual to some extent possess intelligence in multiple areas: Interpersonal, Intrapersonal, Bodily-Kinesthetic, Linguistic, Logical-Mathematical, Musical, Naturalistic, and Spatial (Wallach, 1996). Utilization of these intelligences allows the teacher an array of possibilities for expanding a student's learning potential. Incorporating the multiple intelligences as a foundation upon which to approach the curriculum allows the teacher the advantage of at least seven methods in providing a classroom of discovery and exploration. The seven areas Gardner (1983) describes are:

Interpersonal intelligence is sensitivity to the feelings and moods of others and the ability to understand and interact effectively with others (Wallach, 1996). Students with a focus on interpersonal intelligence would be leaders, share, work as an effective team member, help build consensus and empathize with others. Teaching methods would include cooperative learning, group projects, and creating situations in which students give feedback to others (Wallach, 1996). Gardner (1998) refers to the intrapersonal intelligence as the "access to one's own feeling life-one's range of affects or emotions" (p.239)

Intrapersonal intelligence is a sensitivity to one's own feelings and moods. A person who knows his/her own strengths and weaknesses, establishes goals for herself and holds herself accountable (Wallach, 1996). Students focused on intrapersonal intelligence would pursue their own personal interests and set individual agendas, learn through observing and listening, and use metacognitive skills. Methods used in teaching would include students working at their own pace, individual self-directed projects, involvement in journal writing and other

forms of reflection (Wallach, 1996; Gardner, 1983; 1985).

Bodily/kinesthetic intelligence is the use of one's body to communicate and solve problems in addition to being adept with objects and activities involving fine or gross motor skills (Wallach, 1996). Playing sports and being physically active, constructing crafts, completing mechanical projects, and dance, mime or acting would be the spotlight activities. Instruction techniques would include tactile and movement activities, involving activities like sewing, model-making and other fine motor skills into class lessons (Wallach, 1996). Lazear (1994) offers the idea regarding the understanding of bodily kinestic intelligence of covering the keys of a typewriter or computer and allowing a person who knows how to type to type. The person's fingers automatically know where to go and how to find the correct keys. The same process holds true for riding a bike or maintaining balance while walking, all require the body to know, but not necessarily the conscious mind (Lazear,1994).

Linguistic intelligence is the ability to think in words and use language and words in many different forms to express complex meanings (Wallach, 1996). Telling jokes, riddles or puns, reading writing or telling stories, playing word games and creating poems and stories while using the sounds and imagery of words incorporates linguistic intelligence for students. Methods to facilitate learning would be to create reading and writing projects, assist the students to prepare speeches, encourage the use of puns, palindromes and outrageous words (Wallach, 1996; Gardner 1983; Armstrong 1994; Lazear, 1994).

Logical-mathematical intelligence approaches problems logically, allows for the understanding of numbers and abstract patterns, and recognizes and solves problems using reasoning skills (Wallach, 1996; Lazear, 1994; Gardner, 1983). Working with numbers, figuring things out, analyzing situations, and working through situations in which there are clear black and white solutions are the center of this intelligence. Using Venn diagrams, games of strategy, student demonstrations, and establishing time lines and drawing maps are focal points for instruction methods (Wallach, 1996). Gardner (1983) believes mathematic talent requires the ability to discover promise and idea and then to draw out what the ideas

implies.

Musical intelligence is the sensitivity to non-verbal sounds in the environment, including melody and tone and the awareness of patterns in rhythm, pitch and timbre (Wallach, 1996; Lazear, 1994). Singing, humming, and moving to music, creating and replicating tunes are axis of the student. Techniques for teaching include: encouraging students to add music to plays, rewriting song lyrics to teach a concept, and creating musical mnemonics (Wallach, 1996). Musicians, according to Gardner, (1983) find music to have patterned elements which must appear in sounds, brought together because they have expressive power and effects.

Naturalist intelligence is the sensitivity to the natural world in which a student sees connections and patterns within the plant and animal kingdoms (Wallach, 1996). At the heart of the student's desires would be spending time outdoors, listening to the sounds created in the natural world, categorizing and classifying flora and fauna. The use of the outdoors as a classroom, conducting hands-on-science experiments, and creating a nature area on the playground would assist in the development of the naturalist intelligence (Wallach, 1996; Lazear, 1994; Gardner, 1983).

Visual/spatial intelligence is the perception of the visual world in an accurate manner. A person utilizing visual/spatial intelligence tends to think three-dimensionally, and is aware of relationships between objects in space. (Wallach, 1996). Concentration on doodling, painting, drawing, or creating three-dimentional representations are the focus of students with spatial intelligence. Directing students to draw maps and mazes, lead visualization activities, and design clothing, buildings and play areas allows the creativity of spatial intelligence to shine (Wallach, 1996). Visual-Spatial Intelligence can be observed in the active imagination of children while the children are day dreaming, imagining or pretending to make themselves invisible (Lazear, 1997; Gardner, 1983; 1994).

Multiple Intelligence Theory conveys that every individual uses seven or more "intelligences" and that the different intelligences should be equally valued.

Most schools tend to focus their teaching primarily toward the linguistic and logical/mathematical intelligences. Those two intelligences appear also to be the primary focus of the intelligence testing that most school districts determine special programing for gifted and special education students.

Eisner (1994) states "many selective universities omit grades received by secondary school applicants who have taken courses in fine arts when they calculate the grade point average for the admissions process. This disregard for genuine significant contributions seems to be a source for educational inequity." (p.558)

While some of the earlier philosophers, psychologist and mathematicians believed that intelligence is constant, Multiple Intelligence Theory (Gardner, 1983) relates that all intelligences can be taught, nurtured, and strengthened. The strength of an intelligence may be used to awaken and strengthen a weaker one (Gardner, 1983).

Intelligence and Multiple Intelligences

Intelligence is described mostly as a single capacity that everyone possess to some degree to a greater or lesser extent (Gardner,1983). Unfortunately, the methods of measuring intelligence in the past have been through verbal and pencil and paper tasks (Gardner, 1983). In actuality, as scientists learn more about the human brain they are finding there is a possibility that human cognition is broader than has been measured in the past. These new competencies do not lend themselves to measurement by the usual standard intelligence measurements (Gardner, 1983). Problems have surfaced in the academic life of a student when an IQ score is determined and that score follows that student through school. Unfortunately, in education an IQ score generally becomes a permanent measure of a child's intellectual ability and consequently can limit a child's chances for learning. The standard IQ scores ignore talents that a child may possess in a realm other than the verbal or mathematical areas (Blackburn, 1996). Due to the use of IQ scores in determining special education diagnosis there also seems to be an over reliance on IQ in determining school placements (Hearne & Dixon, 1995). The Wechsler Intelligence Scale for Children 3rd edition is laden with requirements for

meta linguistic thought and reasoning as Hearne and Dixon (1995) relate. While even in the so-called performance subtests: block design, object assembly students are often observed "thinking in language" as they whisper to themselves while performing the tasks.

