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## A comparison of Montessori students to general education students as they move from middle school into a traditional high school program

Shelley K. Corry  
*University of Nebraska at Omaha*

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A COMPARISON OF MONTESSORI STUDENTS TO GENERAL  
EDUCATION STUDENTS AS THEY MOVE FROM MIDDLE SCHOOL INTO  
A TRADITIONAL HIGH SCHOOL PROGRAM

By

Shelley K. Corry

A DISSERTATION

Presented to the Faculty of  
The Graduate College of the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Education

Major: Educational Administration  
Under the Supervision of Dr. John W. Hill

Omaha, NE

UMI Number: 3220657

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BY

Shelley K. Corry

SUPERVISORY COMMITTEE:

APPROVED

DATE

John W. Hill

Signature

Dr. John W. Hill, Chair

April 21, 2006

Typed Name

Neal F. Grandgenett

Signature

Dr. Neal F. Grandgenett

April 21, 2006

Typed Name

Kay A. Keiser

Signature

Dr. Kay A. Keiser

April 21, 2006

Typed Name

Karen L. Hayes

Signature

Dr. Karen L. Hayes

April 21, 2006

Typed Name

Jody C. Isernhagen

Signature

Dr. Jody C. Isernhagen

April 21, 2006

Typed Name

UNIVERSITY OF  
**Nebraska**  
Omaha

## ABSTRACT

A COMPARISON OF MONTESSORI STUDENTS TO GENERAL  
EDUCATION STUDENTS AS THEY MOVE FROM MIDDLE SCHOOL INTO  
A TRADITIONAL HIGH SCHOOL PROGRAM

Shelley K. Corry

University of Nebraska, April 2006

Advisor: Dr. John W. Hill

This study evaluated the achievement and social involvement of students who completed eight years of public school Montessori Academic Instruction ( $n = 31$ ) to determine their current levels of 10th-grade transition adjustment into a traditional high school program, compared to the achievement and social involvement of randomly selected students from the same school district who completed eight years of General Education Academic Instruction ( $n = 31$ ) before entering high school. Results of the posttest only two group comparative study examined students' (a) Grade Point Averages; (b) reading, language, and math Norm-Referenced Test Normal Curve Equivalent achievement test scores; (c) Essential Learner Outcome reading, math, and writing scores compared to cut scores required to demonstrate proficiency; and (d) reported extra-curricular activity frequencies for (i) club, (ii) organization, (iii)

association, and (iv) sports participation. Montessori Academic Instruction students were found to be prepared for successful high school transition as indicated by their achievement and social involvement dependent measures and, therefore, would be expected to experience continued academic success and social involvement. In this study the same outcomes could be anticipated for General Education Academic Instruction students who were equally prepared for continued successful high school transition.



## ACKNOWLEDGEMENTS

I want to take this opportunity to recognize and thank many people for their unwavering support and guidance as I worked through my advanced degrees and this dissertation.

First of all, I want to thank the faculty and staff of the department of Educational Administration and Supervision. There could not have been a more supportive or positive group of people with whom to work. My undying thanks to Dr. John Hill, with whom I have had the pleasure of working with and have known for 10 years, first as advisor during my first Master's degree program and now as my dissertation chair. Dr. Hill spent countless hours with me and I would not have this final product without his advice and guidance. Also my thanks to Dr. Laura Schulte for her encouragement--especially during the statistics classes--knowing that mathematics is not my forte. I also want to thank the members of my dissertation committee Dr. Karen Hayes, Dr. Neal Grandgenett, Dr. Kay Keiser, Dr. Jody Isernhagen, and of course Dr. John Hill for their expert guidance and encouragement.

Secondly, I would like to acknowledge and thank the staff and students of the Millard Public Schools where I had the pleasure of working for 10 years, including 4 years

at Central Middle School where I had my induction into Montessori middle school education. I want to specifically thank Mr. Tim Fickenschler, Ms. Barbara Jens, and Ms. Alice Roberts, teachers in the program who acted as advisors and sources of information on Montessori methodology as I completed my study. I want to thank Dr. Jim Sutfin, Principal and Ms. Beth Balkus, Assistant Principal, who were my strength and friendly sounding boards throughout my doctoral studies. You are both wonderful colleagues and friends. I also want to thank the students of Millard Public Schools who acted as my participants and wish them continued academic success.

Last, but not least, I want to thank my parents, John and Delores Stasch, and my in-laws Bob and Bette Corry. They always offered encouragement and supported my "not being done yet!" But my biggest thanks goes to my husband Tom, and my children Trevor and Cameon. They are my motivation each day--and words cannot express how much I love and appreciate each of them for who they are and who they help me to be each day.

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## CHAPTER 1

### Introduction

#### *Literature About the Problem*

While secondary Montessori education programs have now been in existence for more than twenty years no substantive research studies have been completed comparing the outcomes of secondary Montessori education program students to traditional public education peers. Pressure for research concerning outcomes for Montessori instruction students is growing with the increased and rapid adaptation of this public school option. All schools are now also being held accountable for the achievement progress of students through the No Child Left Behind Act (NCLB) and this is reflected in the required district and state assessments. Although many educators and advocacy groups raise serious concerns regarding the exclusive use of achievement scores as the single defining measure of school success or failure for students, most believe that schools need to be held to a higher standard of accountability and that accountability begins with assessment (Rose & Gallup, 2001). For more than seventy years (1907-1978) Montessori education existed only as pre-school and early elementary private school programs. A wealth of research exists in this arena (Banta, 1970;

Epstein, 1996; Glenn, 1999; Simons, 1980). Now, however, secondary public school Montessori choice and option programs are becoming more commonplace and so must also be held accountable for student performance.

#### *Deficiencies in Past Literature*

Because there has not been a clear idea of what constitutes authentic Montessori instruction within the academic community there has been little agreement about what should actually be measured to demonstrate program success (Boehnlein, 1988). With the Montessori method varying so much from site to site, it is difficult to compare one program with another, or the Montessori program to other instructional methods. The introduction of Montessori into the public school sector also varies in pedagogical, organizational, and political issues (Boehnlein, 1988). The researcher must know what is being measured and isolate the specific characteristics in order to compare program options.

Although a number of studies have followed students from elementary to middle school (Anderman & Midgley, 1997; Midgley, Feldlaufer & Eccles, 1989; Simmons & Blyth, 1987) less is known about their transition into high school and the ways in which middle school experiences shape later

high school experiences for some students (Murdock, Anderman & Hodge, 2000).

#### *Purpose Statement*

The purpose of this study was to evaluate the achievement and social involvement of students who completed eight years of public middle school Montessori Academic Instruction (MAI) to determine their current levels of 10th-grade transition adjustment into a traditional high school program, compared to the achievement and social involvement of their general education peers who completed eight years of General Education Academic Instruction (GEAI) before entering high school.

#### *Research Questions*

The following seven research questions were addressed:

1. Do students who were in the MAI program prior to attending high school have Grade Point Averages (GPAs) congruent with GEAI students at the completion of their 10th-grade school year?

- a. Is there a statistically significant difference in GPA between the MAI students and the GEAI students at the completion of their 10th-grade school year?

2. Do those students who were in the MAI program prior to attending high school have consistent reading, language, and math Norm Reference Test (NRT) Normal-Curve Equivalent (NCE) scores?

a. Is there a statistically significant main effect between MAI students' NRT reading, language, and math NCE scores?

3. Do those students who were in the GEAI program prior to attending high school have consistent reading, language, and math NRT NCE scores?

a. Is there a statistically significant main effect between GEAI students' NRT reading, language, and math NCE scores?

4. Do those students who were in the MAI program prior to attending high school have comparable NRT reading, language, and math NCE scores compared to those students who were in the GEAI program prior to attending high school?

a. Are MAI students' reading NRT NCE scores significantly different from GEAI students' reading NRT NCE scores?

b. Are MAI students' language NRT NCE scores significantly different from GEAI students' language NRT NCE scores?

c. Are MAI students' math NRT NCE scores significantly different from GEAI students' math NRT NCE scores?

5. Do those students who were in the MAI program prior to attending high school have reading, math, and writing Essential Learner Outcome (ELO) scores greater than the Cut Scores required to determine school district reading, math, and writing proficiency?

a. Do those students who were in the MAI program prior to attending high school have reading ELO scores comparatively greater than their reading Cut Scores?

b. Do those students who were in the MAI program prior to attending high school have math ELO scores comparatively greater than their math Cut Scores?

c. Do those students who were in the MAI program prior to attending high school have writing ELO scores comparatively greater than their writing Cut Scores?

