

THE EXTENT THAT MONTESSORI PROGRAMS CONTRIBUTE TO STUDENTS'
ACADEMIC AND SOCIAL GAINS AND HOW MONTESSORI PROGRAMS DIFFER
FROM TRADITIONAL PROGRAMS

by

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Abstract

The purpose of this paper, through a review of current research, is to compare and contrast the Montessori Method and traditional programs and to identify the extent of the social and academic benefit from each. Researchers have found that there are some academic advantages to both programs. However, the academic gains that a child makes in traditional prekindergarten programs appear to diminish as the child gets older. Socially, children who have attended Montessori programs appear to enjoy school and have better relationships with peers and teachers than those in traditional program. An important thing to note is much of this research is inconclusive because of sampling bias due to study design. It is my recommendation that some of the aspects of Montessori education be incorporated into the traditional programs and that this continue as a supplement to the regular school day. Perhaps if students continue to be provided with additional support as they are in prekindergarten, the academic gains experienced as a result could be longer lasting.

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Chapter I--Introduction

School reform is always a topic of any educational policy discussion, particularly now with the No Child Left Behind law. Parents, teachers, and administrators are constantly trying to find ways to improve education for children and it has become known that many children are coming to kindergarten without the academic and social skills necessary to be successful (Logue, 2007). Furthermore, evidence suggests a child's academic performance at the beginning of kindergarten is linked to later school achievement (Magnuson, Ruhm, & Woldfogel, 2005). Since quality prekindergarten programs typically boost academic and social skills for students, the question then becomes: what kind of prekindergarten program is most beneficial? One educational philosophy that is being used in the prekindergarten realm is the Montessori Method. According to Pickering (1992), the first Montessori school was started by Maria Montessori in 1907 to benefit poor and mentally retarded children. Montessori developed educational practices based on her ideas about how children learn. These practices have become the basis of the Montessori Method (Lopata, Wallace, & Finn, 2005). At the center of the modern Montessori Method is the idea that children learn best when material is appropriate not just for their age, but for their stage of development as well (Ryniker & Shoho, 2001). Students learn at an individual pace as opposed to traditional school settings where the pace of material being presented is based on curriculum requirements.

Statement of the Problem

Traditional prekindergarten programs and Montessori prekindergarten programs, both intended to teach children the skills needed to be successful in kindergarten, are fundamentally different. Traditional programs are much like any traditional primary education. The teacher plans and facilitates the activities that are to take place in the classroom, whether they are

lectures, learning centers, discussion or hands on learning. Primarily, assessments of student progress are in the form of testing and grades. Montessori programs have minimal structure and allow the students to choose material that is interesting to them. Students incorporate their interests into the teaching of traditional elementary skills such as reading and math. Emphasis is placed on the process of learning rather than the end results. The problem with trying to determine which type of program would produce the largest benefits for children is the fact that traditional and Montessori prekindergarten programs use very different types of assessments in determining a child's progress. Further complicating this problem is the fact that there are many factors outside of school that are just as important to a child's progress as what type of school the child attends. Things like parental involvement and encouragement can make an average school program look more effective than it actually is or the lack thereof can make the best program look poor. The philosophies themselves make it difficult to compare the two in an unbiased way. Data on long term student success in Montessori programs is often more qualitative than quantitative making it difficult to compare to other teaching methods. Another complication is that there is very little research on Montessori prekindergarten versus traditional prekindergarten and it generally tends to compare students at higher grade levels. The demographics of traditional and Montessori prekindergarten programs are also very different. Traditional programs are generally public and are geared toward students of lower socioeconomic status and other at-risk groups. In contrast, Montessori programs are usually private, for profit schools that are financially unfeasible for families of students attending traditional programs. The potential for skewed study results due to sampling bias is something that must be addressed. Despite the difficulty in comparing the two types of programs, the benefit for the educational system of understanding the differences, strengths and weaknesses of each program is immense. This

understanding would allow both types of programs to incorporate the most effective parts of the other to give their students the best chance at success in both school and life.

Research Questions

To what extent do Montessori programs contribute to students' academic and social gains?

In what ways and to what extent do Montessori programs differ from traditional programs?

Definition of Terms

The Montessori Method is currently gaining a lot of attention. “Montessori education is characterized by a multi-age classroom, a special set of educational materials, student-chosen work in long time blocks, collaboration, the absence of grades and tests, and individual and small group instruction in both academic and social skills” (Lillard & Else-Quest, 2006, p. 1893).