There also appears to be a difference in expectation between countries. Sternberg (1994) compares schools in the United States to schools in Japan, indicating that while US school emphasize intelligence, Japanese schools strongly deemphasize intelligence and instead focus on motivation. Gardner's (1983) whole focus on intelligence relates to having the whole child included in his/her educational endeavors. Thus understanding "Each person has a different configuration of abilities and how these abilities manifest themselves will depend on the tasks they confront in their lives" (Sternberg, 1994 p. 563). Sternberg (1994) also believes that standardized tests should be viewed only as rough guides. Educators need to move away from the "rigidity of predictive tests and concentrate on real performances in the natural settings" (p. 568).

Gardner (1983) states many observers of the intelligence testing in the world do not like the idea that "an hour's worth of questions yields one round number," (p.4) as "there must be more to intelligence than short answers to short questions-answers that predict academic success" (p.4). Unfortunately, Gardner (1983) points out that the scenario of testing for intelligence will not be changing in the foreseeable future. Gardner (1983) would like the world "to consider the wider range of performances that are in fact valued through out the world."

> Consider, for example, the twelve-year-old male Puluwat in the Caroline Islands, who has been selected by his elders to learn how to become a master sailor. Under the tutelage of master navigators, he will learn to combine knowledge of sailing, stars, and geography so as to find his way around hundreds of islands. Consider the fifteen-year-old Iranian youth who has committed to heart the entire Koran and mastered the Arabic language. Now he is being sent to a holy city, to work closely for the next several years with an ayatollah, who will prepare him to be a teacher and religious leader. Or consider the fourteen-year-old adolescent in Paris, who has learned how to program a computer and is beginning to compose works of music with the aid of a synthesizer (Gardner, 1983, p. 4).

Reviewing Gardner's (1983) reflections regarding youngsters each student has "attained a high level of competence in a challenging field and should be by any reasonable definition of the term, be viewed as exhibiting intelligent behavior"(p.4) Yet the question remains would these obviously intelligent young people using the intelligence assessments currently used today, like the Wechsler Intelligence Test and the Standford-Binet, obtain a high score? Gardner (1983) believes the difficulty lies in the ways educators and psychologist usually think about the intellect. Consequently, "one must conceive of the individual and his culture as embodying a certain stage sequence, with much of the information essential for development inhering in the culture itself rather than simply inside the individual's skull" (Gardner, 1983, p. 27).

Along with Gardner, Lazear (1999) believes researchers feel that psychologists and educators have defined intelligence to narrowly and intelligence is far more flexible than previously thought. In fact, Lazear relates that intelligence is more like a set of capabilities that are continuously changing with experience and that intelligence can be taught, learned, developed, and enhanced (Lazear, 1999). Therefore, the development of intelligence is in a hierarchical manner: Basic, Complex, and Coherence (Lazear, 1999). Basic intelligence occurs during infancy and the early years as a result of early socialization (Lazear, 1999). Complex intelligence occurs within the elementary years. During this phase children build on basic skills and expand their intellectual repertoire (Lazear, 1999). The Coherence level is found in secondary education during which time preparation for the real world by integrating skills the children have into living beyond school (Lazear, 1999).

Lazear defined three main concepts similar to Gardner's main groups: a. object-related in which he places the spatial, logical-mathematical and bodily-kinesthetic intelligences, b.object-free in which the intelligence areas linguistic and musical fall, and c. personal in which intra and inter personal reside. Within this framework Gardner (1983) defines intelligences "as the ability to solve problems or create products that are valued within one or more cultural setting" (p. x)." Gardner

based the theory of Multiple Intelligences upon neurological, evolutionary, and cross-cultural evidence (Gardner, 1983). Gardner's (1983) "distributed view" of intelligence focuses on the relation of the person into the things/objects in the immediate environment, as opposed to values and structures of the larger culture of context (Gardener, 1983). Therefore, "intelligences are always expressed in the context of specific tasks, domain, and disciplines" (Gardner, 1983, p. 15); whereas, Multiple Intelligences describe a conceptual explanation among intelligence, domains and fields.

Today the educational system has placed a premium on logical mathematical ability and some aspects of linguistic intelligence. The other intellectual capacities are usually consigned to recreational and/or after school activities (Gardner, 1983). "Cultivation of one intelligence does not imply others can not be acquired. However, some individuals (and some cultures) may develop several intelligences to a keen extent while others may highlight only one or two" (Gardner, 1983 p. 365). Fortunately the development of one intelligence does not entail a decrease in another (Gardner, 1983).

Educational Implications

Hoerr (1994) relates that Multiple Intelligence is more than a theory of intelligences, it is a process and a philosophy of education that guides teachers and schools in the teaching and operation of schools. The process also has great implications for the learning of students (Hoerr, 1994) such as assisting teachers in unlocking the students' abilities and restructuring of classroom curriculum using Multiple Intelligences which incorporates a sensory rich environment from which students can enjoy learning may be the answer (Lazear, 1994). Because each intelligence is linked to the five senses, triggering and activating the intelligences becomes as easy as incorporating activities and exercises that include the senses (Lazear, 1994). Therefore, an important aspect of improving and strengthening an awakened or active intelligence is to use the various intelligences regularly (Lazear, 1994). This eventually will lead to integrating those skills into daily living and thereby applying the intelligence to problem solving. Then the

intelligences will become integrated into each person's cognitive, affective, and sensory lives (Lazear, 1994). Using Multiple Intelligences allows the teacher new opportunities to relate to the curriculum (Hoerr, 1994). Teachers can incorporate problem solving using drama and real life scenarios, experiments using different spatial -visual media like clay, paints, colored markers to express ideas to other students, and creating a rap or musical assessment of a particular assignment. Mind mapping and concept mapping are also excellent methods of incorporating the MI concept into traditional curriculum. Reasonably, students master content by creating a variety of projects, experiments and exhibitions (Lazear, 1994); therefore "the paramount restructuring goal is to promote the fullest possible intellectual development of our students" (Lazear, 1994 p. 191).

Integrating Multiple Intelligences into the curriculum and/or a school is a multi-step process. Faculty and staff must receive on-going initial training and follow up on-going professional development to understand the use of incorporating Multiple Intelligences into the fundamental school principles (Hoerr, 1994). Professional development is a key component to school wide integration. Consequently, teachers need a chance to experiment, explore, share, and refine their ideas (Hoerr, 1994). To integrate these concepts into a teacher's daily routine the staff must have continuous opportunities to meet and share with one another and learn more about Multiple Intelligences otherwise the skills which have been awakened may atrophy because they aren't being used (Hoerr, 1994).