6. Do those students who were in the GEAI program prior to attending high school have reading, math, and writing Essential Learner Outcome (ELO) scores greater than the Cut

Scores required to determine school district reading, math, and writing proficiency?

a. Do those students who were in the GEAI program prior to attending high school have reading ELO scores comparatively greater than their reading Cut Scores?

b. Do those students who were in the GEAI program prior to attending high school have math ELO scores comparatively greater than their math Cut Scores?

c. Do those students who were in the GEAI program prior to attending high school have writing ELO scores comparatively greater than their writing Cut Scores?

7. Do those students who were in the MAI program prior to attending high school participate in as many extra-curricular activities in high school as those students who participated in GEAI programs?

a. Are the observed frequencies for student participation in clubs the same for students who participated in MAI and GEAI programs?

b. Are the observed frequencies for student participation in organizations the same for students who participated in MAI and GEAI programs?

c. Are the observed frequencies for student participation in associations the same for students who participated in MAI and GEAI programs?

d. Are the observed frequencies for student participation in sports the same for students who participated in MAI and GEAI programs?

#### *Assumptions*

The assumption of this study was that both programs, MAI and GEAI, equally prepare students for a general education high school experience in both academics and social involvement.

There are more than 5,000 Montessori schools throughout the United States, North America, South America, Europe, Africa, Australia, and New Zealand (Seldin & Epstein, 2003). Some Montessori schools only offer early childhood programs. Other programs offer childhood through elementary, and recently secondary programs. Each school today is based upon the principles developed almost 100 years ago by founder Dr. Maria Montessori (Montessori, 1937, 1946, 1948). Using her methods, thousands of students have been educated with an approach to learning that addresses all aspects of cognitive, social, emotional, and spiritual growth.

The Montessori way, a term used in Montessori literature, refers to a curriculum based on how the children naturally learn. Teachers act as guides and lead multiple-age groupings of children to complete hands-on activities designed to challenge each student to fully explore his or her unique style of learning. Montessori instruction leads the child to take responsibility for his/her own learning and make decisions and choices in a child-centered classroom. With so many options available for parents today, Montessori is a choice that many families are making to place their child in a smaller learning environment focused on individual learning and pacing at the child's level and ability.

In 1999, a large Midwestern school district chose, after much research and investigation, to start an adolescent Montessori program in one of their traditional middle schools. It began with the 6<sup>th</sup> grade class and added a grade during each of the next two years until a full-adolescent program had been initiated, grades-6 through -8. This large Midwestern school district already has an existing Montessori Pre-primary and Elementary Program in one of their elementary schools and added another



Montessori Pre-primary and Elementary Program in a second elementary school in 2002.

Each Montessori classroom in this large Midwestern school district was multi-aged, except 6th-grade. Traditional Montessori programming combines a 4-6 classroom, but the large Midwestern school district chose to move the 6th-grade class to the middle school so they could participate in the elective class options like other students at their age level.

Despite the lack of research available to support this initiative to add an adolescent program, the school district listened to its citizens, primarily parents in the Montessori Parent Organization, and chose to offer this program choice to its residents. Criteria for participation included, (a) must be residents of the district, (b) must provide transportation to and from the school, (c) tuition is for preschool only, and (d) students currently in the Montessori program are given priority over students wanting to enter the program.

#### *Delimitations of the Study*

This study was delimited to the first two classes graduating from a MAI program as compared to GEAI students

graduating those same years and moving to one of the district's three high schools.

The study could not control for instructional differences even though all district high schools utilize a standards- and outcome-based curriculum with courses taught by certified teachers.

The Midwestern school district began and developed the middle school Montessori Program in 1999, and the study participants were the first two groups of students graduating from the program. Furthermore, changes have occurred in the MAI program since that initial implementation year to make it the best possible program within the confines of district and federal expectations and mandates.

#### *Limitations of the Study*

The first study limitation was matching the MAI students with GEAI students on equivalent organismic variables. District officials matched students as closely as possible for gender, age, social economic status (SES), and special education verification variables. Due to school district confidentiality regulations, age and intelligence data were not released to the researcher.

The second study limitation is the small sample size of students participating in the study MAI (n = 31) and GEAI (n = 31).

*Definitions of Terms*

*Adolescent:* Any student enrolled in sixth through eighth grade.

*Criterion References Test (CRT):* Measures a student's performance against a stated criteria or set of learning objectives.

*Cut Scores:* The research study districts scores, at or above which students are expected to perform in order to meet minimum district competency standards in the following domain areas pertaining to this study, (a) reading, (b) math, and (c) writing. Cut scores were determined through a district wide assessment process. Reliability and validity studies to determine the technical adequacy of the assessments and cut scores determined in conjunction with district assessment personnel was provided by the Buros Institute of Mental Measures, University of Nebraska-Lincoln, Lincoln, NE. Cut score assessment and cut score benchmark development is on-going.

*Essential Learner Outcomes (ELO):* Academic indicators which students must demonstrate proficiency by meeting established standards on district-wide assessments.

*General Education:* A traditional educational approach where the teacher delivers district-prescribed curriculum using a variety of instructional methods to reach all students in his/her classroom.

*Grade Point Average (GPA):* Grade point scale where a numerical grade of 4 equals the term outstanding, a numerical grade of 3 equals the term above average, a numerical grade of 2 equals the term average, and a numerical grade of 1 equals the term below average.

*Montessori:* A holistic educational approach where the teacher acts as a guide and the multi-age classroom is filled with self-teaching objects to develop high levels of self-esteem, self-confidence, and competence.

*Multiple Age Classrooms:* Classrooms that span several age levels and/or several grade levels.

*Multi-sensory approach:* Instructional strategies where several sensory methods (visual, auditory, hands-on, etc.) are incorporated at the same time to activate learning.

*Normal-Curve Equivalents (NCE):* Standard scores with a mean equal to 50 and a standard deviation equal to 21.06.

This scale divides the normal curve into 100 equal intervals.

*Norm Referenced Test (NRT):* Measures student performance on a test compared with a similar group of students who have also taken the test.

*Stanines:* Stanines 1, 2, and 3 are below average; stanines 4, 5, and 6 are average; and stanines 7, 8, and 9 are above average.

#### *Significance of the Study*

This study contributes to research, practice, and policy. It is of significant interest to advocates of choice educational programs, specifically Montessori, and their equal preparation of students for future learning.

*Contribution to Research.* After reviewing the literature, the researcher found there were few studies that addressed the transition of secondary Montessori students into general education high schools. This study examined how different educational programs--one student-led learning and the other teacher-led learning--affect both groups when they attend a general education high school that is primarily teacher-led instruction.

Moreover, this study was comprehensive, looking at both academic and social integration of students during their high school transition years.

*Contribution to Practice.* The results of this study can assist those professionals who interact with Montessori and general education students. Educators and administrators can gain insights that will help design programs, educational and transitional, that will better prepare students for high school and/or future learning.

*Contribution to Policy.* The policies encompassing curriculum and program design are generated from several entities. The district determines curriculum expectations, what is written, taught, and assessed. With the inclusion of the Montessori program, schools have to mesh their philosophy with that of the district. Montessori students take district assessments, so this research will help determine if the Montessori efforts in curriculum alignment are meeting the needs of their students for the high school years.

The social aspects of both programs, general education and Montessori, are very different from each other. For most of the Montessori students, Montessori is the only type of program with which they have been involved. With

its multi-age classroom and inclusive design, some of these students have attended classes together since their preschool years. It is said that they act more as a family unit. This is also true of their teachers. In Montessori schools, students often have the same teacher for several years. These differences, may affect their integration into the high school experience where traditional students have adjusted to new students and teacher changes from year to year.

#### *Outline of the Study*

The literature review relevant to this study is presented in Chapter 2. This chapter reviews literature regarding Montessori as compared to general education, historically and currently, with an emphasis on transition between the two programs. Chapter 3 describes the research design, methodology, and procedures that were used to gather and analyze the data of this study. Chapter 4 reports the research findings, and Chapter 5 includes the researcher's conclusions and discussion.

## CHAPTER 2

## Review of the Literature

This review summarizes the historical background of Montessori education and the differences between it and a traditional education program. The philosophy and beliefs of Montessori instruction will be examined and compared to general education in both academic and social involvement. The research from these provides a basis for the seven research questions regarding transition into high school.

