Helping Students Become Diverse Learners Through Gardner's Multiple Intelligence Theory

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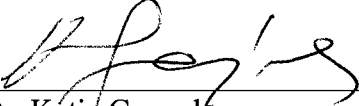
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Donald, my soon to be husband. Thank you for all that you do for me on a daily basis. I could not have gotten through these past 2 years without your love and support. Your encouraging words have helped me to achieve this and I am extremely grateful. I love you more than anything.

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CHAPTER 1

Introduction

History and Development of Intelligence Theories

Intelligence is an important subject in our society. In the Western culture many achievements are based on someone's "intelligence". A school's rating, a teacher's success, admission into some high schools, and all colleges, and even graduate college programs are based on a test that gives your IQ. These various IQ assessment tests all try and measure a person's general intelligence g (Perkins, Lochhead, & Bishop, 1987). General intelligence g is a variable that the positive correlations between various cognitive skills (Brody, 2000) . The individuals' intelligence through g as one type of intelligence represents issues. This issue with this way of assessing IQ is that all of those types of standardized tests and assessments only focus on mathematical and linguistic problems, such as the Scholastic Aptitude Tests (SAT), which focuses mostly on math and verbal scores. There are many other areas that people can excel in that cannot be seen on a paper and pencil test. One theorist who believes that people have more than one type of general intelligence is Howard Gardner and he explains through his Theory of Multiple Intelligences how one test cannot assess everyone's skills and talents (Gardner, 1983).

Of course Gardner's theory was not the first one to be made about intelligence. To help understand Gardner's theory we must first explore the history of intelligence theories. In the 1800s a man by the name of Francis Galton believed that genius is a normally dispensed and a heritable trail of human beings. In 1882, Galton created a laboratory at the South Kensington Museum in London to calculate individual differences. Visitors would come to the museum and were administered a battery of tests that were devised to determine auditory and visual sensory

discrimination abilities, reaction times to stimuli, and the capability to exert hand-squeeze pressure on a dynamometer. Galton chose these measurements because he believed that the sensory discriminative abilities of idiots was damaged and that high intelligence would have sharper discriminative abilities when compared to individuals with low intelligence (Brody, 2000).

Influenced by Galton, James McKeen Cattell was also curious about individual differences. In 1890, Cattell wrote a paper called "Mental Tests and Measurements. This paper explained calculations of 10 psychological functions, which include measures of tactile discrimination, absolute brinks for pain, weight discrimination, reaction time for auditory incentive, and so on. Cattell was the first person to use the phrase mental test. Other psychologists also evaluated large groups of individuals during the 1890s. In 1881, Jastrow handed out a comparable battery of tests to undergraduates at the University of Wisconsin. Afterward, Jawstrow created a large battery of tests that measured discrimination capability, reaction times, memory lines, colors, and forms. In 1891, Boas assessed a large sample of school children while he was at Clark University utilizing computations of memory, hearing, and vision (Brody, 2000).

Wissler was the first to apply the coefficient of correlation to evaluate relationships within psychological measures. His study showed relationships for a group of reaction-time and sensory discrimination measures and assessments of academic performance. He gained correlations for his battery of tests and explained that different measures of psychological functions did not draw a parallel positively and they did not correlate with grades. The findings of this study were most influential in ending the effort to measure intelligence by the methods first advocated by Galton (Brody, 2000).

Charles Spearman wanted to know if various intellectual abilities connected to each other in any methodical ways. To figure this out Spearman created a statistical technique, which later is known as factor analysis, to discover connections between various test items. Spearman gained correlations among many measures of sensory-discrimination capabilities. He explained that the correlations were positive and that there was an ability to discriminate that would be able to be evaluated through an aggregated index. Spearman supposed that there must be a common intellectual ability that explained the positive manifold of correlations. He named this g that stood for general intelligence (Brody, 2000). Spearman's research proposed that there was one dominant intelligence, g, that was the most crucial to be able to succeed in other mental tasks (Malkus, Feldman, & Gardner, 1988). Spearman's idea is that people only truly have one intelligence that is their best and that is what allows them to succeed in any other mental aspects.

Unlike Spearman's theory that was built on the effort to measure intelligence using the methods of Galton, Alfred Binet wanted to measure intelligence using multiple intricate tasks discussed in his paper with Henri, such as the ability to discuss the meanings suggested by theoretical words or to create stories, comprehension, suggestibility, aesthetic judgment, and so on. In 1905, Binet and Simon created the first intelligence test. This test was developed to help ascertain the level of functioning of a child and to come to a decision on whether the child should receive special education services (Brody, 2000). This intelligence test had accomplished what the leaders of the public school system in Paris had wanted and so they implemented it in their schools. Word of Binet's accomplishment made its way to educators and psychologists alike around the world and so the intelligence test's popularity grew and similar programs in other areas of the world were influenced by it (Malkus et al., 1988).

The psychologist L.L. Thurstone (1938), took another outlook on intelligence. Thurstone developed what he named Primary Mental Abilities and launched them into the intellectual testing culture as another way to calculate intellectual function. Thurstone's tests were created for three different age levels that had about six tests that were intended to calculate different abilities. Thurstone alleged that a person's intelligence could not be measured by assessing one single ability. He recognized numerous aspects such as verbal ability, deductive reasoning, spatial ability, and perceptual speed as important to a cohesive theory of intelligence. Even though Thurstone's theory reached out to incorporate different intellectual abilities, it still focused on assessing individuals' intelligence within the structure of "g" as the notion of general intelligence (Morgan, 1996).

In this history we have, so far, looked at intelligence from a standardized test point of view. As the years went on different theories of intelligence emerged that opened a whole new view on what was known about intelligence. Psychologists began to look at a pluralistic view of intelligence which is the view that the mind is structured into comparatively divided areas of functioning. Through this view psychologists believed that there was not only one way to assess someone's intelligence. There are many other intelligences that are not necessarily connected to one another. Two psychologists are well known for their work through the pluralist view of intelligence, David Henry Feldman and Howard Gardner (Malkus et al., 1988).

Feldman gained much of his research through his work with child prodigies. Through this work he explained a variety of diverse fields in which talent manifests itself. An example would be a child who has apparent talent in a specific field, such as chess or music, could seem ordinary through the traditional symbolic domains of Piagetian theory. The idea here is that some domains of capability may be universal, but others depend on outside forces that are essential for potential

to build up and prosper. Malkus describes an example of this as the expertise of a fire dancer is most likely to appear in the Indian social framework. This outside force of Indian culture is what helps to cultivate those skills used to be a fire dancer and succeed at it (Malkus et al., 1988).

Howard Gardner and the Development of Multiple Intelligence Theory

After Gardner became duly licensed as a psychologist, he decided to carry out his own research. He worked with two groups to collect his research. One was studying the cognitive, in particular the artistic, development of normal and gifted children at Harvard Project Zero. At Project Zero, Gardner and other colleagues that followed the Piagetian theory centered on the growth of in different of artistic domains. The domains they focused on consisted of music, drawing, expressive language, and three-dimensional representation. Through this study they discovered that, with age controlled, the success of developmental milestones in one domain was mainly independent of growth in other domains. The second study was working with assorted kinds of brain damaged patients at the Veterans Hospital in Boston. Gardner expresses how these individuals had specific disabilities. For example if they have issues with language, they do not necessarily have problems with other fields, such as logical reasoning, musical performance, or drawing. These two studies with gifted children and brain damaged patients was showing Gardner that people's specific skills in one field was not good for predicting skills in other fields that he was studying (Perkins et al., 1987).