While the concentration of multiple intelligence opportunity should be found in the school setting, it is also imperative for parents to be made aware of how to work with their children in a multiple intelligence approach. Educators frequently hear parents comment "teachers today do not teach in the manner that they, the parents, were taught." Comments like that and others similar to it may cause a school to back away from integrating Multiple Intelligences into its curriculum. However, Greenhawk (1997) discovered in a Maryland elementary school that the process of integrating MI into the educational nomenclature needs to begin with a small group of interested people. In the elementary school the group

saw the need for the performance assessment to be improved to help prove that integrating Multiple Intelligences would work (Greenhawk, 1997). Communications with parents included how Multiple Intelligences would assist their children with skill and content. Parents were asked to reflect on a time they had trouble learning. Then were asked if one of the Multiple Intelligences strengths they possess may have helped them learn that tough subject (Greenhawk, 1997). Then the students were introduced to Multiple Intelligences with surveys and activities allowing them to assess their own intelligences (Greenhawk, 1997). The results of projects like the one in this elementary school provide educators and parents with the concept that each person has a multitude of intelligences which can be utilized; and begin to nurture the full range of a youngster or an adult's abilities (Gary & Viens 1994).

Once exposed to Multiple Intelligences students refer to their intelligences and others and begin to become aware and understand why some things are more difficult for them and not for others. This new self-awareness also helps build self-esteem. Since the students were actively involved in their learning, they consequently retain more information, are better able to transfer the skills to real life, and perform better on standardized assessments. Students also became more confident and self-directed (Greenhawk, 1997).

Gardner believes in the necessity of individual centered education which is derived from separate yet interlocking propositions. Individuals have different minds from one another, thus education should therefore be sculpted to encompass and be responsive to those differences. Educators need to work to ensure each student maximizes his or her intellectual potential (Gardner, 1993). For education to be effective the educational staff needs to be committed on a daily basis to provide quality education in which teachers are encouraged and trained to break free from the curricula and text book mentality; and pursue an educational teaching approach that strives for depth of understanding, thereby assessing students using relevant performance. (Gardner, 1993). Incorporating the use of MI theory into a students' learning environment places the student at the center of the educational

process and respects the different ways in which individuals perceive the work and express their ideas (MI/ND, 1997).

Consequently, when students understand the curricula presented they are able to reproduce that knowledge while integrating and applying the knowledge into daily situations (Gardner, 1983). When made aware of their different intelligences, students in the New City School used their knowledge in the creative process and consciously in their exhibits to encourage the use of multiple intelligences with the persons who visited the exhibits within their plant museum (Wallach, & Callahan, 1994). Smagorinsky (1995) discovered that students who were normally low achievers were much more enthusiastic and productive workers when engaged in alternate assessments based on the students multiple intelligences. These students demonstrated their understanding of literature in methods other than writing (Smagorinsky, 1995). The 20th century intelligence of most importance appeared to be logical/mathematical and linguistic intelligence.

The future will require continuing expansion in telecommunications and computer technology, thus requiring imagery which relates to spatial intelligence. The future may hold a different type of important intelligence, possibly more what the early settlers and explorers depended upon for navigation, architecture, and agriculture (Smagorinsky, 1995).

Conclusion

Gardner (1994) believes the utilization of Multiple Intelligences theory within schools offers students, parents and teachers a non-threatening manner to look more carefully at students, while examining their own assumptions about potential and achievement. Consequently, Campbell (1997) holds schools responsible for assisting students in discovering their strengths and talents. Therefore teaching with Multiple Intelligences grants students the opportunity to learn while enjoying the process of learning thus awakening the multitude of potential abilities while at the same time fueling the perseverance and effort necessary to master skills, understanding, and information (Campbell, 1997). By the students internalizing of the many forms of intelligent behavior they can broaden

their respect for the diverse abilities found within classrooms and within the global society today (Ellison, 1992). Thus the exposure to diverse opportunities for learning and development allows todays students to have a stronger sense of self and be more self aware so the students can be able to find employment and relate to what the world of the future has to offer. The students also have an opportunity to feel good about themselves and receive recognition for their special abilities (Berger & Pollman, 1996). Logically, the teachers role is to encourage students to use their strongest domains while helping them develop their less dominant abilities (Black, 1994).

Chapter Three

Methodology

Subjects

Participants in this study were enrolled at Central Elementary School in the Francis Howell School District during the Spring of 1998. The school district is located in a suburban community of a large mid-western city. Scioeconomically the district is primarily middle class and the student population is primarily Caucasian. Even though the population of the district is middle class the Central Elementary attendance area has a high concentration of students who qualify for the Federal reduced lunch program indicating lower income status for some families.

The participants included all students enrolled in grades two through five (ages 7 through 11). Students represented a number of different cultures. Students included Caucasian, Russian, Romanian, Mexican, African American, and Hispanic. The majority of the students were Caucasian 660 (85%). However the participants gender, race, age, and ethnicity were not taken into consideration for this factor analysis. The school is located in a cross-section of the school district that consists of high middle to lower economic families. All students (special education, remedial reading, and gifted) were included in the MIC collection.

Instrumentation

The Multiple Intelligence Checklist (MIC) was used to determine which of the seven areas of multiple intelligences each child preferred. More than one area could be picked by a student in each of the 11 subtests. This is a self-report checklist which assists teachers in the determination of each student's multiple intelligence. The MIC screening instrument was presented for use by Carolyn Rakotz at the 1997 National School Conference Institute to assist teachers in the identification of a student's dominant intelligence preference. Seven factors are identified: Factor 1-Visual/Spatial; Factor 2-Bodily/Kinesthetic; Factor 3-Interpersonal; Factor 4-Intrapersonal; Factor 5-Musical; Factor 6-Linguistic; Factor 7-Logical/Mathematical. The screening tool (MIC) has 77 questions (11 sets of 7

questions regarding personal preferences). Seven question in each set refer to one of each of the seven areas of intelligence Gardner outline. A sample of 777 students were drawn from the elementary school population and measured on the eleven subtests of the MIC. The reading level is appropriate for third grade readers. However, in most classes, the checklist was read to the students to ensure that special education and reading students were included and not singled out. No information was presented by the developer as to any previous research on the validity of the checklist.