*Maria Montessori*

Dr. Maria Montessori (1870-1952) has been described as a woman before her time (Coe, 1988; Seldin & Epstein, 2003). Dr. Montessori was an Italian physician and later an educator who, through personal observation and working with mentally challenged children, developed an educational program where students were encouraged to self-direct their own learning (Martin, 2002; Vaughn, 2002). Dr. Montessori also found that children learn best when they can choose their own work, work at their own pace, and as Hansen (1998) explained, "use beautiful educational materials for hands-on learning projects" (p. 45).

Maria Montessori believed that we should first follow the child (Montessori, 1946). Teachers would act as guides



(or directress) and children would lead themselves to mastery of themselves and their environment, which ultimately would lead directly to the creation of a peaceful world (Cohen, 1990a.; Loeffler, 2002; Montessori, 1948; Rambusch, 1992; Ruenzel, 1997; Schapiro, 1993). The teacher's task was to reach the imagination of the child by posing questions that produced wonderment and excitement (Coe, 1988; Rambusch, 1992). The teacher was to create an atmosphere that would allow children to make academic and social mistakes with feedback, but not penalty. Montessori believed it was up to the teacher to scientifically control the climate of the classroom and to have a prepared environment (Montessori, 1946) that fostered growth, filled with special hands-on materials to produce optimal conditions for learning. Children learn at their own pace from all five senses (Cohen, 1990a.; Keller, 2002; Ruenzel, 1997; Schapiro, 1993; Shute, 2002; Vaughn, 2002). For Montessori, a basic principle underlying the process of education must be the development of independence in the child, for it is only through independence that the individual can achieve true interdependence (Powell, 2001).

### *Maria Montessori Influences*

Maria Montessori's method of scientific pedagogy influenced many other educators including, Rousseau, Pestalozzi, Froebel, Seguin, Itard, and Pinel (Grazzini & Krumins, 1999; Weinberg, 1969). Jean Piaget, Swiss developmental psychologist, was president of the Swiss Montessori Society, and his own children attended Montessori schools. Erik Erickson, German-American psychoanalyst, was trained in the Montessori method and gives Montessori credit for theories in hands-on methods and observations as a necessary tool (Orem, 1974). On the other hand, John Dewey, the Industrial Age pragmatist, and William Kilpatrick, educator and philosopher, criticized pedagogical aspects of Montessori instruction in its day, but applauded Montessori's ideas about freedom (Vaughn, 2002).

In contemporary comparisons, Howard Gardner (1997, 1999) the Harvard psychologist who mapped out the theories of multiple intelligence, noted as Montessori did the uniqueness of each individual child. They both derived their theories from direct observation and experiences, noting how individual differences in the earlier years in

one area do not necessarily predict strengths in other areas (Vardin, 2003).

Almost a century before Goleman (1995) wrote about emotional intelligence, Montessori popularized the notion of social and emotional learning. Montessori understood and championed the importance of emotional learning in the development of each child's individuality (Powell, 2001).

#### *Montessori's Move into the United States*

In 1958, Nancy Rambusch and the American Montessori Society (AMS) established the first sustained Montessori educational programs in the United States. Among her strong American supporters were Thomas Edison, Helen Keller and Margaret Wilson. The Montessori philosophy and methods spread rapidly in the public schools in the 1980s (Cohen, 1990a). Montessori programs in public schools were, and continue to be, very diverse. Most were started by parent organizations as magnet schools. Montessori programs in public schools rely heavily on parent groups for support, both financially and with in-class assistance (Chattin-McNichols, 1992).

In the United States, there are approximately 5,000 Montessori schools (Ruenzel, 1997). This is an estimate because the name Montessori is not trademarked, so anyone

can open a school under the Montessori name (Boehnléin, 1988; Cohen, 1990a; Ruenzel, 1997; Vaughn, 2002). Of that number, one thousand (20%) are affiliated with either the American Montessori International (AMI) or AMS.

Approximately 200 public schools across the country operate Montessori-based programs. Coe (2003) estimates that 100-130 Montessori secondary programs are currently operating in the United States. The cost for families can range from no tuition in the public schools to \$10,000-15,000 in private schools.

#### *The Montessori Controversy*

Montessori espoused a form of holistic education which combines a child's spirit, mind, and heart (Rambusch, 1992). Chattin-McNichols' 1992 book, *The Montessori Controversy*, explored why the Montessori movement has been regarded with suspicion by the mainstream educational establishment. Chattin-McNichols is skeptical about the future of genuine Montessori programs within the public schools and found that public school teachers did not want to be retrained in a different educational philosophy. One of the biggest problems in Montessori education is the scarcity of trained Montessori teachers (Chattin-McNichols, 1992; Cohen, 1990a; Schapiro, 1993).

To become a Montessori teacher in most states, one must first be a certified general education teacher. Then, one participates in 8 weeks of training from various Montessori Training Centers during the summer at a cost to the district or individual teacher of approximately \$5,000.00 per teacher. During the next 2 years, these teachers continue to take workshops during the school year and in the summer until they are certified by the AMS, one of the two main U.S. Montessori certification bodies.

The question that is often asked and debated even among Montessorians, is what is authentic and genuine Montessori (Cohen, 1990a)? In Montessori classroom's one will typically find multi-age groupings, typically a 3 year span. Also found in Montessori classrooms is the use of manipulatives and a great deal of movement among the students from one learning active to another. Many things are going on in the classroom at once, and the teachers act as guides rather than instructors. In the general education classrooms, one will typically find a more traditional approach to education with teacher-directed learning occurring. The following tables (1 and 2) from the North American Montessori Teacher Association and the AMS compare

the Montessori environment to a traditional classroom methodology (Kahn, Dubble, & Pendleton, 1999).

Table 1

Montessori: Creating a Paradigm Shift in Education

Traditional Classroom	Montessori Environment
Textbooks, pencil and paper, worksheets and dittos	Prepared kinesthetic materials with incorporated control of error, specially developed reference materials
Working and learning without emphasis on social development	Working and learning matched to the social development of the child
Narrow, unit-driven curriculum	Unified, internationally developed curriculum
Individual subjects	Integrated subjects and learning based on developmental psychology
Block time, period lessons	Uninterrupted work cycles
Single-graded classrooms	Multi-age classrooms
Students passive, quiet, in desks	Students active, talking, with periods of spontaneous quiet, freedom to move.
Students fit mold of school	School meets needs of students
Students leave for special help	Special help comes to students
Product-focused report cards	Process-focused assessment, skills checklists, mastery benchmarks

Table 2

## Comparing Montessori with Traditional Education

Traditional Classroom	Montessori Environment
1. Emphasis on rote knowledge and social development	1. Emphasis on cognitive structures and social development
2. Teacher's role is dominant, active; child is a passive participant	2. Teacher's role is unobtrusive; child actively participates in learning
3. Teacher is primary enforcer of external discipline	3. Environment and method encourage internal self-discipline
4. Individual and group instruction conforms to adult's teaching style	4. Individual and group instruction adapts to each student's learning style
5. Same age grouping	5. Mixed age grouping
6. Most teaching done by teacher and collaboration is discouraged	6. Children encouraged to teach, collaborate, and help each other
7. Curriculum structured with little regard for child's interest	7. Child chooses own work from, interests, abilities
8. Child is guided to concepts by teacher	8. Child formulated concepts from self-teaching materials
9. Child usually given specific time for work	9. Child works as long as s/he wants on chosen project
10. Instruction pace set by group norm or teacher	10. Child sets own learning pace to internalize information
11. Errors corrected by teacher	11. Child spots own errors thru feedback from material
12. Learning is reinforced externally by rewards, discouragements	12. Learning is reinforced internally thru child's own repetition of activity, internal feelings of success, repetition

13. Few materials for sensory, concrete manipulation	13. Multi-sensory materials for physical exploration development
14. Little emphasis on instruction or classroom maintenance	14. Organized program for learning care of self and self-care environment
15. Child assigned seat; encouraged to sit still and listen during group sessions	15. Child can work where s/he is comfortable, moves and talks at will; group work is voluntary and negotiable
16. Voluntary parent involvement, often only as fundraisers, not participants in understanding the learning process	16. Organized program for parents to understand the Montessori Philosophy and participate in the learning process

### *Adolescent Education*

Adolescence is a complex time in the life of a child. It is a time of applying previous knowledge to action projects and developing more independence and interdependence (Coe, 2003). Lipsitz (1977; as cited in Hopping, 2001), a leading adolescent psychologist, has stated, "Young adolescents undergo more changes during the middle school years than at any other age except for the time between birth and age 3" (p. 271). Adolescents struggle with the mental, physical, and emotional changes occurring within them, and educational programs need to be tailored to fit their developmental level through meaningful work (Beane, 1990; Coe, 2003; Crain, 2000; Elkind, 1998; Grazzini & Krumins, 1999; Lewis, 1992;



Loeffler, 2003; Lounsbury & Vars, 1978; National Middle School Association, 1995; Vanhose & Strahan, 1988).