Traditional classrooms and Montessori environments have several differences. The differences outlined below were taken from the North American Montessori Teachers' Association website (<http://www.montessori-namta.org/NAMTA/geninfo/devcont3.html>). A traditional classroom has text books, pencils and worksheets, and a unit driven curriculum with individual subjects. These subjects are usually taught during a specific block of time. Traditional classrooms also require students to be quiet and in their seats. A large emphasis is placed on academic learning with social development being secondary. Report cards are focused on the students' final product. A Montessori Environment has kinesthetic materials, which allow children to see and correct their own mistakes. More emphasis is placed on the social development of the child and learning is matched to the child's social development. The curriculum is unified and internationally developed with integrated subjects and uninterrupted work cycles. Assessment is based on the process and not necessarily the end result.

Chapter II-Review of Literature

When it comes to education, there is a plethora of information available on different teaching methods, curricula, and schools. The two main topics of this literature review are the benefits of traditional prekindergarten and the benefits of attending a Montessori school.

Research on Traditional Programs

Gormley, Gayer, Phillips and Dawson (2005) conducted a study of Tulsa, Oklahoma's universal prekindergarten program, which means the program is available to all school districts and all families. The participants of this study were 1,567 prekindergarten students (85.0% of all those who attended) and 3,149 kindergarten students (84.5% of all those who attended). The study intended to test as many of the attending students as possible. These students represent a variety of different ethnicities, socioeconomic levels, and levels of parental education. All of the students participating took the same three tests and they were able to compare the students who did not attend Tulsa's universal program to those who did. The researchers utilized three subtests of the Woodcock-Johnson Achievement Test, Letter-Word Identification, Spelling, and Applied Problems. The test administrators only gave the test in English, which may have led to some skewed results if there were Spanish-speaking children in the class. When planning their study, the researchers realized the potential for selection bias if they compared kindergarten students who attended the prekindergarten program with those who did not because of the underlying factors that affect who attends and who does not. The program's adherence to an age requirement with a strict cutoff date for attendance, September 1st, allowed Gormley et al. (2005) to form subsets for a treatment and a control group. The treatment group included those kindergarten students who made the cutoff date, by three months or less, and attended the program the prior

year. The control group included those students who had missed the cutoff date the year before by three months or less and were just starting the prekindergarten program. These groups included 659 students and 753 students, respectively. This allowed them to compare students, all of whom intended to attend the prekindergarten program, who were all approximately the same age. This effectively eliminated the selection bias and allowed for a meaningful measurement of the effectiveness of Tulsa's universal prekindergarten program. The Gormley et al. (2005) study of Tulsa's prekindergarten program found advantages for all of the students who attended the prekindergarten program. Regression analysis showed an increase in cognitive/knowledge scores of approximately 0.39 standard deviation, an increase in language scores of approximately 0.33 standard deviation, and an increase in motor skills scores of approximately 0.24 standard deviation. The sampling of students allowed for analysis using sub-grouping to further analyze the results. They were sub-grouped by race/ethnicity and by eligibility for reduced or free lunch (analogous to income). The researchers found positive impacts (statistically significant at a p -value $\leq .05$) for all race-ethnicity groups, with the greatest improvements being made with Hispanic children. Students eligible for free or reduced lunch showed more improvement than those eligible for full price lunch. Those receiving free or reduced lunch showed nearly double the improvement in all areas over those receiving full price lunch. The Gormley et al. (2005) study used well thought out and statistically sound methods to show the effectiveness of the Tulsa Public Schools' Universal PreK program. However, the study lacks any follow up testing to show whether or not the head start given to these children was maintained into the future.

In 1996, a longitudinal study of Georgia's prekindergarten program began. Henry (2003) began to follow 3,639 students from 203 randomly selected prekindergarten programs from across the state. These prekindergarten programs included private for profit, not for profit and

local school systems. The final sample, including 1,991 students of which there were slightly more females than males and about half were white, were tested at the third grade level. The sample that was tested included only 1,991 students of the original 3,639 due to losses of students who could not be located and also because only students who were still at grade level were tested. This means that students who were still in contact but had been retained or were not required to take the test because of an Individualized Education Plan. Henry (2003) utilized the third grade standardized test to determine if there were academic gains. The researchers found students who had attended prekindergarten scored average on third grade readiness tests when compared to the national norms (Henry, 2003).