Procedure

A group of 777 elementary students grades two through five at Central Elementary were screened using the MIC screening tool. On the MIC there are seventy-seven questions. To achieve the required sample, the 77 questions were taken times ten equaling seven hundred seventy subjects. Ultimately, 777 students were surveyed, thereby allowing a rather large sample population. The output from the procedure was seven factor-loading matrix, which represents the relationship among the observed variables (the 11 subtests). Students were numbered one through 777. Data was compiled using Excel computer software and then transferred into the SYSTAT program for analysis. Each student indicated a preference for one or more of the seven intelligences areas by placing a check mark on the line beside the statement. Each of these check marks were entered using the number 1. If no preference for a particular item was given, the variable was given a 0.

Using the SYSTAT factor analysis program data was desaggragated using common factor analysis maximum likelihood and integrated principal axis.

Chapter Four

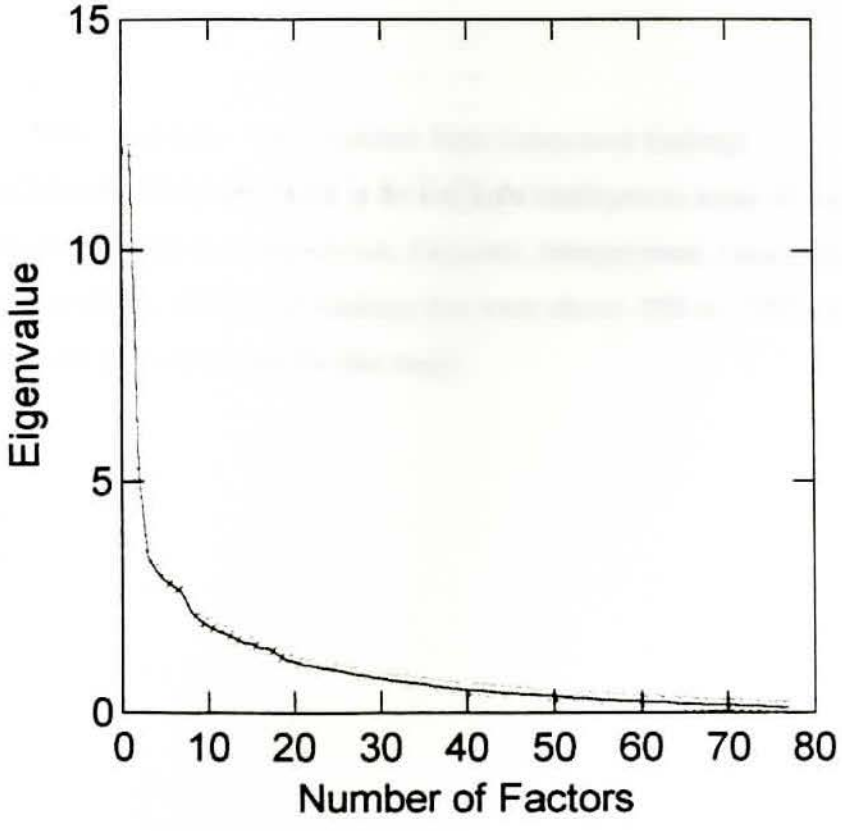
Results

Statistical Analysis

According to the scree plot generated by the SYSTAT program only the first three eigenvalues should be retained. (Figure 1).

Figure 1

Scree Plot



regarding factor analysis. The first eigenvector explained sixteen percent (16%) of the total variance. The second eigenvector explained ten percent (7%) of the total variance, (16% + 7% = 23%) thus twenty-three percent of the total variance is explained in the first two eigenvectors. The third eigenvector explained 4% of the total variance. (Table 1).

Table 1

Percent of Total Variance Explained

Factor 1	Factor 2	Factor 3	Total
15.814	6.702	4.380	26.896

The variables that yielded high component loadings (Table 2) for the first factor were in the multiple intelligences areas of: logical mathematical, musical, interpersonal, linguistic, intrapersonal, visual-spatial, bodily-kinesthetic. The factor loadings that were above .350 or -.350 were considered high correlations for this study.

Table 2

Component Loadings of MIC on Factors

MIC Checklist Area	Loading Factor 1	Loading Factor 2	Loading Factor 3
V6ELING	.0475	-0.260	-0.427
V1DVS	0.299	0.241	-0.413
V5HMUS	0.309	0.097	0.395
V3EINTER	0.337	0.164	-0.387
V1BVS	0.373	-0.267	-0.375
V4KINTRA	0.553	0.070	0.360
V4EINTRA	0.371	-0.270	-0.348
V1JVS	0.311	0.160	0.338
V4CINTRA	0.260	0.270	0.334
V6CLING	0.310	0.255	-0.331
V3JINTER	0.455	0.236	0.324
V5IMUS	0.258	-0.462	0.296
V3AINTER	0.300	0.245	-0.286
V7ALM	0.393	0.263	-0.281
V1CVS	0.364	0.239	-0.280
V6GLING	0.494	0.259	0.276
V5MUS	0.519	0.214	0.255
V7HLM	0.379	0.222	0.252
V7BLM	0.372	0.267	-0.251
V3HINTER	0.516	0.223	0.249
V5AMUS	0.247	-0.378	-0.246
V1FVS	0.451	0.152	-0.241
V2ABK	0.357	0.208	0.238
V6ALING	0.385	-0.289	-0.233
V7ILM	0.327	-0.203	-0.233
V6DLING	0.436	0.237	-0.230
V1EVS	0.308	0.179	0.229
V2GBK	0.458	0.212	-0.223
V3BINTER	0.454	0.201	-0.218
V2KBK	0.481	-0.313	0.218
V7ELM	0.301	0.277	-0.211
V2JBK	0.416	0.082	0.210
V4FINTRA	0.347	-0.280	- 0.204
V4BINTRA	0.538	0.181	0.200
V7KLM	0.257	0.268	- 0.191
V7GLM	0.414	-0.337	0.186
V2IBK	0.566	-0.295	0.183
V3GINTER	0.468	0.227	-0.182
V4IINTRA	0.557	0.198	0.168
V5BMUS	0.313	0.139	-0.163
V2CBK	0.349	-0.215	-0.154
V3CINTER	0.514	0.128	0.150
V2EBK	0.321	0.208	0.150
V5CMUS	0.379	-0.395	-0.148