Adolescents are often not able to think in the abstract across all subject areas and may not perform academic tasks consistently (Keating, 1988; Smart & Smart, 1973).

Classrooms typically are made up of students who perform and are developmentally diverse (Vanhose & Strahan, 1988).

In order for adolescents to be successful, according to the National Middle School Association (NMSA; 1995), schools must be responsive to students diverse needs in the following ways: expectations need to be set high, there needs to be a positive climate in the school, the vision of the school needs to be shared, and a partnership needs to exist between the school and the family. Also a major focus today in education is the need for an adult-advocate for every child (NMSA, 1995).

The first comprehensive study regarding early adolescence was published in 1977 and concluded that our society had virtually forgotten the adolescent (age 12-14) segment of the population (Lipsitz, 1977). Lipsitz found that adolescents were either grouped with elementary or high school students. The academic, social, and emotional

needs of young adolescents are different from the needs of high school or elementary school students (McKay, 1995).

*Montessori Adolescent Program*

There were no middle school Montessori models before 1985. Montessori never created an environment specifically for adolescents, but she stated her views about this age group. She believed that programs should be developed into a variety of options depending on where the school is located and whether it is part of the public school system. She felt that these young people needed an environment where they felt physically safe as they transitioned through puberty. She also thought that secondary education should "aim at improving the individual in order to improve society" (Montessori, 1948, p. 98). Montessori thought adolescents needed to learn to be adaptable in order to be able to face the future. Montessori (1937) wanted them to develop a sense of self: "...we must consider what is the form of independence at this age which guarantees the development of individuality. We must follow the psychic instincts which present themselves at this period of life" (Montessori, 1937, p. 2).

To facilitate this development, Montessori suggested "Erdkinder" meaning earth children (Chattin-McNichols,

1992; Gebhardt-Steele, 1997; Grazzini & Krumins, 1999; Kahn, 1997). What she wanted for children in this period of development was a move away from heavy academic pressures, and a move toward closer contact with the earth (Chattin-McNichols, 1992). She thought that adolescents should be separated from their parents and moved toward more independence. Montessori felt that historically we had moved away from the formal induction into adulthood. Erdkinder centered on preparing the adolescent for the real world of contemporary society, the world of work, and the responsibilities associated with living apart from parents. It would produce students who would make those personal and social milestones in a supportive environment (Chattin-McNichols, 1992). Erickson (1968) refers to this phase of adolescence as "Identity vs. Role Confusion".

#### *Multi-Age Classrooms*

Proponents of multi-age classrooms believe that letting students develop at their own pace helps those at differing ability levels to push and pull each other along. Multi-age classrooms offer, instead, flexible groupings that encompass a 2-4 year span, allowing movement between levels for those students ready to advance or needing more help in a subject (Cohen, 1990b; Katz, 1995; Smith,

Mccarthy, & Scala, 2002; Tangen-Foster, J., & Tangen-Foster, L., 1998).

Learner-centered environments remove the expectations often associated with children grouped according to age, ensuring learning is student centered (Smith, Mccarthy, & Scala, 2002). Learner-centered classrooms and alternative assessments go hand in hand. The National Middle School Association (1995) reports that in a learner-centered class, the assessment system (a) assesses different students differently, (b) includes student input in design and revision, (c) monitors progress continually in order to provide feedback on individual growth and progress, (d) provides appropriate opportunities for student choice of types of products for demonstrating achievement of educational standards, (e) promotes students reflecting on their own growth as learners through opportunities for self-assessment, and (f) allows diversity of competencies to be demonstrated in a variety of ways.

Malaguzzi's (1993) statement, "Start with the child and the rest will take care of itself" is one of the underlying philosophies echoing multi-age investigations (p. 1). A multi-age investigation removes the expected norms of each year group by focusing on the needs of the

individuals, rather than the needs of the whole class and offers a much richer, broader experience to students, teachers, and parents than a more traditional approach (Hopping, 2001).

Day and Yarbrough (1998) reviewed research on the effects of multi-age classrooms with respect to academic achievement and the affective domain. Their review showed favorable results, with the most profound differences being in social and emotional development.

Multi-age classroom clusters are thought to enhance the Montessori dynamics by reducing competition, maximizing curriculum options available to any one child, providing a family atmosphere that plays a vital role in socialization, and permitting older children to model advanced work for younger children (Kahn, Dubble, & Pendleton, 1999; Powell, 2001).

#### *Hands-on Education*

Smith (2003), a technology coordinator and robotics teacher, said that hands-on work captivates the students and holds their attention in a way that book learning cannot duplicate. Smith also said, "Difficult concepts that are hard to master on paper can often be easily understood kinesthetically, by touching, feeling, manipulating, and

thinking--it is at the heart of what stimulates the minds of the young" (p. 35).

### *Grading*

The Montessori program utilizes a unique approach to education that defines specific skill objectives differently than most district curriculum and report card systems (Coe, 2003; Cohen, 1990a.; Kahn, Dubble, & Pendleton, 1999; Martin, 2002). Grades and number scores on report card are not compatible with Montessori philosophy (Kahn et al., 1999).

Many schools experimented with un-graded classes in the 1960s, often unsuccessfully. Experts have noted that un-graded units are a way to steer schools away from competitive and overly academic instruction in the early grades and towards methods grounded in hands-on learning, play, and exploration (Cohen, 1990b). Goodlad and Anderson (1987) cite 1970s research showing that standardized achievement test comparisons tend to favor non-graded programs, and that pupils in those programs may have improved chances of good mental health and positive school attitudes. The un-graded model, they suggest, is particularly beneficial for minorities, boys, underachievers, and low-income pupils. Katz (1995),

director of the Eric Clearing House on Elementary and Early Childhood Education at the University of Illinois, said that when one combines the evidence from cross-age studies, mixed-ability groupings, and cooperative-learning literature, one understands the reason for mixed age groupings.

#### *Montessori Assessment*

The Montessori system of assessment is more descriptive than evaluative. Montessori students do not receive grades for their work but rather keep working on tasks until they achieve mastery, which is thought to be a form of intrinsic reward (Schapiro, 2001; Vaughn, 2002;). In fact, most Montessorians do not support testing at all (Schapiro, 2001). The Montessori philosophy sets a strong standard from both an observational and a research point of view (Boehme & Wymer, 1997). The Montessori middle school is organized to facilitate adolescents' development to become a whole person (Celeste, DeAubrey, Freilino, McDurham, Noel, & Smith, 2003). Montessori middle school advocates do not believe that test scores are a primary measure of success.

In the public schools, Montessori students are still required to take district and norm-referenced tests.

Ignoring state standards is not an option for Montessori classrooms. Parents and the public need to know if all of their students are meeting and exceeding the state standards (Morrison, 2002). The curriculum for Montessori education and the public school curriculum need to be aligned for the students to be successful on both fronts. Montessori principals and advocates agree that public school partnerships enhance their program. For example, integrating computer education, arts programs, and other public school resources are an asset to Montessori goals (Cohen, 1990a; Loeffler, 2003). It is also important that the students have good, concrete skills as they transition into the general education high schools. They will have to integrate, often for the first time, with general education students who have not had the Montessori beliefs and educational experiences. The achievement tests that students take are not a particularly good assessment of what the Montessori method is all about (Chattin-McNichols, 1992). While Montessori program proponents strive to follow the child, they must facilitate the integration of public school standards if they are to co-exist with public education (Morrison, 2002).

#### *Choice Educational Programs*



Stakeholders for quality educational programs are always searching for what makes a quality school and what helps students succeed academically. Over the years politicians and educators have tried to determine what makes an exemplary school, public or private, serving ordinary and extraordinary children. Private school enrollment is surging and bursting the seams of existing programs (Gewertz, 2001; Morrison, 2002). The number of schools-within-schools and magnet schools available to families has almost tripled in the last 7 years (Meier, 1998; Nathan & Yesseldyke, 1994; Raywid, 2001). Support for public and private education is at an all-time high (Rose & Gallup, 2001). Choices are available for parents, students, and teachers because one style does not have to fit all.