Georgia's policies as they relate to prekindergarten are fairly ambiguous. Georgia allows both public schools and private entities to operate prekindergarten programs and lets them choose/design their own curriculum. Teachers have widely ranging levels of training, spanning the range from little or no training to degreed teachers. However, this lack of standardization does not seem to substantially affect retention rates according to the results of this study. Because of a lack of equal access to all of the different curricula in the study, the researchers found it impossible to draw any conclusions about the relative effectiveness of them. Without an unbiased sampling of students in each curriculum, it is impossible to say with any certainty that one provides better results than any of the others. The study also concluded that students' academic, social, and communication skills peaked in the first grade and then declined through the second grade. This conclusion is based upon teachers' assessments but the researchers state that it is unclear whether this is due to schools being ill-equipped to build upon prekindergarten skills, actual regression of the students, or measurement error on the part of the assessing teachers. This study seems to have some serious problems with its design. The sampling is poor

in that it does not allow for unbiased comparison of one subgroup to any other. It appears to be far too broad to return any conclusive results. The study should either have been narrowed to examine one program or more care should have been taken in sampling to allow for comparison of curricula. Measurement of students progress is another area that added to the inherent error in the study. The instructions for the teachers' assessments of the students were too subjective to accurately compare one student to another.

The next program we will look at is the Michigan School Readiness Program. This study is actually part of a much larger one that includes Michigan, New Jersey, Oklahoma, South Carolina and Virginia. The Michigan program focuses on at-risk children. When creating the sample, Lamy, Barnett and Jung (2005) first randomly selected state funded preschool classrooms, and then selected kindergarten classrooms from the same district. From each classroom they randomly selected four students. In essence, what the researchers did was to test children of approximately the same age, only one would be just entering the preschool program and one would have just completed it and would be entering kindergarten. The total sample was 865 children, 57 percent were white, 25 percent African American, 12 percent Hispanic, two percent Asian, less than one percent American Indian, and four percent all other ethnicities. The three assessments used were the Peabody Picture Vocabulary Test, 3rd edition (PPVT-3), the Applied Problems subtest of the Woodcock-Johnson Tests of Achievement and the Blending and Print Awareness subtests of the Preschool Comprehensive Test of Phonological and Print Processing. The PPVT-3 is a test of receptive vocabulary and can be used as an assessment of cognitive ability. The Applied Problems subtest gauges early mathematical skill. The Blending subtest determines phonological skill by testing the students' ability to blend initial and ending phonemes onto one and two-syllable words. The Print Awareness subtest determines whether

children can correspond letters and letter sounds. It also uses words in print and corresponding pictures and symbols. The students who attended the Michigan State Readiness Program scored higher than their peers who were just beginning the program in the areas of receptive vocabulary (6% average score improvement), math (21% average score improvement), and print awareness (63% average score improvement) (Lamy et al., 2005). Since early print awareness and receptive vocabulary skills have been found to predict later reading abilities, these students are also more likely to pass the Michigan Educational Assessment Program's reading tests (Lamy et al., 2005). The researchers involved with this study did not include any data on the statistical significance of their findings. This makes the data obtained from the regression analysis less trustworthy.

Magnuson et al. (2007) conducted a study in order to address several limitations that they found in prior research. The five limitations that they looked at were the effects of different types of early education, the impact of behavior problems in addition to academic skills, selection bias, if the academic benefits seen at school entry continue or if they fade over time, and whether the benefits are greater for children from low-income families. These researchers used data from the Early Childhood Longitudinal Study (ECLS), Kindergarten cohort. The ECLS was conducted by the US Department of Education and used a nationwide sample of children entering kindergarten in the fall of 1998. The ECLS included academic assessments, child, parent, teacher, and school administrator surveys, and observational rating of school environments. The sample included 10,224 children. Magnuson et al. (2007) caution that their sample may not be representative of the nation because the sample was smaller than the one originally used in the ECLS. This was due to the fact that information was missing on 1,848 children and for 5,540 children data was not collected because they changed schools. Furthermore, in the sample remaining, the students still participating in the study had a higher income to needs ratio, were less likely to be receiving

welfare, less likely to be a minority and their parents had a higher level of education. Students' reading and math skills were assessed using tests prepared by the ECLS team in the fall of kindergarten and the spring of first grade. The reading test measured letter and word recognition, beginning and end sounds, vocabulary and comprehension. The math portion assessed understanding of numbers, geometry, and spatial relations.