Table 2 continued

Component Loadings of MIC on Factors

MIC Checklist Area	Loading Factor 1	Loading Factor 2	Loading Factor 3
V4GINTRA	0.542	-0.280	-0.145
V1AVS	0.441	0.147	0.140
V4JINTRA	0.320	-0.317	0.136
V4AINRA	0.312	0.226	0.128
V5DMUS	0.338	-0.207	-0.125
V1HVS	0.307	0.242	-0.123
V2HBK	0.327	-0.196	0.121
V7JLM	0.360	-0.277	0.121
V3FINTER	0.402	0.247	0.120
V4DINTRA	0.397	-0.306	0.117
V6FLING	0.442	-0.278	-0.103
V1IVS	0.363	0.219	-0.096
V3DINTER	0.375	-0.262	0.096
V4HINTRA	0.387	-0.353	0.093
V5JMUS	0.326	-0429	0.087
V7FLM	0.372	-0.236	0.083
V2BBK	0.385	-0.311	0.066
V6HLING	0.406	-0.325	0.055
V3IINTER	0.451	0.075	-0.050
V6BLING	0.436	0.370	-0.049
V6KLING	0.351	-0.324	-0.044
V7CLM	0.363	0.066	0.038
V7DLM	0.397	0.213	-0.036
V2DBK	0.525	0.200	0.034
V5KMUS	0.411	-0.265	0.033
V5EMUS	0.255	-0.274	0.026
V3KINTER	0.406	-0.329	-0.025
V5GMUS	0.416	0.138	0.023
V1GVS	0.222	0.193	-0.016
V6ILING	0.331	-0.373	0.014
V6JLING	0.524	0.151	-0.014
V2FBK	0.427	0.166	-0.012
V1KVS	0.357	-0.390	0.005

After examining the MIC and the students' responses to various questions the following pattern appears to be related to the three factor loadings. The factors did not appear to be corresponding to intelligence, but related to words. The word "enjoys" begins 8 of the 77 (10%) statements on the MIC. These statements do not fall within one multiple intelligence area, the statements are scattered throughout the

various subtests. The statement in the first subgrouping yielded 81% or (630) "enjoys computers and/or chemistry sets" of the students responses. Additional responses in the second grouping were 70% or (546) who chose "Enjoys loosely structured group activities where talking is allowed." Another 44% or (343) students selected "Enjoys playing with words, puns, silly lyrics, etc.", and 69% or (533) students chose "Enjoys logical rules, games, puzzles, and formulas." Other groupings also yielded high percentages of student responses: 87% or (677) selected "Enjoys movies, slides, videos, and photography " 62% or (479), "Enjoys machines, contraptions, and sometimes builds their own"; 51% or (394); "Enjoys brain teasers, logical puzzles, chess, and reasoning games"; and 45% or (346); "Enjoys reading in free time". Thus, the identification of Factor One could be the recognition of the word "enjoys" as opposed to that specific area of intelligence.

Factor Two portends to be associated with the word "likes" as five of the statements in the MIC begin with the work "likes". The students' responses included the following scores related to the expression that began with "likes": Likes games like Scrabble and crossword puzzles - 73% or (565); Likes to tell jokes, stories, or tall tales - 43% or (333); Likes being involved in group activities of games 81% or (631); Likes to be alone to pursue personal interest, hobby, or project - 47% or (368); Likes to write - 47% or (362).

Factor Three seems related to the word "learns" as six sentences begin with the word "learns". These responses account for 48.8% of the responses of the youngsters surveyed. Since these youngsters are elementary students it is highly likely that the students responded to words they understood or thought they understood, at least the first few words in a statement.

The Chi-Square Test indicated $p < .5$ which supports the null hypothesis that no common factors can be explained by the inter correlation among the seven areas of intelligence on the Multiple Intelligence Checklist. (Table 3 & Table 4).

Table 3
Chi-Square Test
All Eigenvalues Equal

Total Sample	CSQ	P	Difference Frequency = df
N=777	32943.3918	0.0000	2926.00

Table 4
Chi-Square Test
Last 74 Eigenvalues are Equal

Total Sample	CSQ	P	Difference Frequency = df
777	21713.3770	0.0000	2727.28

Chapter Five

Discussion

Defining intelligence today seems to be a difficult task. Some educators find Gardner's MI theory to offer an alternative method to approach the required curricula. Analysis of the MIC indicates only three factors instead of the seven factors indicated in Gardner's theory. While these three factors could relate to the three main areas; object-related, object-free, and personal that was not the focus of this research.

Instead, the focus was to determine whether or not an intercorrelation of factors could be explained among the seven areas of intelligence using the MIC. The results of the research correlate with the information generated by Hoerr and the New City School in St. Louis and Gardner's research at Project Zero at Harvard showing that the best indicators of MI is through observations from trained teachers and observers as opposed to student and parent checklists. While Gardner (1983; 1994) and Hoerr (1994) have found the use of observations to be most beneficial in their research, Lazear (1994) (Appendices D,E,F) has developed checklists for various educational levels, elementary, middle and high school that allow for self-reporting. Unfortunately no research has been completed as to the effectiveness of this type of reporting compared to the observations.

The main difference in the MIC and Lazear's checklists is that the MIC is not differentiaed by levels. There is only one checklist used at all grade levels, thus not accounting for differences in development, self-awareness and academic understianding.

The null hypothesis that no common factors can be explained by the inter correlation among the seven areas of intelligence on the Multiple Intelligence Checklist is supported by the Chi-Square Test and the total explained variance. This data is supported by Gardner's own view that the methods of measuring intelligence in the past have been through verbal and pencil and paper tasks (Gardner, 1983). In actuality, as scientists learn more about the human brain they are finding there is a possibility that human cognition is broader than has been

measured in the past.

Limitations

It is important to keep in mind that this checklist was chosen as a sample to test for validity not to test Gardner's theory of multiple intelligences. The schools, like the New City School (Appendices A, B, C) rely on trained observers instead of a student's self-report due to the possible lack of knowledge or awareness of the student, especially with an elementary population such as the sample population. The student's age and insight may have been a factor in the results due to the reading ability of the students as well as each student's individual ability to comprehend the meaning of the terms used in the checklist. The checklist was administered to students with only one day's introduction by their teachers explaining the different types of multiple intelligence. Additionally the sample size was relatively large as the sample population would have been acceptable at 385 (5 X 77).

Recommendations for Further Research

Further research into the validity of the MIC, other surveys, and checklists concerning multiple intelligences is needed; particularly with an older, possible middle school or high school age group who would be more insightful or self-aware. Another study using the MIC and high school students who have had experience in classes using multiple intelligence theory could be compared with high school students who did not have exposure to classes utilizing multiple intelligence theory. In addition, a factor analysis could be completed using those MIC results and analyzed for the possibility of the three factors being related to the three main areas Gardner described: object-related, object-free, and personal. Other areas of investigation could be the effect of gender or ethnicity on the outcome of the checklist.

Conclusion

The area of multiple intelligence offers many opportunities for continued research within the educational arena. Educators are continuously seeking new and more unique methods of reaching the students in today's schools. By increasing

the awareness of each student and instructor's personal intellectual ability a more exciting classroom and world of learning blossoms.