In the 1970s, Gardner began to examine more closely the idea that was already starting to arise from his studies with gifted children and brain damaged patients, which was that there really are different types of intellectual faculties. Gardner's goal was to intensify his knowledge of what is known about the organization of cognition in the nervous system. Through the Van

Leer Project, Gardner discovered that there was a chance to learn more about how intellectual abilities are used in other cultures.

In order to learn more about how intellectual abilities are used in different cultures Gardner preformed a "thought" experiment, where he imagined himself going into several diverse cultures and trying to recognize in each one of them its developed roles and "end states". According to Gardner "end states" are skills that are greatly valued in that specific culture and extremely vital for the culture's survival. As a part of this "thought" experiment, he thought about religious leaders, shamans, seers, mothers, fathers, dancers, surgeons, sculptors, businessmen, hunters and so on. He wanted to be able to come up with a concept of cognition that would be able to give an improved explanation of how individuals can become exceedingly knowledgeable in these incredibly different kinds of abilities. The idea of "end states" and how to explain the diversity of them was one of the starting points for Gardner into his Multiple Intelligence Theory. The other starting point was he wanted to organize into a helpful and defensible structure the existing information on cognitive growth and brain organizations (Perkins et al., 1987).

From these beginnings, the Multiple Intelligence Theory affirmed that there were seven "relatively autonomous" intelligences. Gardner's definition of intelligence is an ability to create products or to solve problems that are of importance within one or more cultural settings. This definition means that he does not believe that intelligence is one single capacity (Perkins et al., 1987). In developing this theory that followed his definition, Gardner did not follow psychometric approaches. The theory was created from a set of criteria that he used to evaluate individuals' skills or intelligences that together allowed people to carry out various adult roles (Kornhaber & Gardner, 2006). The sources of criteria Gardner used were thinking about what is

already known about the development of both normal and gifted children. By thinking about

what patterns of breakdown there are after brain damage, examining exceptional individuals in

particular children, prodigies, idiot-savants, autistic children, children with learning disabilities,

he thought about what is known about the evolution of cognition, cognitive capacities in other

species, and psychological evidence that came from both psychometrics and psychological

experimentations that demonstrates whether or not training for a explicit task yields a capacity

that is movable from one task to another (Perkins et al., 1987).

After Gardner studied this set of criteria he performed a "subjective factor analysis". This

"analysis" consisted of Gardner "eye balling" the data he collected for a long period of time and

testing for plausibility for an assortment of ways for categorizing intelligences. Through this

process he came up with the list of seven intelligences, linguistic intelligence,

logical/mathematical intelligence, musical intelligence, bodily kinesthetic intelligence, spatial

intelligence, interpersonal intelligence, and intrapersonal intelligence (Perkins et al., 1987).

Linguistic intelligence features an understanding of language in spoken or written forms,

the skill of being able to learn a language, and to be able to use language to achieve an

individual's goals. Logical/Mathematical intelligence is the skills for mathematical operations,

logical analysis, and scientific investigation. Musical intelligence is concerned with facilitating

compositions, performance, and appreciating musical patterns. Bodily kinesthetic intelligence

focuses on the use of all parts of the body in order to figure out problems or create products.

Spatial intelligence requires being able to perceive, use, and transform spatial information.

Interpersonal intelligence involves understanding other individuals and having empathy for them

by recognizing what others are feeling. Finally, intrapersonal intelligence focuses on

understanding oneself and using that understanding to help run one's own life (Gardner, 1983).

Gardner believed that except in the case of brain damage, everyone has all the intelligences as part of being a human being. The differences between individuals depends on what makes up their "profiles of intelligence". Some individuals have strengths in some areas and weaknesses in other intelligences which makes up everyone's unique "profiles of intelligence". Gardner also believes that the intelligences work together to help people learn academic disciplines and to do real world activities. He gives an example saying that it is obvious that a musician is using the musical intelligence to understand and execute a musical composition, but to control one's voice or instrument requires the bodily kinesthetic intelligence, and stage presence involves the interpersonal intelligence. All of these intelligences are working together to carry out this activity (Kornhaber & Gardner, 2006).

Impact of Multiple Intelligence Theory on Education

This theory became very popular with educators. Kornhaber and Krechevsky (1995) wanted to understand why Multiple Intelligence Theory had become so accepted in education and found out some of the following information. Teachers felt that Gardner's theory confirmed their experiences in the classroom that noticed that students learn in many different ways. Educators also felt that the theory connected with the constructivist theory that was used in the classroom, that students need to be fully educated in a variety of subjects, and that students should be able to feel achievement in at least one area. Educators also liked that it aligned with the practices that they were already using in their classrooms such as thematic units, learning centers, and hands on activities. This theory also provided a structure that organized their practices. It helped teachers to sort and recognize the content in their lesson plan collection. (Kornhaber & Krechevsky, 1995).

These same ideas are still felt by teachers today. Gardner's intelligences account for a more extensive array of potential among students because it distinguishes seven forms of human intelligence. Multiple intelligences shift the spotlight away from weaknesses and puts it on students' strengths. This focus on strengths is good for all learners, and it is beneficial for academic and emotional growth of students with learning disabilities. When teachers implement multiple intelligence theory in the classroom they move beyond only relying on paper and pencil tests. The assignments teachers give speak to students' individual strengths. This theory is very useful in the classroom to help students to understand the material and have a sense of pride in themselves by using their individual strengths (Delaney & Shafer, 2007).

With all the pressure of the standardized tests looming over schools, the staff, teachers, and students are bound to feel the weight. Multiple Intelligence Theory is the idea that shows that one test cannot capture all you need to know about someone from one test. Standardized tests focus mainly on linguistic and logical/mathematical intelligences when there are so many other intelligences to assess. Since the tests focus strongly on linguistic and logical/mathematical intelligences it is difficult for students to develop their other intelligences and become diverse learners. This study exclusively looked at preschool students in the Wagner College Early Childhood Center during a seven week program in which students were taught alphabet letters in sounds through different intelligence styles. The study assessed students' preferences toward specific intelligences and aptitude for explicit intelligence. The study also evaluated students' growth in preference and aptitude for intelligences after the seven week curriculum. Students were also assessed on their alphabet knowledge after the lessons. The research questions correlated with this study were:

- How do different modalities affect children's letter knowledge?

- How does using multiple intelligences enhanced student's flexibility in working with varied modalities.

CHAPTER 2

Literature Review

There have been many studies conducted all over the world in which multiple intelligence theory is implemented in classroom instruction. These studies focus on various school subjects, ages of children, students' races, and students' economic backgrounds. These studies show how incorporating multiple intelligence theory helped several areas in schools such as academic achievements and children's behavior in the classroom. These articles are a basis for this study in which I will use information on implementing multiple intelligences into my letter knowledge lesson plans to try to aid preschool students in becoming diverse learners.

The study by Pienaar, Nieman, and Kamper (2011) provides information on incorporating Gardner's multiple intelligence theory in teaching to an eighth grade class in Gauteng, South Africa. The goal of this research was to assess the influence that implementing a teaching approach using multiple intelligence theory had on students, teachers, and students' performance at the school. The researchers first executed the study by assessing the children and teacher's brain profiles through computer produced brain profile tests. These brain profiles made exact reference to the multiple intelligences of specific teachers and students in the study. This was used to compare the teachers' brain profiles with the students' brain profiles. Teachers also needed training in multiple intelligence theory. Multiple intelligence theory was not well known among the teachers and they required instruction on the subject through PowerPoint presentations, lectures, and a workshop from an outside company (Pienaar, Nieman, & Kamper, 2011).