When the scores of the students who attended prekindergarten were compared to those that did not, it was found that, at kindergarten entry, they scored slightly above the full sample mean and during first grade, they tested with average scores (Magnuson et al, 2007). In order to assess student behavior in relationship to attending prekindergarten, Magnuson et al.(2007) utilized 10, 224 teacher reports of children's externalizing (aggressive) behavior and self-control. The results of this study show that prekindergarten attendance does predict a statistically higher reading and math score but it also shows an increase in aggressive behavior and a decrease in self control (Magnuson et al, 2007). These researchers also note that the positive academic gains the students demonstrated at the beginning of kindergarten have mostly dissipated by the end of first grade but the negative classroom behavior has actually increased. In contrast, when looking at only disadvantaged children, the academic gains they experience in reading and math last longer than those of other children. The effect of prekindergarten on the behavior of disadvantaged students is similar to that of the full sample. However, their externalizing behavior is greater than that of the other students in the sample by the beginning of first grade. Another subset of children Magnuson et al. (2007) looked at was those who attended public schools because those children were more likely to have attended publicly funded prekindergarten. Forty percent of school children from the sample attended the prekindergarten at the same building as kindergarten. This limitation on the sample does not greatly affect the

academic scores but it does have an effect on student behavior. Students who attend the same school as they did for prekindergarten do not tend to have the same externalizing behaviors as those who attend different schools for prekindergarten (Magnuson et al., 2007).

Prekindergarten programs can teach children about fairness, problem solving, taking turns, and making friends but these social skills are increasingly being neglected in favor of academic interests (Logue, 2007). Forty states currently have prekindergarten programs for four year olds and have adopted content learning standards to comply with the No Child Left Behind Law. Many states have even added standards for social skills. The standards are being developed and adopted because researchers have shown a high quality program can greatly benefit children, especially those considered at risk, but unfortunately the opposite is also true. The need for prekindergarten programs is becoming more and more apparent. Kindergarten used to be viewed as the place where students learned to learn the social skills necessary to participate in group situations. Now these social skill opportunities are being neglected as more academic expectations are being placed on students (Logue, 2007). As previously discussed, some positive cognitive outcomes of prekindergarten have been found. However, results are mixed as to the effects on behavior. Again, evidence is minimal on whether or not prekindergarten increases misbehavior because most experimental studies focus on a model program and not the typical prekindergarten program. Magnuson et al. (2007) tried to remedy this. The researchers found children in their sample experienced the same increase in aggressiveness and lack of self control; however, children who attended prekindergarten in the same schools that they attended in kindergarten did not exhibit any behavioral problems. To the contrary, a study of five states' prekindergarten programs, four states found no significant impact while only one reported a significant negative impact on behavior (Gilliam & Zigler, 2004).

Research on Montessori Programs

Little research has been conducted on the Montessori Prekindergarten separate from the program as a whole. Much of the research done on the Montessori Method is from longitudinal studies. Many of the studies on the Montessori Method compare Montessori schools to what researchers simply refer to as “other educational systems.” The following research compares Montessori schools to traditional schools.

Lillard and Else-Quest (2006) compared the academic and social scores of a Montessori school and a traditional elementary. In order to attend this Montessori school, one needed to participate in a lottery. The researchers utilized the lottery that was already in place to form their control and experimental group. The control group was comprised of students chosen at random from those who applied for the lottery but were not chosen for the Montessori school (lottery losers). The experimental group was made up of students chosen at random from those who applied for the lottery and were chosen (lottery winners). Lillard and Else-Quest (2006) contacted families and offered them \$100 to participate. The intent of using the lottery winners and losers was to rule out the possibility that parents who sent their child to a Montessori school were somehow different than those who did not. The groups were composed of twenty five, five year olds in the traditional elementary and thirty, five year olds in the Montessori school. Average household income appears to be approximately the same but ethnicity and gender were not considered to be an issue in this study.

Lillard and Else-Quest (2006) found when five-year-olds were given seven scales from the Woodcock-Johnson (WJ III) Test Battery (7), (i.e. Letter-Word identification, Word Attack (phonological decoding ability), Applied Problems (math skills), Picture Vocabulary, Spatial

Reasoning and Concept Formation) Montessori five year olds out scored children attending “other educational systems” in three of the seven areas. In the other four areas, no significant difference was found. Furthermore, children in the studied public inner city Montessori school performed better on standardized tests of reading and math by the end of kindergarten (Lillard & Else-Quest, 2006). When Montessori five-year-olds were given five stories about social problems (i.e. a child hoarding a swing) and asked how to solve them, the students were more apt to use a higher level of reasoning by referring to fairness in order to convince the child to give up the object. When these same children were observed on the playground, they were more likely to be involved in sharing than in rough play (Lillard et al., 2006). When considering the information in this study, it is important to remember that the overall sample size was very small and the results may not be representative of the school or even the grade as a whole. Another concern is that only one Montessori school was compared to one public school. While the researchers were careful to note the quality of education of the Montessori school no mention was made of the quality of the traditional school.