However, none of the learning experiences for students will be manifested unless professional development components are utilized and the educational staff are offered these growth opportunities with a sense of congeniality. The natural effect of the educational staff understanding and learning to utilize the multiple intelligence theory within the classroom will be the infusion of curriculum, instructional evaluation, and increased parent communication (Hoerr, 1994). In short, Multiple Intelligence can empower teachers, parents, and students to succeed.

Appendices A, B, C

New City School Observations

Linguistic Intelligence

Logical-Mathematical Intelligence

Specialist' Report for 6/7's 7/8's

Student's Name _____

LINGUISTIC INTELLIGENCE

Key: I = Introduced
R = Reinforced
M = Mastered
* = Exceptional performance
Uncircled = Not covered at this time

ED = Exceeding Deveopmental Expectations
DA = Developing Appropriately
AC = Area of Concern

READING	5/6s	6/7s	7/8s
Exhibits growth in reading vocabulary	R	R	R
Recognizes ending sounds	I	R	R M
Understands long and short vowels		I R	R M
Exhibits ability to decode words	I	R M	
Identifies base words, prefixes, and suffixes		I R	R
Identifies and forms compound words		I R	R M
Identifies and forms contractions		I R	R M
Recognizes and divides words into syllables		I R	R
Alphabetizes		I R	R M
Comprehends written material		I R	R
Demonstrates self-direction in silent reading		I R	R

WRITTEN LANGUAGE	5/6s	6/7s	7/8s
Uderstands grammatical concepts (punctuation, capitalization, uses complete sentences, ets.)	I	R	R
Participates in daily writing	I	R	R
Organizes and presents ideas clearly and correctly	R	R	R
Demonstrates originality and imagination	R	R	R
Forms letters correctly	R	R M	
ORAL LANGUAGE			
Expresses ideas clearly and correctly	R	R	R
Demonstrates originality and imagination	R	R	R
Reads with fluency and expression	I	R	R
Volunteers in group discussions	R	R	R

Effort in developing Linguistic Intelligence:			
Reading	ED	DA	AC
Writing	ED	DA	AC
Oral	ED	DA	AC

Comments:

NEW CITY SCHOOL · 5209 Waterman Avenue · St. Louis, MO 63108

SPECIALISTS' REPORT for 6/7s, 7/8s

Key: ED = EXCEEDING DEVELOPMENTAL EXPECTATIONS
DA = DEVELOPING APPROPRIATELY
AC = AREA OF CONCERN
= = NEEDS ADDED ATTENTION

Child's Name_____

Grade _____ Date_____

LIBRARY (Linguistic Intelligence)

Teacher: Nancy Solodar

Reporting Period	1	2	3
Chooses books at an appropriate reading level			
Uses library materials appropriately			
Is interested in a variety of books			
Listens carefully, follows directions			
Works cooperatively with others			
Respects classroom rules			

Comments:

PHYSICAL EDUCATION (Bodily-Kinesthetic Intelligence)

Teacher: Lauren McKenna

Reporting Period	1	2	3
Willingly and actively participates in all activities			
Uses equipment appropriately			
Shows an interest in physical education			
Listens carefully, follows directions			
Works cooperatively with others			
Respects classroom rules			

Comments:

PARENTS: If you have questions or comments, please call or write us a note.

Student's Name _____

LOGICAL-MATHEMATICAL INTELLIGENCE

Key: I = Introduced
R = Reinforced
M = Mastered
* = Exceptional performance
Uncircled = Not covered at this time

ED = Exceeding Deveopmental Expectations
DA = Developing Appropriately
AC = Area of Concern

	5/6s	6/7s	7/8s		5/6s	6/7s	7/8s
Forms numerals correctly	I R	R M		Knows basic addition facts to 12	I R	R	M
Can extend pattern and creates own pattern	I R	R M		Knows basic subtraction facts to 12	I	R	M
Understands basic graphing concepts	I R	R	R	Understands 2-digit addition/subtraction without regrouping		I R	R M
Counts and recognizes numerals 1-100	I R	R M					
Counts and recognizes numerals beyond 100		I R	R M	Understands 2-digit addition/subtraction with regrouping			I
Understands 1:1 correspondence	I R	R M		Tells time to the hour and half-hour	I	R M	
Recognizes place value to 100		I R M		Understands measuring concepts (volume, length, weight)		I	R
Understands symbols (+ - = < >)	I	R	R M	Applies appropriate methods when problem solving	I	R	R
Counts by 2's, 5's, 10's	I	R M					
Knows even/odd numbers		I	R M	Recognizes/understands fractions (1/2, 1/3, 1/4)	I	R M	
Effort in developing Logical-Mathematic Intelligence:				Recognizes and knows values of coins	R	R M	
Computation	ED	DA	AC				
Problem Solving	ED	DA	AC				

Comments:

Appendix D, E, F

Lazear's (1994) Self Analysis

Elementary

Middle School

High School

Self-Analysis
(Elementary)

What Do I Like?	
Reading and writing	
Working with numbers	
Drawing and painting	
Body stuff	
Singing	
Working with others	
Being alone	

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Self-Analysis
(Middle School)

What do I like and what am I good at?

+++ = "super!" — – – = "ugh!"
++ = "okay" — – = "fair"
+ = "so, so" — – = "so, so"

	Pluses	Minuses
Verbal/Linguistic: reading writing speaking		
Logical/Mathematical: working with numbers solving problems thinking logically		
Visual/Spatial: pretending and using the imagination drawing/painting/working with clay finding my way		
Bodily/Kinesthetic: playing roles playing physical games exercising my body		
Musical/Rhythmic: singing or playing music sounding rhythm or beats recognizing different sounds		
Interpersonal: listening to others encouraging and supporting others being part of a team		
Intrapersonal: talking positively to myself being aware of my feelings liking to do some things alone		

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Self-Analysis
(Secondary)

What am I good at?