The study showed many different findings when it was finished. When the researchers compared the brain profile assessments of the teachers and students it showed many

dissimilarities between the two groups. Interpersonal intelligence was exhibited the most by the teachers, trailed by the linguistic intelligence. The third intelligence that got the highest was the logical intelligence among the teachers. After discussing these results, the teachers agreed that they taught lessons more to the linguistic and logical intelligences even though the brain profiles of the students show that they are stronger in the musical, bodily-kinesthetic, interpersonal, and spatial intelligences. Teachers also noticed that through these comparisons the teachers became conscious of the fact that the linguistic intelligence was the least represented out of all the intelligences, but it is frequently used as the way to confirm that learning has occurred. Teachers recognized that they needed to make use of each of the students' strong intelligences, but also help increase other intelligences that they are weaker in (Pienaar et al., 2011).

Additionally, the research showed the effect a multiple intelligence approach had on scholastic achievement. Pienaar, Nieman, and Kamper (2011) compared marks gained following the use of a multiple intelligence approach to figures that show a general tendency in scholastic achievement when students advance from eighth grade to ninth grade. The study provides a chart on performance in previous years of students at that school in eighth and ninth grade and another chart of students' performances who participated in the multiple intelligence instruction in eighth and ninth grade. In the previous year's chart it showed a decline in performance in all the subject areas from eighth to ninth grade. In the performance chart where students learned through multiple intelligence instruction the only decline that was seen was in one learning area, LLC: English. Except for the one minor decline, the results speak positively about the influence the multiple intelligence teaching approach had on students' performance academically in school (Pienaar et al., 2011).

Moreover, the study showed that the multiple intelligence teaching approach has a positive impact on students' behavior. Throughout the study there was a discipline strategy in place in which the teachers would deduct points from students because of inappropriate behavior. The study showed that the teachers who use the multiple intelligence teaching approach only deducted twenty-one points due to misconduct, while the teachers who did not use the multiple intelligence approach deducted forty-six points from the same group of students. These findings showed how having engaging lessons that focused on different intelligences helped to maintain behavior management in the classroom (Pienaar et al., 2011).

At the end of the year with using the multiple intelligence teaching approach, the students were asked to fill out an open-ended questionnaire. The students' answers to the questions showed that they were completely conscious of their specific strengths and weaknesses based on their brain profile assessments. This alertness to strengths and weaknesses is significant for students in best handling learning challenges they may face. Students also discussed how they tried to work on their weaknesses, by getting extra help, working more efficiently, keeping to a timetable for studying, or having more confidence in themselves. These ways of trying to work on their weaknesses shows to some extent how their intrapersonal intelligence has grown because they looked in themselves to find out answers instead of asking other students or teachers. Lastly, the questionnaire showed that most of the students responded well to the multiple intelligence teaching approach and liked coming to school more than before. Overall, all the aspects examined in this study after the implementation of a multiple intelligence teaching approach fostered positive results (Pienaar et al., 2011).

The study conducted by Eisa Al-Balhan (2006) focused on multiple intelligences in relation to better achievement in reading in a middle school in Kuwaiti. The students that were

used in this study had low academic achievement in reading. The study was set up to compare

the experimental group which consisted of 104 male students and 106 female students. In this

group of students there were 102 from government school and 108 students from private schools.

The control group consisted of 98 males and 102 females with 90 of them being from public

schools and 110 of the students being from private schools. All these students were asked to go

for extra help in reading through this tutoring program. The students were randomly placed in

either the traditional reading methodology program (control group) or the Gardner multiple

intelligence program (experimental group). The teachers in the Gardner multiple intelligence

program underwent a four week training course in Gardner's multiple intelligence inventory for

teaching middle school students (Al-Balhan, 2006).

The experimental group was given the Gardner Multiple Intelligence Inventory to

evaluate the favored intelligence of each of the students. The individual students that scored the

highest in a specific category were considered to be proficient in that intelligence. The academic

performance of both groups was calculated by their reading development from the start to the

end of the tutoring program. The study displayed descriptive statistics that were produced on

reading levels, teaching methods, and student variables with the experimental group. A T-test

was measured applying the students' scores during the academic school year and differentiating

between the traditional method and the Gardner multiple intelligence method. The study also

utilized T-tests to clarify differences within the experimental group for grades based on gender

and type of institution (Al-Balhan, 2006).

The results showed many diverse results in the categories of reading tutoring program,

gender, and school institution. The T-test that compared the experimental group and the control

group demonstrated that the experimental group had a higher mean of 3.50 when measured up to

the control group's mean of 2.53. When comparing these two means, the experimental group's mean was significantly higher. This suggests that the use of the Gardner multiple intelligence program helped better overall reading performances more than the traditional method. It helps for students to understand their strengths in an intelligence and work within that intelligence to improve their reading.

Other findings from the T-test that compared male and female students explained that the mean of the females was 4.04 and was higher than the mean of the males which was 2.96. This shows that the female students were better at improving their reading grades throughout the marking period in the experimental group. Lastly, the T-test comparing government and private schools showed that the mean of the private school was 4.13 which was higher than the 2.84 mean of the government schools. The mean score of the private school was significantly higher than the government school's mean. This data illustrates that students that are enrolled in private schools increase their reading skills when multiple intelligences are implemented in their school work in reading (Al-Balhan, 2006).

The two above mentioned studies focus on implementing multiple intelligences in the middle school classrooms outside of the United States. Both of these research articles discuss the benefits of using multiple intelligences in lessons. The students gain a lot from understanding their strengths and weaknesses in specific intelligences and are more engaged in lessons when they feel "smart" in an area. Eisa Al-Balhan (2006) and Pienaar, Nieman, and Kamper (2011) examined the advantages of incorporating intelligences in various subjects. The idea is that students learn in different ways and teachers' lessons should reflect the diverse ways students can absorb information. If a student is not understanding a topic one way, a teacher can present that topic in a different way and it may click right away for that child. These studies show how much

can be gained in middle school by using multiple intelligences, but the younger students can

benefit as well. It is hoped that by using this theory to teach letter knowledge in my study that

children to become more diverse learners so that they do not only rely on one way of thinking,

but can thinking using many of the intelligences.

Other studies examine implementing multiple intelligence theory in early education

classrooms. David Feldman and Howard Gardner (1996) worked together on Project Spectrum

which was intended to conclude whether young children have specific profiles of ability. Project

Spectrum used fifteen diverse assessments to establish children's strengths and weaknesses in the

intelligences. These different assessments were able to be utilized anytime throughout the year as

part of the regular preschool curriculum (Hatch & Gardner, 1996).

The Project Spectrum is set up in such a way that students can choose from an extensive

assortment of "intelligence- fair" materials such as figures and props to narrate stories, games

that involve numbers, musical instruments, and mechanical objects that students can take apart

and put back together to train their spatial skills. An "intelligence-fair" approach allows students

to be exposed to materials that respect the diverse ways of thinking and performing that

differentiate each intelligence (Gardner & Hatch, 1989). The Spectrum Program also has weekly

or bi-weekly activities like "Weekend News", which connects to students' descriptive language

skills, and creative movement sessions, which permits teachers to examine students' bodily-

kinesthetic skills develop (Hatch & Gardner, 1996).