Dohrmann (2003) looked at students who attended a Montessori school through fifth grade and students who attended something other than a Montessori school through fifth grade. The Milwaukee Public School System has two public Montessori schools which were used for this study. The curriculum and quality of education at these schools is well documented and provided the researchers with an advantage over previous studies in that the schools provide a known quality of instruction. Attendance at these Montessori schools is based upon a lottery selection. Because records of those who were not chosen, the lottery losers, were not available, the researchers took great care in developing their control group. The Montessori sample was composed of 201 students who had begun their schooling at Montessori schools between the

ages of three and four, completed fifth grade at the same school and later graduated from a Milwaukee Public High School from 1997 - 2001. For the control sample, each Montessori student was matched with a student of the same gender, race, ethnicity, and of comparable socio-economic status who graduated from the same high school between 1997 and 2001. Dohrmann (2003) looked at ACT scores, WKCE (Wisconsin Knowledge and Concept Examination, a form of nationally standardized Terra Nova administered in the 10th grade) scores, and GPA. Students who had attended a Montessori program had a statistically significant score improvement over the control group in math and science. No statistically significant differences (positive or negative) were seen between the control group and the Montessori students in GPA, English or social studies.

Dohrmann did not provide the actual statistics to quantify these differences. He merely provided a direction (higher or lower) for the difference and states that the differences are significant at the $p \leq 0.05$ level. The study showed that socio-economic status (free lunch = lower GPA), gender (females had a higher average GPA), and status as a minority (minorities had a lower average GPA) had much larger effects on GPA. Minority status in both groups also had a negative effect on math and science skills. None of the above had a statistically significant effect upon English or social studies skills. While the Montessori students only show advancement above the control group in math and science skills, this is still a significant finding because the effects of the Montessori schooling are still evident 5 – 7 years *after* the students left the program and re-entered the traditional public school system.

Lopata et al. (2005) conducted a similar study. This researcher looked at the achievement outcomes for 543 fourth and eighth grade children in the Northeastern United States who attended public Montessori programs, structured magnet programs, open magnet programs, and

traditional non-magnet programs. All of the schools were non-selective in nature (no admissions criteria). Schools were selected based on gender, ethnicity and socioeconomic status. Another criteria was the very different teaching philosophies that each of the schools used. Data were collected at the fourth and eighth grade levels on language arts and math using the New York State Mathematics and English/Language Arts exams. The mathematics portion of the Terra Nova was also used to document mathematics skills at both of these levels. Test scores for the students involved were provided by school administrators and were part of the students' annual evaluations. At the fourth grade level, the results show that there was a significant difference between the schools in the area of language arts. However, in math, Montessori students were approximately the same as students who attended the structured magnet school. They were higher than those at an open magnet school but lower than those at a traditional non-magnet school. In mathematics at the eighth grade level, all schools tested at nearly the same level of proficiency. In language arts, the Montessori students scored lower than the three other schools.

The results of this study fail to support the hypothesis that a Montessori school education would lead to elevated math and language arts skills. However, the study itself has some significant flaws. While the researchers did a reasonably good job of selecting students with attention to potential sampling bias, there was only one school of each type involved in the study. This could possibly have led to skewed results based on a varying quality of instruction rather than the effectiveness of the curriculum and teaching style at the individual schools. Selecting the students from several schools of each type would have lessened this potential effect and made the study much more statistically powerful.

Glenn (2003) began a study of Montessori education in 1986 and completed it in 2003. He wanted to assess the effects of Montessori education on children into adulthood. He invited

all families currently attending Franciscan Montessori Earth School in Portland, Oregon to participate, but his initial sample included only 145 students, which declined as the study went on. At the end of the eighteen year study, 44 participants remained. Glenn (2003) concedes that, due to funding limitations, they could not track participants every year so a considerable number of the study dropouts were due to loss of contact rather than the families declining to participate.

Glenn (2003) posed a primary and a secondary hypothesis at the beginning of the paper. The first is that the number of years of Montessori education would relate positively to the qualities stressed in Montessori teaching (lifelong learning, self-control, self-direction, creativity, etc) and the second was that Montessori educated students (any number of years) would be as successful or more so than students with traditional education. Glenn (2003) calls these two hypotheses “Montessori helps” and “Montessori does not harm.” Over the course of the study, six assessment cycles were conducted approximately every three years. Cycles 1 – 4 used quantitative surveys and personality and achievement tests to determine the students’ progress. The last two cycles used a more qualitative approach with open ended survey questions. The sample was broken into three groups based on the number of years of Montessori education they had received (MEY). The three groups were few MEY (3 – 5), some MEY (6 – 9), and many MEY (10 – 16). It was felt that qualitative assessment would better capture some of the less tangible variables used to assess Montessori education.