10 = *WOW!* | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 0 = *UGH!*

	Individual Capacity Ranking	Totals
Verbal/Linguistic: 1. Reading and understanding what I've read 2. Communicating through writing something I'm thinking 3. Making a speech or giving a report		
Logical/Mathematical: 1. Doing math in my head 2. Knowing that I've received the correct change at the store 3. Figuring out how to solve everyday problems		
Visual/Spatial: 1. Finding my way using a map 2. Drawing an object or scene on paper 3. Pretending or imagining things		
Bodily/Kinesthetic: 1. Playing charades or roles (as in drama) 2. Dancing or playing games that require body movement 3. Exercising my body for better body performance		
Musical/Rhythmic: 1. Being able to hum a tune I've heard on the radio or a tape 2. Recognizing different recorded instruments and sounds 3. Using music to alter my feelings and moods		
Interpersonal: 1. Listening to others' opinions and feelings (even when I disagree) 2. Doing my part when I'm part of a team project 3. Giving encouragement and positive support to other people		
Intrapersonal: 1. Spending time alone thinking things through 2. Being aware of and dealing with my own feelings 3. Evaluating my own thinking patterns and improving them		

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Appendix G

Taylor (1997)

Teacher Checklist

TEACHER CHECKLIST

Frequency Scale: 3 = strong. 2 = average. 1 = weak.
U = not observed or unknown

	(Please Circle)			
I. Linguistic				
- Possesses an advanced vocabulary	3	2	1	U
- Displays an unusual amount of information for his/her age	3	2	1	U
- Is an excellent and avid reader or writer	3	2	1	U
- Remembers facts verbatim	3	2	1	U
- Uses colorful and imaginative figures of speech (such as puns, analogies, creative expressions)	3	2	1	U
Linguistic Score _____				
II. Logical/Mathematical				
- Approaches tasks in a logical manner	3	2	1	U
- Possesses high ability in mathematics	3	2	1	U
- Shows unusual ability in science	3	2	1	U
- Transforms concrete to abstract easily	3	2	1	U
- Appreciates puzzles and easily recognizes patterns	3	2	1	U
Logical/Mathematical Score _____				
III. Musical				
- Seeks out opportunities to hear or create music	3	2	1	U
- Is sensitive to rhythm through body movements or changes in tempo	3	2	1	U
- Has exceptional tone or pitch	3	2	1	U
- Easily remembers melodies and can repeat them	3	2	1	U
- Often hums, whistles, or taps fingers or toes	3	2	1	U
Musical Score _____				
IV. Spatial				
- Can re-create (orally or on paper) a visual experience; or can see the unusual, what others may overlook	3	2	1	U
- Creates products of unusual depth or quality	3	2	1	U
- Produces balance and order in art work	3	2	1	U
- Can skillfully use a variety of media and techniques	3	2	1	U
- Can read maps and/or reproduce them easily	3	2	1	U
Spatial Score _____				

V. Bodily Kinesthetic

- Handles the body with ease and poise for his/her age	3	2	1	U
- Can use the body in highly differentially skilled ways for dramatic expression.	3	2	1	U
- Is adept with objects that require fine motor skills	3	2	1	U
- Possesses strong gross motor skills	3	2	1	U
- Is adept at role-playing, improvising, mimicry or acting out situations.	3	2	1	U

Bodily/Kinesthetic Score _____

VI. Intrapersonal

- Is able to laugh at him/herself	3	2	1	U
- Shows strong sense of right and wrong	3	2	1	U
- Works independently or prefers to work alone	3	2	1	U
- Offers unusual, or clever responses	3	2	1	U
- Is self-motivated and/or demonstrates perseverance	3	2	1	U

Intrapersonal Score _____

VII. Interpersonal

- Displays self-confidence	3	2	1	U
- Is looked to by others for decisions	3	2	1	U
- Likes to organize and bring structure to situations, people, and things	3	2	1	U
- Is sensitive to the needs of others	3	2	1	U
- Easily draws the attention of others	3	2	1	U

Interpersonal Score _____

Appendix H

Multiple Intelligence Checklist

Carolyn Rakotz

Multiple Intelligences Checklist

There are 77 multiple intelligence characteristics listed below. Read each item and make a check-mark in column A for those that "fit" you.

1._____ Thinks in visual images. That is sees pictures in their mind.
2._____ Learns best by doing things, acting them out.
3._____ Is "street smart."
4._____ Has a deep awareness of inner feelings, dreams and doing them.
5._____ Plays a musical instrument or sings during free time.
6._____ Spells words easily and accurately.
7._____ Enjoys computers and/or chemistry sets.
1._____ Learns best by seeing and observing.
2._____ Shows talent in sewing, woodworking, pottery, or other crafts.
3._____ Enjoys loosely structured group activities where talking is allowed.
4._____ Has a quality of inner wisdom and intuitive ability.
5._____ Collects records, tapes, or c.d.'s.
6._____ Enjoys playing with words, puns, silly lyrics, etc.
7._____ Enjoys logical rules, games, puzzles, and formulas.
1._____ Remembers faces easily.
2._____ Has great fine-motor and /or large motor coordination.
3._____ Has a lot of empathy for others' feelings.
4._____ Lives in search of personal goals and lives in own private world.
5._____ Keeps time rhythmically to music.
6._____ Likes games like Scrabble and crossword puzzles.
7._____ Good memory for principles and theories.
1._____ Good at doing jigsaw puzzles or mazes.
2._____ Communicates well with gestures and body language.
3._____ Often mediates conflicts for friends, family and co-workers.
4._____ Has strong opinions when controversial topics are discussed.
5._____ Remembers facts best when they are put to music.
6._____ Likes to tell jokes, stories, or tall tales.
7._____ Favors science-fiction or mysteries for reading.
1._____ During free time chooses art activities or building things.
2._____ Moves, taps, and fidgets when seated.
3._____ Likes being involved in group activities or games.
4._____ Independent minded in style of dress, behavior, and/or attitude.
5._____ Turns to music to express feelings.
6._____ Performs well on paper and pencil tests.
7._____ Gets comments like: "so smart, or so quick or so brainy."
1._____ Enjoys movies, slides, videos, and photography.
2._____ Engages in physical activities:running, golf, swimming, etc.
3._____ Socializes a great deal at work, school, in the neighborhood, etc.
4._____ Likes to be alone to pursue personal interest, hobby, or project.
5._____ Makes up lyrics, raps, and /or tunes.