Since the early 1990s, various approaches to increasing student achievement have emerged to address the issue of increased accountability. One approach has been through alternative types of schooling, suggested as a means of promoting increased learning. For example, charter schools have increased in number, but only report academic gains similar to their districts (Horn & Miron, 2000).

### *Comparison Research Studies*

Research on the Montessori method is limited because the name Montessori is in the public domain, and it is difficult to discern which programs are aligned with the Montessori philosophy (Vaughn, 2002). Montessori is also open to interpretation because of the belief that there is no one way to do things. The university-based research community has shied away from the broad spectrum of Montessori education. Few university researchers study it, and without research, there is no proof of its effectiveness and no way to justify its place in higher education (Schapiro, 1993). Because of this, and the variety of Montessori training facilities, Montessori has a variety of perspectives. The American Montessori Society is generally considered to be more eclectic in its educational approach (Ruenzel, 1997). The Association Montessori Internationale (AMI) works to "protect the integrity of her life's work" (Ruenzel, 1997, p. 30) and share a network of qualitative and quantitative research through various publications and conferences, but differ on philosophical perspectives.

There are a wealth of Montessori-related studies assessing elementary age children (Glenn, 1999). Two recent

studies, by Manner (1999) and Faro (1997), compared academic achievement between Montessori and non-Montessori students in the public school setting. Manner found no significant statistical difference in first year mathematics achievement (as measured by the Stanford Achievement Test) between the Montessori and traditional student groups. However, achievement testing in the second year of the study reportedly showed the Montessori group surpassing the traditional group by three percentile points. A seven-percentile point difference was observed during the third year of the study. In reading, the Montessori students surpassed the traditional students' scores in the second year. This trend continued into the third year. Within the reading component of her study, Manner found that Montessori students' scores surpassed both the matched pair traditional students and the district's traditional students as a group.

Faro (1997) noted that, (a) the aptitude scores of the Montessori students in his study were significantly higher than that of traditional students, (b) at the second grade level, students in traditional classrooms achieved at higher levels than Montessori students in both mathematics computation and mathematics concepts and applications, (c)

at the fifth grade level, Montessori students performed significantly higher than traditional students on subtests for language expression and for social studies, (d) fifth grade Montessori males achieved higher on the subtest than did Montessori females, traditional females or traditional males, (e) at the second grade level, low aptitude Montessori students achieved at significantly higher levels than low aptitude students in traditional classes, and (f) at the fifth grade level, high aptitude Montessori students' scores were significantly higher than those of high aptitude students from traditional classrooms. Researchers cited the need for longitudinal studies to examine and document the effectiveness of the Montessori education philosophy and method (Faro, 1997; Manner, 1999; Smith, 2001).

A longitudinal study was completed in 1986 at the Franciscan Montessori Earth School in Portland, Oregon. The participants were students in the multi-grade classroom (grades 1 to 3) or (grades 4 to 6) elementary classroom and had been in school since 1984 (Glenn, 1993). Longitudinal study students were assessed every 3 years, and the study continued for 15 years. The study grew out of the need to establish valid and reliable outcome research as related to

elementary and secondary education. The primary hypothesis related to the longitudinal study was that the number of years students received Montessori instruction would be positively related to those qualities that are emphasized in the Montessori teaching environment. A secondary hypothesis was that participants with any Montessori education would be successful in the general population (Glenn, 1999).

At the 10-year follow-up, the researcher described the longitudinal student population as normal or healthy. Students were rated as performing better and behaving with more maturity than other class members. The secondary hypothesis also showed no negative difference from the general population. At the 13-year follow up the participants completed an online survey. Questions focused on underlying psychological, social, and vocational issues. These results supported the primary hypothesis in two related areas, lifelong learning and self-development (Glenn, 1999). Glenn also noted that an alternative explanation might not be in the number of years the student spent in Montessori education. The more important factor could be a natural predisposition, or attitudes, learned

from parents during childhood, toward a Montessori-compatible lifestyle.

In 1991, Takacs studied the relationship between Marotta Montessori Schools of Cleveland and Cleveland Public Schools (CPS). The California Achievement Test scores were compared with the overall scores of 1st-through 8th-graders in the areas of reading and math. The comparison showed former Montessori students consistently faring better. Takacs (1991) also found that the Marotta Montessori graduates far surpassed their CPS peers in eligibility for the gifted program. In addition, Boehnlein (1990) reviewed 244 studies of Montessori pedagogy, including 25 that focused on children of low socioeconomic status (SES). Overall, these studies show that low SES children benefit significantly from Montessori preschool, even if they attend for less than the full 3 years (Boehnlein, 1990). This research, although considered valid, did not continue and examine the success for these students as they entered high school.

Duax (1989) conducted a study to determine how Montessori graduates compared in 25 descriptors of educational preparedness. One of those areas was in the use of basic skills to succeed in middle school. The study

showed how almost all Montessori alumni make a smooth transition to junior high school, and that they were well prepared for that new experience. The survey results showed Montessori students rating highest on the following eight dimensions:

- Respect for other students
- Respect for teachers
- Starting work independently
- Creativity
- Being independent and not afraid to be different
- Enthusiasm for learning
- Math skills
- Reading skills

While the sample size was relatively small (43), the study did yield information concerning Montessori students exiting an elementary program and moving in to traditional middle schools.

In 2003, researchers Gartner and Lipsky conducted a study to compare academic and behavioral outcomes of two groups of students who graduated from the Milwaukee Public Schools in 1997-2001. The first group included students who completed the fifth grade Montessori program in 1990-1994. The comparison group was students from the same high school

who were not in the Montessori program. Areas that demonstrated significance for Montessori students were their overall GPAs in the areas of social studies, mathematics, science and English. Those Montessori students had been in the Montessori program 7 years previously. In all instances, there were statistically significant differences that favored the Montessori group. The strongest differences were in the areas of mathematics.

#### *Transition*

School transitions have been a frequent topic in both research and literature in recent years (Alspaugh, 1998; Chung, Elias, & Schneider, 1998; Eccles, Lord & Midgley, 1991; Felner et al., 1993; Hertzog & Morgan, 1998; Mizelle & Irvin, 2000; Perkins & Gelfer, 1995; Weldy, 1991).

Adjusting to the social aspects of a transition may be equally as important as adjusting to its academic demands--the two aspects may well be intertwined (Akos & Galassi, 2004). Previous research (Berndt & Keefe, 1992; Dornsbusch, 1989; Juvonen & Weiner, 1993; Osterman, 2000) has identified a positive relationship between students' need for belonging and peer acceptance in school on the one hand and academic achievement, a positive orientation toward school, class work, and teachers on the other hand. Because



of this, a student's sense of belonging, community, and small groups foster this intimate learning environment and appears to hold promise as a method to assist students socially and academically as they transition into new levels.

Isakson and Jarvis (1999) noted that surprisingly few studies have emphasized the transition to high school (Cadwallader, Farmer & Cairns, 2003). The transition to high school presents many challenges. High school students are faced with a new environment, new teachers with different expectations and new peers (Bronfenbrenner, 1979; Eccles, Midgley, & Adler, 1984). They typically have more assignments and more distractions because of peer relationships. High schools are also more anonymous than typical middle schools and their teams of teachers that oversee students. Some students experience role loss and research has shown that participation in extracurricular activities significantly declines in the first year of high school (Gifford & Dean, 1990; Seidman, Aber, Allen & French, 1996). The ability to cope with school transitions, while maintaining high levels of academic motivation, knowledge, and skills is essential for student progression

post-high school (Newman, Myers, Newman, Lohman, & Smith, 2000).

The family is an important factor in academic development and achievement (Newman et al., 2000). Family influences, however, on school achievement become weaker during middle school and high school (Slaughter & Epps, 1987). Parents remain the most influential regarding children's long-term educational plans, however, peers have more influence on day-to-day behaviors. Students who receive both kinds of support, parent and peer, are more likely to have academic success (Steinberg, Dornbusch, & Brown, 1992). In terms of gender differences in transition between middle school and high school, in general, girls report greater levels of positive adjustment than boys (Bowman & Yates, 2001). Although a number of studies have followed students from elementary to middle school (Anderman & Midgley, 1997; Midgley et al., 1989; Simmon & Blyth, 1987) less is known about their transition into high school and the ways in which middle school experiences shape high school experiences (Murdock et al., 2000).