Through these various activities, teachers can assess a broad range of skills

inconspicuously. The guidelines for teacher observations and checklists to record children's

interest and growth in these areas assist teachers to take advantage of the beneficial information

that is produced throughout the year. In addition, several of the activities have thorough scoring systems which the teachers can employ to take a detailed look at the intellectual profiles of the individual students. To aid parents to take advantage of the information that is provided over the school year, teachers came up with "Spectrum reports". These reports give a detailed account of a student's strengths and weaknesses based on informal observations and individual evaluations. The reports also consist of suggestions for activities that a student may enjoy and recommendations of resources in the community that the student can utilize to respond to that intellectual profile (Hatch & Gardner, 1996).

The data from a pilot study was examined to give preliminary results for Project Spectrum. The pilot study of Project Spectrum was in a 20 children classroom at the Eliot-Pearson Children's School in Medford, Massachusetts. The children in this school came from mainly white, middle to upper income population, and varied in age from 3.5 to 4.8 years at the start of the school year. Throughout the year students were assessed on ten various Spectrum activities which included the dinosaur game, the bus game, treasure hunt game, assembly activity, art portfolios, music production activity, music perception activity, storyboard activity, creative movement, and classroom model. The students were also tested on the Stanford-Binet Intelligence Scale, Fourth Edition (Hatch & Gardner, 1996).

In this preschool study, children's performances in the Spectrum activities were compared by calculating standard deviations for each activity. The results demonstrated that children did not perform at the same level in each specific area. These results showed that students had specific intellectual strengths and weaknesses. Additional findings were found when the Spectrum activity results were compared to the Standford-Binet Intelligence Test results. The outcome of these tests showed that there was limited overlap between children's achievements on

the two dissimilar measures. The correlation analysis disclosed that only the activities that used numbers were correlated with the Standford-Binet scores. This makes sense because the Standford-Binet centers on logical-mathematical skills. It also showed that the narrative language measure did not correlate well with the Standford-Binet scores. The reason for this is probably the fact that both tests measure a dissimilar type of language ability (Hatch & Gardner, 1996).

These above mentioned articles have shown that race, class, or ethnicity is not much of a factor in order to benefit from using multiple intelligences. Pienaar, Nieman, and Kamper (2011) focused on students from South Africa, Eisa Al-Balhan (2006) focused on students struggling in reading from private and public schools of both affluent and underprivileged backgrounds in Kuwaiti, and Hatch and Gardner (1996) worked with students from the white middle class in Massachusetts. The diverse group of students observed from these studies all showed positive results when working with multiple intelligences in the lessons they learned. These various studies showed that it does not matter where a student is from, their class, race, or ethnicity because students can always find their strength when they are introduced to the multiple intelligences. When students understand that there is something they are "good at" they feel a sense of pride and worth. They want to work on lesson topics through that intelligence but they also want to try and improve other weaknesses they might have in other areas.

A different study by Ping Liu (2009) focuses on learning outcomes of preschoolers ages three to four, in P.R. China. In this study the instructional technique "Integrating Thinking, Art, and Language" (ITAL) is used to support the children in increasing multiple intelligences. ITAL was created to focus on the development of drawing, rhyming, and thinking as well as communicating at the same time. It is used to aid children develop coordination of motor skills,

language ability, artistic capability and thinking capability, and care for the development of their creativity, learning different content areas for instance science, social studies, and math. In this study, ITAL is implemented as a crucial means to achieve educational goals on a daily basis. Throughout ITAL lesson plans, teachers engage in continuous professional development to progress the value of their instruction.

The samples given that show how ITAL was implemented are in art to help students draw a flower, a duckling, and a chick. With the flower picture students talk about how typical items that they are associated with everyday, an egg, chopsticks, and two slices of bread, are used in a rhyme to help them draw a flower. Similarly students are given rhymes that focus on lines, shapes, and size to aid them in drawing the picture. ITAL is using art as a base to integrate various intelligences such as musical intelligence through the rhyme, bodily-kinesthetic through the motor skills used to hold the pencil, and mathematical and logical incorporating the shapes. The students are developing these intelligences through one single activity (Liu, 2009).

There were 59 preschool students assessed in the study. A pretest was administered within the first three weeks of school. For this test the students came into a separate room individually with a teaching assistant and met with an evaluator. As the students walked in they were greeted and asked to take a seat. The teaching assistant would ask students to respond back to the greeting if they did not do so on their own. The evaluator asked the child to state his or her name and then asked if they would participate in a "game". Each child was then asked to draw his or her "favorite" picture or anything that he or she liked. There was no time limit on the child to complete the task. After the child completed his or her picture, the evaluator asked him or her to talk about his or her picture. This oral explanation was recorded for further analysis. The

student received a sticker reward after they had finished and returned to their class. Eight months later a post test was given out to each student that followed the same procedure (Liu, 2009).

The study compares students pretest and post test results. In the t-test of the pretest and post test the findings show through an examination of the mean that there is a major improvement in the post test and their average score in the post test demonstrates an increase of 2.02 points. There are also work samples of children provided to show the improvement from pretest to post test. Lily's work sample shows that during her pretest when she was greeted, she smiled but did not say anything back to the evaluator. She created a picture quietly with the encouragement of the teaching assistant. When she was asked to explain her picture all Lily said to the evaluator was "pocket". When she was asked to elaborate all she did was shake her head. She was given a sticker as a reward and smiled but said nothing. There was significant change for Lily in the posttest. After the evaluator greeted Lily, she greeted her back without being told to do so. When she was asked to show what she learned in art she looked confident and excited. She created a picture of a duckling while saying the rhyme that aided her in finishing the duckling. After, she orally entitled the picture "duckling" and created a story for it. When she was given her sticker she said "thank you" and "bye bye" as she left the room (Liu, 2009).

These results demonstrate that the group of students made major growth in learning during their eight months using ITAL instruction. This growth can be seen in both the differences between evaluations of students' skills in drawing and communicating the artwork they made. The students were able to use what they learned during the ITAL instruction to complete their work. This points out how intelligences can be learned and developed. These results show how teachers do not only move from different intelligences in teaching but students

also reveal an assortment of intelligences while performing tasks. ITAL helps to foster students

multiple intelligences (Liu, 2009).

Furthermore, Marina Sotiropoulou-Zormpala's article "Reflections on Aesthetic

Teaching" (2012) focuses on how using the aesthetic process can develop teaching practices in

preschool and elementary school classrooms. Aesthetic teaching (AT) is a way of teaching in

which teachers focus on building experiences that enable students to partake aesthetically in the

world around them. Aesthetic teaching correlates well with Gardner's theory of multiple

intelligences. Aesthetic teaching aids students to trigger the diverse types of thinking and

intelligences studied by Gardner. This article examines the AT activities that Sotiropoulou-

Zormpala developed and used with a classroom teacher during a language lesson in kindergarten

and first grade.

Many AT activities were implemented in the classroom. Activity 1 was multilanguage in

which students pretended that they were from different countries that spoke a variety of diverse

languages. For example, one country's sound could be "ah" while another one's sound could be

"ih". The children will be given a sound and walk around with their eyes closed trying to listen to

students who are speaking their same "language". Activity 2 was conversations connects with the

first activity. Every country develops their "language" by making symbols that contain their own

specific vowel. For example, in a country with the "ah language", all the syllables they create

must have that "ah" sound. Then the group must draw a sketch and choose an emotion to express

while speaking their language, such as "ah" will be a surprised emotion. Activity 3 is called

directors and in this one students are broken up into groups of five to eight and work together to

make and direct a short play, which is supposed to end in an exclamation that is also a short

vowel. The fourth activity is named weird singers and children are again in groups of five to

eight and they must choose a song that they know and change it by swapping all the vowels in the song with another vowel they chose beforehand. Then they present the new version of the song and try to convince the audience that the words mean the same thing even with the new vowels (Sotiropoulou-Zormpala, 2012).