By the end of the fourth cycle, the data did not support the primary hypothesis but did support his secondary hypothesis. The qualitative assessments showed a much stronger correlation between MEY and a student’s level of understanding and dedication to lifelong learning. However, students did state that having attended a Montessori school did not put them behind their peers academically but they were slightly unprepared for the different teaching

styles and larger classes they encountered as they went on to larger schools. Glenn downplays the effect that sample bias may have played in the results from his later cycles but these effects cannot be ignored. It seems likely that the students that stayed in contact and participated throughout the entire eighteen year study might have had a personal preference for the Montessori style and been better suited to it. The lack of any type of control group to compare the Montessori students to is a fundamental flaw in the study that limits what kind of conclusions can be drawn from the results.

Rathunde (2003) compared Montessori and traditional students' motivation and quality of experience. His sample included 150 sixth and eighth grade students from five Montessori schools across four states, and 160 students from traditional educational settings. These students were the same ethnicity (approximately 75% white), parents had a similar education level, and the schools they attended were similar in student to teacher ratio. The design of the sampling takes into account the fact that most prior research has shown that lower socioeconomic status and minority status strongly correlate to classroom performance. With this in mind, the control group was selected from participants in a larger study. The middle schools selected for study reflected the primarily European American background and generally higher socioeconomic status of most Montessori students in the Montessori schools being studied. Both sets of students utilized the Experience Sampling Method (ESM). The ESM required wearing special watches that beeped throughout the day. This happened eight times per day between the hours of 7:30 am and 10:30 pm for seven days. When the students were signaled, they were to take out response cards and write about what they were feeling, where they were, and what they were thinking about. The four things these response cards measured was affect, potency, salience, and intrinsic

motivation. These are composite measures of several factors developed by the researcher to help quantify qualitative feelings. See below for an explanation of these measures.

- Affect = happy + relaxed + sociable + proud
- Potency = strong + active + excited
- Salience = challenge + importance to self + importance to future
- Intrinsic Motivation = enjoyment + interest + wish to be doing the activity

(Rathunde, 2003)

Values were calculated for these items in two contexts: while doing academic activities and while doing non-academic activities. The context was determined by asking the question on the ESM card: What was the main thing you were doing? For comparison, the values calculated for these composites was standardized so the average for the week was zero, thus, negative numbers are below average and positive numbers are above average. “The results showed that the Montessori students reported a significantly better quality of experience in academic work than the traditional students. There were strong differences suggesting that Montessori students were feeling more active, strong, excited, happy, relaxed, sociable, and proud while engaged in academic work” (Rathunde, 2003, p. 24). Responses from traditional students seem to suggest that the students understand that what they are doing is important to their futures but it neither interests nor motivates them.

The conclusion of these researchers is that Montessori students generally have a more favorable opinion of their schools, teachers and classmates than their traditional school peers which leads them to have a more positive outlook on learning. There are few ways that the

instrument could have led to skewed results. The students could have lied about what they were doing on the response cards or the answers that they wrote down may not actually have been how they were feeling about the task at hand but, if this did occur, there would most likely have been an equal amount of it in both types of programs.

Montessori classrooms are designed to be developmentally appropriate and are designed “to teach children how to play and learn cooperatively” (Michel, 2002, p. 2). The Montessori belief is children’s misbehavior is a result of an “unsatisfied need” or a “state of tension” (Haines, Baker, & Kahn, 2003, p. 8). In a Montessori environment, children who are misbehaving are given something to do, something that interests the child or children and something to focus their energy on. Montessori believed “when children work, they demonstrate patience and obedience, are polite, gentle, and affectionate, have better mental balance, are content in doing good and are respectful of others” (Haines et al., 2003). Researchers of the Montessori environment appear to support this belief.

According to the research, the Montessori Method appears to provide more academic and social gains than traditional programs (Lillard & Else-Quest, 2006; Glenn, 2003; Rathunde, 2003; Dohrmann, 2003). However, the research should be regarded as somewhat inconclusive due to the fact most Montessori schools attract families of high socioeconomic status and families who place a high priority on education while traditional prekindergarten programs tend to focus on disadvantaged children with fewer opportunities for academic success outside of school (Dohrmann, 2003).