### *Summary*

Middle school ushers in a new level of independence. Montessori instruction is a general sequence of learning in which the student is responsible for the context of an integrated whole. The student has time to collaborate on both self-initiated and instructor-initiated projects. Montessori instruction teaches to a mastery level and encompasses emotional autonomy in order to establish a sense of self. Montessori students want to interact with others in order to test and to get feedback on who they are (Coe, 1988).

General Education, on the other hand, is district written, teacher taught and student assessed. Little room is often left open for student choice, and the district assesses what the district has determined needs to be learned at each individual level.

Competition exists when multiple providers of a service, who all must adhere to the same legal rules and regulations, are available to meet the demands of the consumer. In the education sector, the "consumers" are the parents and students while the "suppliers" are the schools and districts. Theoretically, more competition should

translate to higher quality schooling and enhance educational outcomes (Belfield & Levin, 2002).

The federal NCLB law provides direct funding for choice programs. It also requires schools that are not making Adequate Yearly Progress (AYP) or that are identified as unsafe to offer more choices, thus promoting competition and allowing parents to make informed decisions. This study attempts to determine the academic and social preparedness of students completing middle school Montessori instruction compared to students completing regular 8th-grade instruction at one midwestern public school system.

## CHAPTER 3

## Methodology

The purpose of this study was to evaluate the achievement and social involvement of students who completed eight years of public middle school MAI to determine their current levels of 10th-grade transition adjustment into a traditional high school program, compared to the achievement and social involvement of their general education peers who completed eight years of GEAI before entering high school. This chapter describes the research design, participants, research questions, data analysis, and procedures that were used in the completion of this research study.

*Research Design*

The posttest only two group comparative survey study design is displayed in the following notation:

Group 1  $X_1$   $X_3$   $O_1$

Group 2  $X_2$   $X_3$   $O_1$

Group 1 = naturally formed MAI group (n = 31)

Group 2 = randomly selected GEAI group (n = 31)

$X_1$  = first- through 8th-grade student participation in same school MAI program

$X_2$  = first- through 8th-grade student participation in different schools similar neighborhood GEAI program

$X_3$  = 9th- and 10th-grade student participation in different schools similar neighborhood GEAI program

*Independent variables.* MAI or GEAI served as the two independent variables of this study. The students' Midwest suburban school district is well known for its rigorous academic general education program, overall high levels of student achievement, learning options that are designed to fit students learning needs, and parent choice--such as MAI and GEAI. Both instructional programs would be considered educational best practices and equivalent in all aspects of funding, staffing, and administrative support. The MAI environment is structured using multi-age classrooms and a unified internationally developed curriculum taught in uninterrupted work cycles. GEAI is a traditional school structure focused on unit-driven curriculum, single-graded classrooms, and specific periods of time for each subject.

*Dependent variables.* Two overarching dependent variables ( $O_1$ ) were evaluated for this study, 1) student achievement and 2) social involvement. Student achievement was determined by students (a) 10th-grade GPA scores, (b) 10th-grade NRT reading, language, and math NCE scores, and

(c) 10th-grade ELO reading, math, and writing scores and cut scores. Social involvement was determined by students' participation in extra-curricular activities (a) clubs, (b) organizations, (c) associations, and (d) sports.

*Dependent measures.* Aggregated GPA, NRT NCE achievement scores in reading, language, and math, and school district ELO scores in reading, math, and writing were used to examine student achievement.

Students' self-reported participation in high school clubs, organizations, activities and sports were used to determine student social involvement.

*Research plan.* The posttest only two group comparative survey design utilized both retrospective and prospective data. All achievement dependent measures for MAI and GEAI students were collected retrospectively. NRT and ELO scores are required high school district assessments and this study utilized archival de-identified data for analysis.

All social involvement data reported by students were collected prospectively. Students were asked to complete a form listing their involvement in clubs, organizations, associations, and sports. Parental permission was obtained before students were asked to complete the social involvement questionnaire. Two graduating MAI 8th-grade

classes (2000-2001 and 2001-2002) were utilized to provide a larger number of participants and to ensure robust norm-referenced data collection.

### *Participants*

Participants were drawn from the first two 8th-grade MAI classes graduating from the middle school Montessori program at the end of two years 2000-2001 and 2001-2002. MAI data was de-identified. GEAI students were randomly selected and matched as closely as possible for gender, race, SES status, and special education participation by district personnel using the districts computerized data base. An equal number of MAI students ( $n = 31$ ) and GEAI students ( $n = 31$ ) participated.

### *Research Question Data Analysis*

Research Question #1 utilized an independent sample  $t$ -test to determine if there was a statistically significant difference between MAI and GEAI students GPA at the end of their 10th-grade school year. An alpha level of .05 was utilized to test the null hypothesis.

Research question #2 utilized a single classification Analysis of Variance (ANOVA) to determine the main effect between the NRT NCE subtest scores for MAI students. An  $F$



ratio was calculated and an alpha level of .05 was utilized to test the null hypothesis.

Research question #3 utilized a single classification Analysis of Variance (ANOVA) to determine the main effect between the NRT NCE subtest scores for GEAI students. An *F* ratio was calculated and an alpha level of .05 was utilized to test the null hypothesis.

Research Questions #4 utilized independent sample *t*-tests to determine if there was a statistically significant difference between the MAI and GEAI academic NRT NCE achievement subtest scores for reading, language, and math. An alpha level of .05 was utilized to test the null hypothesis.

Research questions #5 utilized independent sample *t*-tests to determine if there was a statistically significant difference between the MAI ELO achievement subtest scores for reading, math, and writing compared to cut scores. An alpha level of .05 was utilized to test the null hypothesis.

Research questions #6 utilized independent sample *t*-tests to determine if there was a statistically significant difference between the GEAI ELO achievement subtest scores for reading, math, and writing compared to cut scores. An

alpha level of .05 was utilized to test the null hypothesis.

Research questions #7 utilized a chi-square test of significance to compare observed versus expected social involvement frequencies for clubs, organizations, associations, and sports. An alpha level of .05 was utilized to test the null hypothesis for these frequencies.

### *Procedures*

Retrospective data were collected by a district employee utilizing the System Information Management Services (SIMS) and the district's planning and evaluation website. Academic data were collected using the schools' NRT scores taken during the student's freshman and sophomore years. Criterion-referenced scores consisted of Reading Comprehension (ELO) scores during the student's freshman year. Criterion referenced scores also consisted of Writing and Mathematics ELO scores during the student's sophomore year. Survey questions were mailed to all participants in the study to ask the following questions:

1. Did you or have you participated in any clubs, organizations, associations in high school? If you have, which one/s? Please list.
2. Did/do you participate in any sports in high school? If

you have, which one/s? Please list.

Dissertation committee members reviewed and accepted the proposal June 2005. The proposal was then forwarded to the joint University of Nebraska Medical Center/University of Nebraska at Omaha, Institutional Review Board (IRB) for the Protection of Human Subjects for authorization (See appendix C for IRB letter).

## CHAPTER 4

## Results

This study evaluated the achievement and social involvement of students who completed eight years of public school MAI to determine their current levels of 10th-grade transition adjustment into a traditional high school program compared to the achievement and social involvement of their GEAI peers who completed eight years of GEAI before entering high school. Data related to each of these dependent variables were gathered through the use of the district's School Information and Management System (SIMS) as well as the survey sent to the homes of students selected to participate in this study.

*Research Question #1*

Table 3 displays the demographic and grade point average data of individual students in the MAI group. The demographic and grade point average data of individual students in the GEAI group are found in Table 4. A comparison of MAI and GEAI student's grade point average totals is found in Table 5. The first hypothesis was tested using the independent *t*-test. As seen in Table 5 the null hypothesis was not rejected. The MAI group end of 10th-grade GPA ( $M = 3.24$ ,  $SD = 0.60$ ) compared to the GEAI group

end of 10th-grade GPA ( $M = 3.06$ ,  $SD = 0.90$ ) data were not statistically different,  $t(60) = 0.93$ ,  $p = 0.18$  (one-tailed),  $d = .24$ . The results indicate students GPA scores on average were measured at the above average level for both MAI and GEAI groups.