Sotiropoulou-Zormpala (2012) discusses how after implementing these activities in the classroom she noticed accomplished goals above the disciplinary aims. The activities had an affirmative effect not only on intellectual growth, but also on social and personal growth. Specifically, the activities assisted students to voluntarily and actively work with letters, increase self confidence, and be able to relate letters to their everyday life. Further observations showed how the activities allowed the students to be able to approach and understand letters in various ways. The way they thought about letters during activities linked to the seven intelligences. The linguistic intelligence was used in all the activities, logical/mathematical was used in activities 2, 3, and 4, spatial intelligence was used in activities 1, 2, and 3, musical was used in activities 1 and 4, bodily-kinesthetic was used in 2, 3, and 4, intrapersonal was used in 1 activity, and interpersonal was used in activities 2, 3, and 4. Students were using multiple senses and intelligences in tandem which benefited their learning experience (Sotiropoulou-Zormpala, 2012).

Sotiropoulou-Zormpala (2012) and Liu (2009) both explain the increase in self confidence and social skills that are gained through using multiple intelligences in the classroom. Through the use of AT activities Sotiropoulou-Zormpala (2012) showed that that incorporation of intelligences in the activities improved students' engagement in the lesson and their social skills working with others in their groups. Liu's (2009) study also showed students' progress in their social and communication skills from the pretest when Lily first would not say anything to

the evaluator to the post test when she was discussing her art work and voluntarily saying

goodbye without prompting from the assistant teacher. The use of multiple intelligences within

the classroom is far reaching. It does not only effect the students knowledge of a particular

subject, but it also helps other aspects of their development such as communication and social

skills.

Sotiropoulou-Zormpala (2012), Liu (2009), Hatch and Gardner (1996) all talk

about how using multiple intelligences in the classroom promotes students' learning in early

education classrooms. Using activities that allow students to approach topics in diverse ways and

not think about it in just one way works. The idea of one intelligence or focusing on the

linguistic and logical/mathematical intelligence does not work for all learners, even though that

is what the standardized tests are based on. Students need to learn in their own way so that they

can understand the material and executing activities that incorporate a multitude of intelligences

will help children in the long run.

The ideas in these articles about multiple intelligences can be taken even further. My

study will focus on students learning letters through incorporating multiple intelligences, but also

trying to create learners who are almost equal in their use of all the intelligences. Research has

shown the benefits multiple intelligences has on students' learning and my study will try and

create diverse learners who do not have a particular strength or weakness in a specific

intelligence. They students will be constantly exposed to letters through all the intelligences to

try and observe growth in all the intelligences.

CHAPTER 3

Methods

This study was designed to explore whether using a conscious curriculum of modalities impacts children's interest in engaging with those modalities and whether or not it impacts children's letter knowledge. The study compared preschool students' letter knowledge growth using Gardner's multiple intelligences. This study also observes preschool students interest in the different intelligence learning centers after being exposed to each intelligence over nine weeks.

Participants

The participants in this study were 16 preschool children participants between the ages of three to five. The study was conducted over nine weeks. Each week students participated in a multitude of activities that focused on a specific intelligence based on Gardner's theory of intelligences. The students were split into a control group and an experimental group. Both the control group worked on letter knowledge through the regular curriculum while the experimental group received additional activities based on Gardner's multiple intelligences. The students in this study were selected by sending consent forms home to the parents and they chose if their child would be allowed to participate in the study. All students' names and other information is strictly confidential. Parents and children could have choose to be removed from the study at any time and without any repercussions.

Setting

This study took place in the Wagner College Early Childhood Center on Staten Island. The classroom had 16 students whose ages ranged from 3 to 5 years old. Seven learning centers

were created the first week within the classroom. Each center focused on books and word

matching games for the linguistic intelligence, pattern games for the mathematical/ logical

intelligence, aerobics and high movement games for the bodily-kinesthetic intelligence, mazes

and building blocks for the spatial intelligence, audio devices and CDs for the musical

intelligence, games where you had to play with other students for the interpersonal intelligence,

and games that you could only play on your own for the intrapersonal intelligence. These centers

were not focused around letter knowledge, but on other topics such as numbers so that students

were not pre-exposed to any letter knowledge activities that might be similar.

Materials

The researcher had several different types of materials for each of the centers. These

materials included worksheets to provide students with paper and pencil application, word cards,

picture cards, writing implements, multimedia, researcher references such as word lists and

directions, and miscellaneous items like paper bags and colored cups. Some materials, such as

the multimedia were used for only one intelligence, while others, like worksheets were used for

different purposes at multiple centers. All worksheet materials were created by the researcher.

Pre-Assessment

The first pre-assessment for this study included allowing students to play in any of the 7

learning centers during the first week. The researcher explained to the students that they did not

have to stay in any particular one for a set amount of time. They were free to explore any of the

centers they wished for the whole first week. To obtain a baseline the researcher observed

students as they self selected centers and noted students who remained in each center as long as

they chose to. By the end of the week students were rated based on the observation notes on

areas of intelligence that they had high interest , medium interest, and low interest in. The students were rated in each intelligence between 0 to 5, 0 meaning that students did not spend any time at that activity and 5 meaning that they spent most of their free time at that activity.

The second part of the pre-assessment was to test their letter knowledge. The students were assessed on their ability to identify letters, identify capital and lowercase forms of the letters, and their ability to identify letter sounds. Students were shown each letter in their letter book, which contained a capital and lowercase form of each letter, and asked the following questions: "What letter is this?", "What sound does this letter make?", and "What kind of letter is this?" Students were pre-assessed on all 26 letters.

Each of the following seven weeks focus on a particular intelligence. The goal of each of the intelligence learning centers was to improve students' letter knowledge focusing on identifying letters, identifying the capital and lowercase forms of the letters, identifying letter sounds, and listing words that begin with the letters. At the end of each activity the teacher assessed students' performance and reviewed material if necessary.

Linguistic Intelligence

The linguistic activity focused on learning the letters A, L, and P. There were 3 different activities for this intelligence. First students sorted 15 lowercase words that began with a particular letter in response to the prompt "Put the words that begin with the letter "L" in the green cup and all the other words that do not begin with the letter "L" in the red cup.". Students then did the same activity with 15 capital letters. The second activity also asked students to sort but for this activity, students were given four to six cards with the same letter on it in either its

capital or lowercase form. The students' responded to the prompt "Put the capital letters in the green cup and the lowercase letters in the red cup."

The final game for the linguistic intelligence was a listening activity. The teacher explained to the child that they were listening for a specific target letter sound. Students needed to be able to know the sound a specific target letter made in order to chose the correct word from the word group. For example, the teacher's prompt was "Which word made the letter "a" sound, pumpkin, apple, snake, candy?" The question was continuously repeated in that manner until the child gave an answer. At the end of each activity the teacher assessed students' performance and reviewed material if necessary.