Chapter III-Results and Analysis Relative to the Problem

The influence of prekindergarten on students' academic gains is difficult to measure because the programs vary greatly in their structure, duration, classroom characteristic, quality of teachers and comprehensiveness of services (Gilliam & Zigler, 2004; Gormley et al., 2005). A lack of uniformity from school to school and a lack of state or federal standards makes comparison of different teaching methods difficult at best. Many prekindergarten program evaluations are administered through a state department of education and the methods of evaluation vary from state to state. The studies overwhelmingly show that students who attend a prekindergarten program test higher at the outset of kindergarten. However, the advantages gained tend to fade by the end of first grade. This effect was more prominent in students who were not at risk. High socioeconomic, non-minority students were most likely to have the gains made in prekindergarten programs fade. At risk students, including minorities and lower socioeconomic students, appeared to benefit from prekindergarten programs the most and retained the advantage the longest but the effect does still diminish with time. These students then revert to being in the at risk category.

Most of the researchers reviewed showed Montessori students to be ahead of their peers in traditional programs in one or more subject. In some areas, Montessori students outscored students who attend traditional school but in other areas, they scored the same as their peers. However, as with other prekindergarten programs, the academic advantages gained tend to fade by the end of first grade. Glenn's research (2003) shows a link between a positive outlook on learning and lifelong learning and Montessori education. However, due to a lack of a control group in the Glenn study (2003), it cannot be said that this is a uniquely Montessori phenomenon. On the other hand, Rathunde (2003) makes a reasonably strong argument for

students in Montessori environments having a more positive outlook on their learning experiences which certainly affect their future prospects for lifelong learning.

Academically, Montessori prekindergarten students seem to be on par or even slightly ahead of traditional prekindergarten students (Gormley et al., 2005). However, an increase in behavioral problems associated with Montessori prekindergarten students when they enter a traditional classroom has also been noted (Magnuson et al., 2007). Magnuson et al. noted that this effect was present in both Montessori prekindergarten students and traditional prekindergarten students but almost non-existent in students who did not change schools when they went from prekindergarten to kindergarten. This takes some credibility away from the conclusion that prekindergarten causes behavioral problems because it opens up the possibility that a change in venue, loss of friends, or other non-school related issues are causing the behavioral problems.

The biggest difference between Montessori education and traditional programs is the attention paid to the social element of education by Montessorians. Socially, there does appear to be a benefit. Students who attend a Montessori school tend to enjoy the learning process much more. They also had a more favorable opinion of their classmates and teachers (Glenn, 2003; Rathunde, 2003). This could be related to the freedom that the Montessori programs afford the students to incorporate their own interests into the learning process. Reduced stress could also be a factor. Stress to perform to a certain level can detrimentally affect students' interest in learning (Rathunde, 2003). A combination of topics that interest the student and an evaluation method that stresses the learning process over final results likely contribute to Montessori schools producing happier, more positive learners.

Chapter IV-Recommendations and Conclusion

Recommendations

The research seems to support a definite short term benefit to attending a prekindergarten program, whether it is a traditional one or Montessori. Students were invariably ahead of other, non-prekindergarten students at the outset of kindergarten but in almost every study, the prekindergarten students had fallen back to even by the end of first grade. This is not likely to be a problem for more advantaged students who have a strong support network at home to help them succeed. However, the traditionally at-risk children that do not have stable home lives or otherwise lack the outside encouragement to succeed in school would benefit from further help after the advantages gained in prekindergarten programs have dissipated. We need to continue addressing these students' needs throughout their school career. This could be done with a before school, after school, or summer program. Taking some elements from Montessori programs would help to instill some of the lifelong learning values that will help encourage future success.

A research project class could teach a variety of skills at multiple grade levels using Montessori methods to foster self-reliance, self-discipline, and social skills along the way. Students could select an area of interest and start researching and learning about it. Research could be conducted in a variety of ways, both individually and in groups. While they are completing this process, they would be introduced to writing skills, communication skills, and presentation skills and much more. Again using the Montessori philosophy, students would be "graded" according to their progress not necessarily the finished product. Students would be able to work at their own pace and continue practicing until a specific skill is mastered. Throughout this process, if there were several children working on the same topic they would be encouraged to work together and share the work load. At times, the concept of multi-age groups could also be utilized. Older children may be paired up with younger ones to allow the older children an

opportunity to demonstrate their understanding of a particular skill and to provide younger children with someone else's explanation of a problem or skill.

Areas for Further Research

The problem with comparing traditional programs to Montessori programs is that the nature and demographics of the two programs make any study of the differences very susceptible to sampling bias. Montessori programs, usually private and generally less accessible to lower socioeconomic status students, attract families that would probably go out of their way to make sure that their children are successful in school. Traditional programs are usually public and are typically designed to help those students who are considered at risk. Many of the students attending these programs are in a situation where their academic success is almost entirely based on the services that the school can provide for them. Trying to design a study that eliminates or at least mitigates the advantages or disadvantages of the outside influences on these children is extremely difficult. Any future studies need to be aware of this and be very careful in how they design their sampling plans.