#### *Research Question #2*

Table 6 displays the MAI Terra Nova reading, language, and math normal curve equivalent scores. The GEAI Terra Nova reading, language, and math normal curve equivalent scores are found in Table 7. Results of MAI student's Terra Nova reading, language, and math normal curve equivalent scores are found in Table 8. The second hypothesis was tested using a single factor ANOVA. As seen in Table 8 the null hypothesis was not rejected. The MAI group end of 10th-grade NRT NCE scores for reading ( $M = 70.39$ ,  $SD = 15.90$ ), language ( $M = 69.29$ ,  $SD = 16.59$ ), and math ( $M = 74.10$ ,  $SD = 17.58$ ) were congruent and the main effect of subtest achievement was not statistically significant, ( $F(2, 90) = 0.70$ ,  $p = .50$ ). Because  $F$  did not reach a significance level no post hoc contrast analyses were conducted.

Comparing MAI students NRT NCE scores with derived achievement scores puts their performance in perspective.

An NRT NCE mean reading score of 70.39 is congruent with a Standard Score of 114, a Percentile Rank of 83, a Stanine Score of 7, and an achievement qualitative description of High Average. An NRT NCE mean language score of 69.29 is congruent with a Standard Score of 114, a Percentile Rank of 83, a Stanine Score of 7, and an achievement qualitative description of High Average. An NRT NCE mean math score of 74.10 is congruent with a Standard Score of 117, a Percentile Rank of 87, a Stanine Score of 7, and an achievement qualitative description of High Average.

Overall, these findings indicate that MAI students measured reading, language, and math NRT NCE achievement scores were all measured within the High Average range.

### *Research Question #3*

The third hypothesis was tested using a single factor ANOVA. As seen in Table 9 the hypothesis was not rejected. The GEAI group end of 10th-grade NRT NCE scores for reading ( $M = 69.00$ ,  $SD = 17.16$ ), language ( $M = 67.19$ ,  $SD = 17.26$ ), and math ( $M = 74.26$ ,  $SD = 16.17$ ) were congruent and the main effect of subtest achievement was not statistically significant, ( $F(2, 90) = 1.47$ ,  $p = .24$ ). Because  $F$  did not reach a significance level no post hoc contrast analyses were conducted. Overall, these findings indicate that MAI

students measured reading, language, and math NRT NCE achievement scores were all measured within the High Average range.

Comparing GEAI students NRT NCE scores with derived achievement scores puts their performance in perspective. An NRT NCE mean reading score of 69.00 is congruent with a Standard Score of 114, a Percentile Rank of 83, a Stanine Score of 7, and an achievement qualitative description of High Average. An NRT NCE mean language score of 67.19 is congruent with a Standard Score of 112, a Percentile Rank of 79, a Stanine Score of 6, and an achievement qualitative description of High Average. An NRT NCE mean math score of 74.26 is congruent with a Standard Score of 117, a Percentile Rank of 87, a Stanine Score of 7, and an achievement qualitative description of High Average.

Overall, these findings indicate that GEAI students measured reading, language, and math NRT NCE achievement scores were all measured within the High Average range.

#### *Research Question #4*

The fourth hypothesis was tested using the independent t-test. As seen in Table 10 the hypothesis was not rejected for (a) MAI students Terra Nova NCE reading scores ( $M = 70.39$ ,  $SD = 15.90$ ) compared to GEAI students Terra Nova NCE

reading scores ( $M = 69.00$ ,  $SD = 17.16$ ),  $t(60) = 0.33$ ,  $p = 0.37$  (one-tailed),  $d = .08$ , (b) MAI language scores ( $M = 69.29$ ,  $SD = 16.59$ ) compared to GEAI students language scores ( $M = 67.19$ ,  $SD = 17.26$ ),  $t(60) = 0.49$ ,  $p = 0.31$  (one-tailed),  $d = .12$ , and (c) MAI math scores ( $M = 74.10$ ,  $SD = 17.58$ ) compared to GEAI students math scores ( $M = 74.26$ ,  $SD = 16.17$ ),  $t(60) = 0.04$ ,  $p = 0.49$  (one-tailed),  $d = .01$ .

Overall, these findings indicate that MAI and GEAI programs equally prepared students for performance on achievement tests and this is reflected in the reading, language, and math dependent measures comparisons.

#### *Research Question #5*

Table 11 displays the essential learner outcome and cut score data of individual students in the MAI group. The essential learner outcome and cut score data of individual students in the GEAI group are found in Table 12. A comparison of MAI students reading, math, and writing essential learner outcome scores compared to cut scores is found in Table 13. The fifth hypothesis was tested using the independent  $t$ -test. As seen in Table 11 hypotheses were rejected for (a) MAI students ELO reading score ( $M = 62.48$ ,  $SD = 6.69$ ) compared to ELO reading cut score ( $M = 44.00$ ,  $SD$



= 1.55),  $t(60) = 14.99$ ,  $p = .000$  (one-tailed),  $d = 4.48$ , (b) MAI students ELO math score ( $M = 54.26$ ,  $SD = 10.29$ ) compared to ELO math cut score ( $M = 31.45$ ,  $SD = 1.98$ ),  $t(60) = 12.12$ ,  $p = .000$  (one-tailed),  $d = 3.72$ , and (c) MAI students ELO writing score ( $M = 77.64$ ,  $SD = 8.39$ ) compared to ELO writing cut score ( $M = 53.90$ ,  $SD = 4.06$ ),  $t(60) = 14.18$ ,  $p = .000$  (one-tailed),  $d = 3.81$ .

Overall, these findings indicate that MAI students measured ELO reading, math, and writing scores were statistically significantly greater than the established cut scores required for them to demonstrate mastery for these same three conditions reading, math, and writing.

#### *Research Question #6*

A comparison of GEAI students reading, math, and writing essential learner outcome scores compared to cut scores is found in Table 14. The sixth hypothesis was tested using the independent  $t$ -test. As seen in Table 14 hypotheses were rejected for (a) GEAI students ELO reading score ( $M = 64.42$ ,  $SD = 8.27$ ) compared to ELO reading cut score ( $M = 44.32$ ,  $SD = 2.01$ ),  $t(60) = 11.84$ ,  $p = .000$  (one-tailed),  $d = 3.52$ , (b) GEAI students ELO math score ( $M = 53.48$ ,  $SD = 10.90$ ) compared to ELO math cut score ( $M = 31.32$ ,  $SD = 2.01$ ),  $t(60) = 11.13$ ,  $p = .000$  (one-tailed),  $d$

= 3.43, and (c) GEAI students ELO writing score ( $M = 78.87$ ,  $SD = 7.29$ ) compared to ELO writing cut score ( $M = 55.06$ ,  $SD = 4.35$ ),  $t(60) = 15.61$ ,  $p = .000$  (one-tailed),  $d = 4.09$ .

Overall, these findings indicate that GEAI students measured ELO reading, math, and writing scores were statistically significantly greater than the established cut scores required for them to demonstrate mastery for these same three conditions reading, math, and writing.

#### *Research Question #7*

A comparison of MAI and GEAI student's extra-curricular activity participation levels is found in Table 15. The seventh hypothesis was tested using chi-square ( $X^2$ ). The result of  $X^2$  displayed in Table 15 was statistically different so we reject the hypothesis of no difference or congruence for student's extra-curricular activity participation levels. Inspecting our frequency and percent findings in Table 15 we find that the number of MAI students reporting (a) club participation (17, 74%), (b) organization participation (15, 71%), and (c) association participation (21, 72%) was greater than the totals reported by GEAI students (6, 26%; 6, 29%; and 8, 28%, respectively). MAI students reported a lower frequency of

sports participation (35, 47%) than GEAI students (39, 53%).

Table 3

Demographic and Grade Point Average Data of Individual Students in Montessori Academic Group

Ethnicity	Gender	Grade Point Average
1. White	Male (a)	2.65
2. White	Female	2.25
3. White	Male	3.09
4. White	Female	3.37
5. White	Male	3.14
6. White	Female	3.93
7. White	Female	3.79
8. White	Male	3.79
9. White	Male	3.50
10. White	Male	3.19
11. White	Female	3.36
12. White	Male	4.00
13. White	Male	3.22
14. White	Female	3.41
15. White	Female	4.00
16. White	Female	3.66
17. White	Female	2.59
18. White	Male	2.45
19. White	Female	2.77
20. White	Female	3.17
21. White	Female	3.22
22. Native-American	Female	3.69
23. White	Male	1.62
24. White	Female	4.00
25. White	Female	3.46
26. White	Male	3.00
27. White	Female	3.94
28. White	Female	3.52
29. White	Male	2.21
30. White	Female	3.69
31. White	Male	2.85

(a) Note: Eligible for special education support.