Intelligence	Letters	Activity	Materials
Linguistic	A, a, L, l, P, p	Students sorted words based on the first letter of the word	• 15 words beginning with different letters • Green cup • Red cup
Linguistic	A, a, L, l, P, p	Students sorted words based on whether the first letter of the word is capital or lowercase Ex. Lowercase letter "p" go in the red cup and capital letter "P' go in the green cup	• Four to six cards with the same letter on it in either its capital or lowercase form • Green cup • Red cup
Linguistic	A, a, L, l, P, p	Given 4 words presented verbally, students identified which words made the sound of the target letter.	• Word list

Mathematical/Logical Intelligence

The mathematical/logical activities concentrated on the letters B,T, M, and E. There were two activities students participated in this week. The first activity had students identify the

picture, the picture's letter sound, the letter sound pattern, and choose a picture that would

complete the letter sound pattern. For example, students would be given pictures of a bee, tree,

ball, and train. Students responded to the following prompts "What is this a picture of? What

sound does that word begin with? What is the pattern?" Student would be given 4 more pictures

such as a clown, bear, towel, and sun. They would be asked to finish the pattern by choosing the

picture that should come next in the letter sound pattern. The second activity focused on patterns

again, but with actual letters. Students were given letter patterns where they were asked to

identify each letter, if it was capital or lowercase, and then choose what letter would be next to

complete the letter pattern.

Intelligence	Letters	Activity	Materials
Mathematical/Logical	B, b, T, t, M, m, E, e	Students completed pictured patterns based on letter sounds	• Pictures based on letter sound patters
Mathematical/Logical	B, b, T, t, M, m, E, e	Students completed letter patterns based on letter identification, capital, and lowercase letters Ex. Students are given 'B b T t B b T t B...' as their pattern Then they must choose from these letters ' B t b T' which one goes next	• Letter pattern worksheet

Kinesthetic Intelligence

The kinesthetic games worked on letters Y, C, F, and O and students participated in three

separate activities. For the first activity students were asked to respond to the following prompts:

"Can you show me fast feet? What sound do the words fast feet make? What letter makes that

sound?" Students respond with the correct letter based on the movement the teacher asked them

to do. The second task was to ask the students to do "Sky Writing", which meant that the teacher

would ask the student to write a target letter in the air. An example prompt would be: "Can you write a capital letter F in the air and a lowercase f in the air?" If the teacher needed clarification of what letter the student wrote in the air they were asked to write it on paper, both the capital and lowercase letters. Lastly, the student would respond to the prompt: "Can you make the letter 'F' with your whole body?" Students would be able to stand up or lie on the floor and make that letter with their whole body.

Intelligence	Letters	Activity	Materials
Kinesthetic/Bodily	Y, y, C, c, F, f, O, o	Students made specific movement and repeated the phrase Ex. Can you show me fast feet?	• Verbal instructions of movement directions from the teacher
Kinesthetic/Bodily	Y, y, C, c, F, f, O, o	"Sky Writing"	• Verbal directions for the teacher • Scrap paper to write the letter • Markers/Crayons
Kinesthetic/Bodily	Y, y, C, c, F, f, O, o	Students created letter shapes using their whole body Ex. Can you make the letter Y with your body?	• Verbal instructions from the teacher to make a letter

Visual/Spatial Intelligence

The visual/spatial center focused on the letters I, W, Z, and H. Students worked on three activities this week. The first activity the teacher gave the students a bunch of puzzle pieces and students responded to the prompt: "Can you put together this puzzle? What letter does it make?" The next two activities both had students using mazes. At one exit of the maze there would be a lowercase letter and at the other exit there would be the capital form of that same letter. Students

were asked: "Can you follow the maze to the exit with the target letter in either capital or

lowercase form?" Lastly, for this intelligence the students would be asked to do a similar maze

but instead of the two exits having letters the students would be asked to lead the specific letter

through the maze to an exit with a picture that made that letter sound.

Intelligence	Letters	Activity	Materials
Visual/Spatial	I, i, W, w, Z, z, H, h	Students assembled a puzzle and identified the letter the puzzle created.	• Letter puzzle
Visual/Spatial	I, i, W, w, Z, z, H, h	Students completed a maze to the correct lowercase or capital letter.	• Maze worksheet with 2 exits, one leading to a lowercase letter and one to a capital letter • Pencil/markers
Visual/Spatial	I, i, W, w, Z, z, H, h	Students completed a maze bringing the target letter to the correct letter sound picture.	• Maze worksheet with 2 exits, each one leading to a different picture • Pencil/markers

Musical Intelligence

The musical activity focused on the letters Q, S, V, and K. Students worked on two

different games at this center. The first activity had students listening to a specific song that

focused on each of the letters. The students could listen to the song as many times as they

wanted. The children would respond to the prompts: "What letter is this song singing about?

What sound does that letter make?" The student would answer what letter and letter sound the

song sang about and make the letter sound.

The next activity asked for students to identify the letter visually the song was singing

about by choosing the correct letter character. The pictures of each of the letter characters had no

identifying letter items on them except for the letter itself. Students were also asked to show

where the capital letters and the lowercase letters were on the letter character. For each letter character the capital and lowercase letters would be in different areas on the letter character's body so that students could not go to the first spots where they identified the capital and lowercase letters and think it was the same on all of the characters.

Intelligence	Letters	Activity	Materials
Musical	Q, q, S, s, V, v, K, k	Students identified letter sounds by listening to songs that focus on the target letter. Ex. What letter did most of the words in the song begin with?	• Alphabet letter CD • CD player • 3. Headphones
Musical	Q, q, S, s, V, v, K, k	Students chose the correct letter character the song was singing about. Students identified the capital and lowercase letter on the letter character.	• Alphabet letter CD • CD player • Headphones • Letter character worksheet • 5. Marker/pencil

Interpersonal Intelligence

The interpersonal activity focused on letters G, N, X, and R. The students completed two tasks during this week. Students worked with a partner for each of these activities. The first activity was a guessing game where one of the students would take turns as the 'clue giver' and the 'guesser'. The 'clue giver' would choose a letter out of a box and not show it to their partner and try and have the 'guesser' identify the correct letter sound. This would go back and forth until each student was able to be a 'clue giver' and 'guesser' for each letter.

The second activity had students sort out the correct letters they needed to find and put them into the right container based on capital or lowercase letter form. The students would first respond to the prompt: "Keep only the letters that being with the letters G, N, X, and R." Then

the teacher would ask, "Can you sort the capital letters in the red cup and the lowercase letters in the green cup?"

Intelligence	Letters	Activity	Materials
Interpersonal	G, g, N, n, X, x, R, r	Students played a guessing game where one person was the 'clue giver' and the other was the 'guesser'. The 'clue giver' tried to make the 'guesser' name the target letter and letter sound.	1. Paper bag 2. Cards with various letters written on them
Interpersonal	G, g, N, n, X, x, R, r	Students worked together to sort specific letters. Students then sorted the remaining letters into the correct container as either a capital or lowercase letter.	1. Cards with capital and lowercase letters on them 2. Red cup 3. Green cup

Intrapersonal Intelligence

Finally, the intrapersonal activity worked with the letters D, U, and J. Students worked on three activities at this center. People who fall under this intelligence tend to be self motivating so for these activities the teacher tried to give minimal prompting or support in the activity. The students were given a red and a green cup, 10 different letters, and minimal instructions with the teacher saying "red is for lowercase letters and green is for capital letters." If students needed a little more prompting it would be given to them after a few minutes if the students did not understand the activity. They were then given the same minimal instructions, but the students had to sort pictures into the containers based on letter sounds. The last activity asked students to choose a letter from a bag of the letters that were being worked on and identify it. If students needed review of any of the letters the teacher would go over things after each activity.