6._____ Gets comments like: "Very verbal, very bright, very witty."
7._____ Thinks conceptually)categorizing, hypotheses.)
1._____ Knows where everything is located in desk, office, house.
2._____ Prefers stories with a lot of action.
3._____ Understands people well.
4._____ Has a quiet, but strong sense of self-confidence.
5._____ Gets comments like: "So talented, so musical."
6._____ Thinks in words.
7._____ Learns best by exploring patterns, relationships, and manipulating environment.
1._____ Enjoys machines, contraptions, and sometimes builds their own.
2._____ Touches people when talking to them.
3._____ Knows what is going on with co-workers (likes, dislikes, who like whom).
4._____ Gets comments like: "unique, knows self well, insightful."
5._____ Often sings, hums, or whistles tunes to self.
6._____ Learns best by verbalizing and hearing words.
7._____ Constantly questioning and wondering about natural events.
1._____ Easily understands maps, charts, diagrams.
2._____ Can pantomime people's gestures and behaviors.
3._____ Gets comments like"great listener, supportive, real friend."
4._____ In touch with his/her feelings.
5._____ Often moves and sings along with music.
6._____ Likes to write.
7._____ Enjoys brain teasers, logical puzzles, chess, and reasoning games.
1._____ Daydreams a lot
2._____ Gets comments like:"very graceful, very athletic, great dancer."
3._____ Thinks by talking.
4._____ Learns best when working on independent activities.
5._____ Has strong opinions about music played around him.
6._____ Has good memory for names, dates, details.
7._____ Capable of highly abstract forms of logical thinking.
1._____ Gets comments like: "So creative, so talented, great art work."
2._____ Thinks best by doing, moving, and tuning into bodily sensations.
3._____ Learns best through study groups, teamwork, and cooperative learning.
4._____ Has a definite personality, and strong sense of autonomy and discipline.
5._____ Sensitive to nonverbal sounds in the environment.
6._____ Enjoys reading in free time.
7._____ Calculates mathematical problems quickly.

Record below how many check marks you have entered for each numbered blank on the two previous pages. Count all the check marks identified. Write that total below in the line "Number of 1's=_____. Repeat the process with all the numbers.

Totals

Number of 1's=_____Visual/Spatial
Number of 2's=_____Bodily/Kinesthetic
Number of 3's=_____Interpersonal
Number of 4's=_____Intrapersonal
Number of 5's=_____Musical
Number of 6's=_____Linguistic
Number of 7's=_____Logical/Mathematical

This is only a snapshot of your natural learning capacities. They are not a measure of your IQ nor of any intelligence.

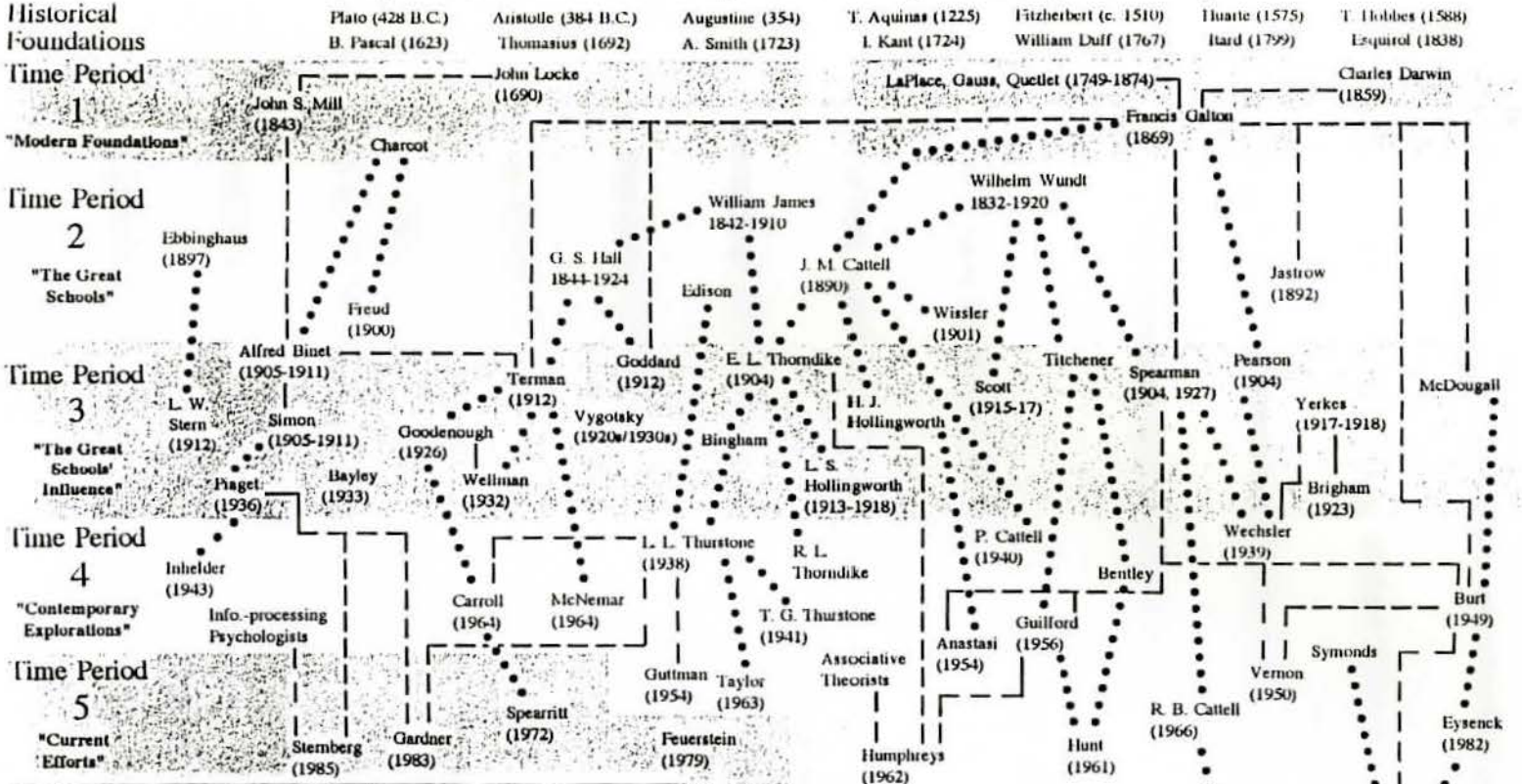
Carolyn Rakotz
(Presented Scottsdale Az 1997)

Appendix I

Plucker (1997)

History of Influences in the Development of Intelligence Theory and Testing

History of Influences in the Development of Intelligence Theory and Testing



LEGEND

student/asst. of • • • • •	influenced by — — —
i.e., Wundt • • • • • Spearman: Spearman was a student of Wundt	i.e., Darwin — — — Galton: Galton was influenced by Darwin

Time periods set as follows:
1 - Up to 1869, when Galton's *Hereditary Genius* was published
2 - Up to 1901, the year in which Wissler finished his seminal research
3 - Up to 1937
4 - Up to 1969, the year before Jensen's article in *Harvard Ed. Review*
5 - From 1969 to the present day

NOTES

-The following influences could not be shown due to space considerations: Leta Hollingworth's influence upon Goodenough, Binet upon Goddard, Scott upon Bingham, and E. L. Thorndike upon R. B. Cattell and Wechsler. Also, J. McK. Cattell was a student of G. S. Hall, and Carroll and several others were influenced by Vernon's work.

-Placements are by the year of each person's primary or seminal contribution/s.

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