Most of the studies that have been conducted to date have been too narrow in their sampling of schools. Some have had fairly large sample populations but all of the students come from the same program, be it Montessori or traditional. The studies tend to focus on the comparison of one Montessori school to one public school. This introduces the possibility that the quality of the school's staff, students, or other factors besides curriculum could skew the results of the study. It would be much more powerful if a study compared public Montessori schools in Wisconsin to traditional public schools with similar demographics also located in Wisconsin. This would allow a much larger sampling of students while minimizing the effect that any one school has on the overall outcome of the study. It would be important that all

schools included in the study have licensed teachers and that the programs have been in place more than three years.

Once the schools were selected, an equal number of students at the prekindergarten level would be selected from each school. Selections would be based on levels of parental education, SES, ethnicity or race, and gender. An equal number of each gender, ethnicity, and race would be chosen to allow for comparisons between student groups. For instance, white girls could be compared to Hispanic boys to see if one group has an advantage over the other not related to curriculum. Using SES and parental education as a selection criteria would help to eliminate the sampling bias from the study. Making sure that an equal number of students from each category (low SES, high SES, parents with no college, some college, or with college degrees) are included in the study would allow conclusions to be drawn about the relationship between the factors and gains made relative to the program attended. The students chosen would be followed through their fourth grade year. Based on the students' grade level, different assessments would be utilized to assess academic achievement. In prekindergarten through first grade, the Woodcock-Johnson (WJ III) Test Battery (7), (i.e. Letter-Word identification, Word Attack (phonological decoding ability), Applied Problems (math skills), Picture Vocabulary, Spatial Reasoning and Concept Formation) would be utilized. In second grade, students in Wisconsin are required to take the Terra Nova, which measures skills in reading, language arts, mathematics, science, social studies, vocabulary, spelling, and other areas. In fourth grade, students would take the WKCE (Wisconsin's Knowledge and Concepts Examination), which tests students in the subjects of reading, mathematics, science, language arts, and social studies.

For the social aspect of this study, there would be teacher and parent surveys, as well as interviews with the students. In the surveys, parents and teachers would be asked questions about

the students' behavior, attitude, friendships, and work habits. During the interviews, the students would be asked questions concerning the same topics that the parents and teachers were responding to. This would allow the researchers to compare the two items for consistency. When the students' reach third and fourth grade the ESM (Experience Sampling Method) could also be used as another source of data.

The data would then be compiled and the scores of the Montessori children would be compared to their traditional school counterparts at the same grade level using statistical tools like analysis of variance to determine if there is a significant difference in the mean test scores between the two groups. Sub-grouping of the sample by race, ethnicity, SES, and gender would also be done to determine potential sources of error or sample bias. The social data would be compiled by grade level and then by the school as a whole in an effort to determine if Montessori or traditional schools produced happier and more contented learners. Sub-grouping by race, ethnicity, SES, and gender would be used again here to determine if any of these factors affect the results.

Summary and Conclusion

The main focus of this paper was to identify if there were indeed more academic and social gains for children who attend a Montessori school over those who attend a traditional prekindergarten program. The research indicates that some children benefit from attending either one of these programs. However, the results are rather inconclusive. In many of the prekindergarten studies, a variety of different programs were being compared at the same time. Furthermore, many of the traditional prekindergarten programs studied were primarily for children who come from disadvantaged homes. The problem with many of the studies of the Montessori schools was that they had a very small sampling of students and only looked at one

school in each of the studies. Just as many of the traditional prekindergarten programs were geared for disadvantaged children, the opposite can be said for the families sending their children to a Montessori program. An inordinate number of the children in the Montessori programs were from high SES families who are provided with many more opportunities for success than those in the traditional programs. This created a clear problem in the selection of students from each program for comparison. In order to more effectively answer the research question as to the extent of academic and social gains that Montessori schools provide, a great deal more research needs to be conducted. This research needs to use more than one school at a time and larger, more carefully selected samples need to be identified. The intent of both of these programs is to help children with their academic and social development. In order to better help children succeed in school and be successful in their adult life, the Montessori philosophy should be made available to a larger number of children. It seems to provide a more positive learning experience for children that could help to instill a love of learning and encourage a continuation into higher education. However, we do need to be careful when doing this and not lose sight of the reality that not all children learn the same. Some children may thrive in the Montessori Method setting while for others, a more traditional approach might be best.

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