Intelligence	Letters	Activity	Materials
Intrapersonal	D, d, U, u, J, j	Students sorted letters into specific containers based lowercase or capital letter form.	• Cards with capital and lowercase letters • Red cup • 3. Green cup
Intrapersonal	D, d, U, u, J, j	Students sorted pictures into specific containers based on letter sound identification. Ex. Red cup for letter "D" pictures	• Pictures • Red cup • Green cup • 4. Blue cup
Intrapersonal	D, d, U, u, J, j	Students chose a letter from a bag and identified the letter.	• Paper bag • 2. Cards with letters on it

Post Assessment

After students completed all the instructional activities the students were again allowed to play in any center they wanted and each center was set up based on each of the intelligences just like in the first week. The subject matter of the centers were different from the first week's centers and from the letter centers, but each center focused on a specific intelligence. Similar to the first week the students were observed and notes were taken based on where they frequented and where they did not venture to. By the end of the week students were rated based on the teacher's observation notes on areas of intelligence that they had high interest, medium interest, and low interest in.

The second post assessment was also taken during the last week. Students were given a post-assessment of their letter knowledge which was the same as the pre-assessment given the first week. The students were assessed on their ability to identify letters, identify capital and lowercase forms of the letters, identify letter sounds, and then being able to list words that begin with the letters. Students were post-assessed on all 26 letters.

CHAPTER 4

Findings and Results

For this study, students in both the control group and experimental group worked with the researcher on the classroom instruction. The letter instruction used to teach both groups focused on letter puppets introduced during circle time and individual work in their letter books. In addition, the experimental group worked each week with the teacher focusing on a specific multiple intelligence on selected letters of the alphabet.

The data compared the control group and experimental group's pre and post assessment of each letter knowledge. The areas focused on were students' mean scores and range of change before and after instruction. The researcher compared pre and post instruction scores in four areas: letter identification, letter sound knowledge, capital letter identification, and lowercase letter identification. Additionally, the researcher compared qualitative data about students' play in the seven learning centers based on Gardner's Multiple Intelligences. This qualitative data was compared between the first week and last week of the study.

Letter Knowledge Results

Letter identification. To measure students' growth in letter identification, the researcher focused on two aspects for both the control and experimental group. The first was the average number of letters known. The second was the range of change in the number of letters known. Table 1 shows a comparison between pre and post assessment scores for the control and experimental group. The first measurement of performance was a comparison of mean scores. For the experimental group, the mean score for letter identification increased by 3.5, while for

the control group, the mean score increased by 1.5. While both groups gained in letter

identification, the experimental group showed a greater mean gain.

The researcher also measured performance by the range of change for analyzing the

experimental and control groups. For the experimental group, the range of gain for letter

identification was +0 to +8, while the range of gain for the control group, the range of gain was

+0 to +4. Again, both groups showed gain in letter identification, but the experimental group a

larger range of gain.

Table 1

Letter Identification Assessment - Number Correct out of 26

Experimental				Control		
Pre-Assessment	Post Assessment	Change		Pre-Assessment	Post Assessment	Change
11	20	+8		20	22	+2
23	25	+2		15	19	+4
20	25	+5		23	24	+1
19	23	+4		25	26	+1
26	26	+0		19	20	+1
25	26	+1		21	22	+1
21	25	+4		26	26	+0
20	23	+3		20	22	+2
Mean = 20.6	Mean = 24.1			Mean = 21.1	Mean = 22.6	

Letter sound knowledge. To compare students' growth in letter sound knowledge for the

control group and experimental group, the researcher examined both the average number of

letters known and the range of change in the number of letters known. Table 2 demonstrates a

comparison between pre and post assessment scores for the control and experimental group. The

first assessment of performance was a comparison of mean scores. The experimental group's

mean score for letter sound knowledge increased by 3.8. The control group's mean score

improved by 1.8. While both groups increased in letter sound knowledge, the experimental group

demonstrated a superior mean gain.

For the second measure of performance, the researcher also measured performance by the

range of change for analyzing the experimental and control groups. For the experimental group,

the range of gain for letter sound knowledge was +2 to +8, while for the control group, the range

of gain was +1 to +3. Both groups gained in letter sound knowledge , but the experimental group

demonstrated a greater range of gain.

Table 2

Letter Sound Knowledge Assessment - Number Correct out of 26

Experimental				Control		
Pre-Assessment	Post Assessment	Change		Pre-Assessment	Post Assessment	Change
7	15	+8		19	20	+1
19	21	+2		16	18	+2
20	23	+3		20	21	+1
21	26	+5		20	22	+2
19	23	+4		17	18	+1
18	24	+6		23	26	+3
14	21	+7		16	19	+3
18	22	+4		20	21	+1
Mean = 17	Mean = 20.8			Mean = 18.8	Mean = 20.6	

Capital letter identification. Subsequently, the researcher compared both the average

number of letters known and the range of change in the number of letters known before and after

instruction for the experimental and control group to measure students' capital letter

identification. Table 3 explains a comparison between pre and post assessment scores for the

control and experimental group. The first gauge of performance was a comparison of mean

scores. The experimental group's mean score for capital letter identification increased by 2.8. The

control group's mean score increased by 1.6. While both groups increased in capital letter identification, the experimental group showed a greater mean gain.

The second measure of performance the researcher analyzed was the range of change for the experimental and control groups. For the experimental group, the range of gain for capital letter identification was +1 to +5, while for the control group, the range of gain was +1 to +3. This information shows that both groups gained in capital letter identification, but the experimental group demonstrated a larger range of gain.

Table 3

Capital Letter Identification Assessment - Number Correct out of 26

Experimental				Control		
Pre-Assessment	Post Assessment	Change		Pre-Assessment	Post Assessment	Change
23	26	+3		21	23	+2
20	25	+5		18	20	+2
20	22	+2		23	24	+1
22	24	+2		21	22	+1
25	26	+1		22	24	+2
21	23	+2		25	26	+1
19	22	+3		17	20	+3
16	20	+4		21	22	+1
Mean = 20.7	Mean = 23.5			Mean = 21	Mean = 22.6	

Lowercase letter identification. Lastly, to compare student's increase in lowercase letter identification for the control group and experimental group, the researcher examined both the average number of letters known and the range of change in the number of letters known before and after instructions. Table 4 displays a comparison between pre and post assessment scores for the control and experimental group. The first measure of performance for lowercase letter identification was a comparison of mean scores. For the experimental group, the mean score for

lowercase letter identification increased by 3.1, while for the control group, the mean score

increased by 1.7. Both the experimental and control group increased in lowercase letter

identification, but the experimental group demonstrated a greater mean gain.

For the second measure of performance the researcher also measured performance by the

range of change for analyzing the experimental and control groups. The experimental group's

range of gain was +2 to +5, while the control group's range of gain was +1 to +3. The greater

range of gain for the experimental group suggests that students in this group benefitted from the

additional intelligence related instruction.

Table 4

Lowercase Letter Identification Assessment - Number Correct out of 26

Experimental				Control		
Pre-Assessment	Post Assessment	Change		Pre-Assessment	Post Assessment	Change
23	26	+3		20	21	+1
21	23	+2		21	24	+3
21	24	+3		22	24	+2
24	26	+2		24	25	+1
20	25	+5		20	21	+1
23	26	+3		26	26	+0
18	21	+3		16	19	+3
15	19	+4		22	24	+2
Mean = 20.6	Mean = 23.7			Mean = 21.3	Mean = 23	

Summary of letter knowledge findings. The data shows that both the control group and

experimental group increased letter knowledge average from the pre-test compared to the post

test. The data also shows that in each one of the letter knowledge areas the experimental group

had a greater increase in their average than the control group. This data shows that students letter

knowledge increased more with the students who worked on specific letters through a specific

intelligence each week. While student's letter knowledge was successfully increasing from both forms of instruction, working with a specific intelligence yielded greater results.

Learning Center Observation Results

In addition to assessing students' letter knowledge the researcher noted students' interest in each center. Interest was determined by the amount of time students spent at each center and how frequently they visited each of the centers during the first week. The students' interests were then determined during the last week based on the same criteria.

The researcher compared the number of students who went to all seven centers during the first and last week . Observations show that one student from both the experimental and the control group visited all seven centers during the first week. During the last week, students were reintroduced to the centers. Observations show that two students from the control group went to all seven centers, while five students from the experimental group went to all seven centers. While both groups showed an increase in students that visited all seven centers, the experimental group showed a greater increase.

Chapter 5

Discussion and Implications

Limitations

Throughout this study there were various limitations that arose during the nine weeks. These limitations varied from scheduling issues and time restraints to overlapping intelligences in each of the activities. This study worked hard to try and avoid any of the time issues by coordinating with the master teacher in the preschool on the schedule of activities. The study worked to get as much accurate data as possible throughout the nine weeks.

The first limitation that occurred was not having enough time in the school day and variations in scheduling. There were eight students in the experimental group that met with the teacher on different days and at different times because of scheduling. The study had hoped to be able to work with each student on a specific day each week and at an exact time so that students would have a routine. This could not occur because of scheduling conflicts with classroom work, field trips, guest speakers, students' absences, and snow days. Students were all able to complete each particular intelligence activity, but based on the list of previously mentioned limitations some students went through one week where they did not work on an intelligence activity and then the next week they worked on two activities. The study still occurred over the nine week time span. However, the time frame during which students worked on intelligence activities was effected.

The limitations involving time could be addressed, by organizing a schedule with minimal interruptions. While certain interruptions, such as school closings due to weather and

student absences, cannot be controlled, other interruptions can be. For example, events such as class trips and guest speakers can be scheduled for either before or after the study.

Next, the small number of participants in this study was also a limitation. Even though out of 18 students in the class 16 of the students participated, this study could benefit from a larger class and participant pool. To keep the control group and the experimental group even I had to divide them which only allowed for eight students to be in the control group and eight students to be in the experimental group. With a larger class size or multiple classes the data could show if there was more of a discrepancy between the control and the experimental group's pre and post assessments. Also, there would be more students to observe playing in the intelligence centers. It would give the study a wider array of students.

Thirdly, the duration of the study was limited to nine weeks. While nine weeks does allow the data to show growth in letter knowledge and different intelligences, a longer study duration could yield more information. If the study could be performed over the entire school year it could show more information to see how effective teaching based on the multiple intelligences could be. The teacher would have more time to devote to specific letters and intelligences. Instead of having three or four letters a week, the teacher could focus on one letter a week. Also, the teacher could do a month of activities based on an intelligence instead of only being able to fit it in one week. The students' exposure to the different intelligence centers could also be longer than a week to see if that changes what intelligence centers students venture to. A longer time period to study, such as a school year, could supply a lot more data for the study.

Next factors other than students' interest in centers may have impacted students' selection of centers and time spent in each. It was difficult to distinguish if students made their selection of

centers based on learning preferences or based on the novelty of the centers. This factor of center novelty could be addressed by exposing students to the centers prior to the study. Students could also have been persuaded to go to different centers or to like certain intelligence activities based on what their peers said about them. Given the nature of the activities it would be unlikely that students would work with other students whom they do not know well. Therefore the impact of peer influence is difficult to reduce.

The final limitation of this study was the overlapping of intelligences. Every intelligence activity and center contained aspects of other intelligences. The researcher attempted to limit the overlap among intelligences. The seven multiple intelligences are very much intertwined, which makes it difficult to fully separate them all from one another. Each center and activity focused on the particular dominant intelligence with aspects of the other intelligences to support the activities.

Conclusions/Discussion

This study addressed two areas of focus. The first was to see if the use of Gardner's multiple intelligences effect children's letter learning. While student's letter knowledge was successfully increasing from both forms of instruction, working with a specific intelligence yielded greater results.

The study also explored whether using multiple intelligences enhanced student's flexibility in working with varied modalities. Students were assessed on their interest in the seven multiple intelligence centers. While all of the students broadened their interest between the first week and the last week, the students in the experimental group, who were exposed to activities using the intelligences, expanded their interests more.

Implications for Practice

In future practices, it is important for teachers to incorporate more modalities in the curriculum, such a Gardner's multiple intelligences. The students in the experimental group that learned through activities based on specific intelligences had a greater increase in letter knowledge than the students in the control group that did not work on different intelligence activities. Creating a curriculum that focuses on multiple modalities and ways of learning may encourage greater mastery.

Every child learns differently which means that the curriculum should be taught in a way that reaches all students. In addition, creating a curriculum of multiple modalities allows students' interests to broaden and may encourage students to develop into more well rounded learners. The students in the experimental group who were exposed to activities based on Gardner's multiple intelligences were more likely to venture out and experience different intelligence centers during the last week of the study. Having a curriculum that focuses on multiple modalities could truly enhance the classroom environment and students' engagement in the lessons.

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Appendix A

Informed Consent Letter to Parents of Child Participants

Dear Parents/Guardians:

Hi, my name is Beth McComiskey, or as your children know me Ms. Beth. For those of you who do not know me, I am a graduate assistant at the Early Childhood Center and I work in your child's classroom while they have lunch. Next semester I will be working as the graduate assistant in Mrs. Woodward's classroom. I have attached a parental consent form that explains my thesis study that I will be conducting next semester to graduate in May. I am asking for your permission to allow your child to participate. The official consent form explaining the study is attached behind this letter. If you could please check on of the lines below and return this letter as soon as possible before the holiday break I would truly appreciate it. If you have any questions about the study you can email me at ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ or call me on my cell phone at ▮▮▮▮▮▮.

Thanks,

Miss Beth

_____   Yes, I am allowing my child to participate in the study and I have signed and returned

the parental consent form attached.

_____   No, I am not allowing my child to participate in the study.

Appendix B

Intelligence Interest Scale for Each Student

Name _____

Date_____

Time Spent on a Specific Activity

0= no time spent on that activity   5=most time spent on that activity

Logical Learner	0	1	2	3	4	5
Linguistic Learner		0	1	2	3	4	5
Spatial Learner	0	1	2	3	4	5
Musical Leaner	0	1	2	3	4	5
Kinesthetic Learner	0	1	2	3	4	5
Interpersonal	0	1	2	3	4	5
Intrapersonal	0	1	2	3	4	5

Appendix C

Letter Knowledge Assessment Check Sheet

	Recognizes Letter	Identifies Capital Letter	Identifies Lowercase Letter	Identifies Letter Sound	Lists Words with that Specific Letter Sound
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					
K					
L					
M					
N					
O					
P					
Q					
R					
S					
T					
U					
V					
W					
X					
Y					
Z					

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Signed _Elizabeth McComiskey_____   Date _5/22/14_____