Table 4

Demographic and Grade Point Average Data of Individual  
Students in General Education Academic Group

Ethnicity	Gender	Grade Point Average
1. White	Male	3.84
2. White	Male	3.92
3. White	Female	3.28
4. White	Male	3.59
5. White	Male	2.23
6. White	Male	1.33
7. White	Male	3.47
8. White	Male	2.41
9. White	Female (b)	3.77
10. White	Male	2.44
11. White	Male	3.63
12. White	Female	3.69
13. White	Male	3.12
14. White	Male	3.36
15. White	Female	3.85
16. White	Male	2.00
17. White	Male (a)	2.88
18. White	Male	3.50
19. African-American	Male (b)	1.07
20. White	Female	3.79
21. White	Female	4.00
22. White	Male (a)	1.28
23. White	Female	3.76
24. White	Male	3.96
25. White	Male (b)	2.65
26. White	Female	3.97
27. White	Male	2.96
28. White	Female	3.28
29. White	Female	4.00
30. White	Male (a)	1.54
31. White	Male	2.41

(a) Note: Eligible for special education support.

(b) Note: Eligible for free and reduced price lunch.

Table 5

Comparison of Montessori and General Education Academic  
Instruction Students Grade Point Average Totals

Source Of Data	Montessori Academic Instruction		General Education Academic Instruction		Effect Size	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Grade Point Average	3.24	(0.60)	3.06	(0.90)	0.24	0.93	<i>ns</i>

Table 6

Montessori Academic Instruction Terra Nova Reading,  
Language, and Math Normal Curve Equivalent Scores (a)

Student (a)	Reading	Language	Math
1.	48	43	56
2.	42	40	48
3.	72	81	58
4.	56	59	60
5.	70	69	57
6.	71	85	93
7.	84	74	91
8.	98	82	99
9.	65	68	75
10.	60	60	64
11.	75	92	86
12.	64	48	68
13.	56	61	83
14.	93	75	91
15.	82	98	98
16.	75	81	85
17.	71	75	63
18.	71	73	86
19.	44	54	42
20.	56	53	78
21.	65	75	95
22.	77	80	79
23.	54	38	41
24.	99	88	90
25.	60	51	50
26.	99	76	76
27.	78	93	98
28.	75	77	89
29.	56	48	55
30.	98	89	76
31.	68	62	67

(a) Note: Numbers correspond with Table 3.

Table 7

General Education Academic Instruction Terra Nova Reading,  
Language, and Math Normal Curve Equivalent Scores (b)

Student (a)	Reading	Language	Math
1.	49	64	91
2.	90	76	93
3.	56	59	63
4.	76	88	87
5.	55	39	63
6.	54	54	58
7.	54	70	59
8.	86	86	65
9.	88	77	75
10.	72	68	79
11.	67	65	83
12.	76	76	93
13.	81	78	81
14.	92	79	63
15.	68	85	74
16.	58	49	51
17.	60	56	77
18.	83	59	79
19.	55	51	56
20.	91	77	88
21.	98	95	92
22.	32	21	29
23.	71	64	83
24.	73	85	96
25.	45	54	56
26.	86	99	89
27.	65	69	82
28.	69	69	63
29.	92	75	99
30.	39	39	59
31.	58	57	76

(a) Note: Numbers correspond with Table 4.

Table 8

Results of Analysis of Variance for Montessori Academic Instruction Students Terra Nova Reading, Language, and Math Normal Curve Equivalent Scores

Source of Variation	Mean	SD	Sum of Squares	Mean Square	df	F
Between Groups			393.35	196.68	2	
Within Groups			25118.45	279.09	90	0.70 (a)
$\bar{A}$ Reading	70.39	(15.90)				(b)
$\bar{B}$ Language	69.29	(16.59)				
$\bar{C}$ Math	74.10	(17.58)				

(a) Note: *ns.*

(b) Note: No *post hoc* analyses were conducted.



Table 9

Results of Analysis of Variance for General Education  
Academic Instruction Students Terra Nova Reading, Language,  
and Math Normal Curve Equivalent Scores

Source of Variation	Mean	SD	Sum of Squares	Mean Square	df	F
Between Groups			835.12	417.56	2	
Within Groups			25612.77	284.59	90	1.47 (a)
$\bar{A}$ Reading	69.00	(17.16)				(b)
$\bar{B}$ Language	67.19	(17.26)				
$\bar{C}$ Math	74.26	(16.17)				

(a) Note: *ns.*

(b) Note: No *post hoc* analyses were conducted.

Table 10

Comparison of Montessori versus General Education Academic Instruction Students Terra Nova Reading, Language, and Math Normal Curve Equivalent Scores

Source Of Data	Montessori Academic Instruction		General Education Academic Instruction		Effect Size	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Reading	70.39	(15.90)	69.00	(17.16)	0.08	0.33	<i>ns</i>
Language	69.29	(16.59)	67.19	(17.26)	0.12	0.49	<i>ns</i>
Math	74.10	(17.58)	74.26	(16.17)	0.01	-0.04	<i>ns</i>

Table 11

Essential Learner Outcome and Cut Score Data of Individual  
Students in Montessori Academic Group

(a)	Essential Learner Scores			Cut Scores		
	Reading	Math	Writing	Reading	Math	Writing
1.	54	41	68.5	44	33	51
2.	41 (b)	42	73.5	42	29	51
3.	64	55	86.5	44	33	57
4.	55	41	76	44	29	60
5.	63	49	72.5	44	33	51
6.	63	67	82.5	44	33	51
7.	69	65	83	42	29	60
8.	70	69	80	48	29	60
9.	61	62	70.5	44	33	51
10.	67	39	71	48	29	51
11.	67	58	86	44	33	51
12.	64	57	72.5	42	29	51
13.	62	56	73.7	42	29	60
14.	65	56	77	44	33	57
15.	70	65	83	44	29	60
16.	68	61	72	48	29	60
17.	62	52	77	44	33	51
18.	67	57	86.5	44	33	51
19.	52	43	79.5	44	33	51
20.	61	56	80.5	44	33	51
21.	63	62	79.5	44	33	51
22.	64	61	87	42	29	60
23.	49	32	58	44	29	51
24.	70	62	89	44	33	51
25.	62	36	76.5	44	33	51
26.	65	64	84.5	44	33	51
27.	63	64	84	44	33	57
28.	66	63	88	44	33	51
29.	55	43	60.5	44	33	51
30.	70	60	87.5	44	33	51
31.	65	44	60.5	42	29	60

(a) Note: Numbers correspond with Table 3.

(b) Note: Outcome Score is less than the Cut Score.

Table 12

Essential Learner Outcome and Cut Score Data of Individual  
Students in General Education Academic Group

(a)	Essential Learner Scores			Cut Scores		
	Reading	Math	Writing	Reading	Math	Writing
1.	63	60	79	48	29	60
2.	70	65	82.5	44	33	51
3.	57	58	83.5	44	33	57
4.	66	64	86.5	44	33	51
5.	40	47	72.5	44	33	51
6.	63	47	65	44	33	51
7.	63	40	75.5	44	33	51
8.	60	47	86	44	33	51
9.	70	61	88	44	33	51
10.	68	61	82.5	48	29	60
11.	60	68	77.5	44	33	51
12.	65	61	88	44	33	57
13.	64	61	77.2	44	33	51
14.	69	47	82.5	42	29	60
15.	67	57	88	44	33	51
16.	52	50	67.5	44	33	51
17.	67	50	70	44	33	57
18.	68	67	78.5	42	29	60
19.	58	35	66.5	42	29	60
20.	67	55	82	44	33	51
21.	70	66	79	48	29	51
22.	60	43	73.5	44	33	51
23.	69	45	73	42	29	60
24.	70	67	87.5	48	29	60
25.	55	35	69	42	29	60
26.	71	67	87.5	44	33	51
27.	58	49	77	44	33	51
28.	58	43	83.8	42	29	60
29.	69	66	90	48	29	60
30.	36 (b)	31	69.5	42	29	60
31.	62	45	76.5	48	29	60

(a) Note: Numbers correspond with Table 4.

(b) Note: Outcome Score is less than the Cut Score.

Table 13

Montessori Academic Instruction Students Reading, Math, and Writing Essential Learner Outcome Scores Compared to Cut Scores

Source Of Data	Essential Learner Scores		Cut Scores		Effect Size	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Reading	62.48	(6.69)	44.00	(1.55)	4.48	14.99	000***
Math	54.26	(10.29)	31.45	(1.98)	3.72	12.12	000***
Writing	77.64	(8.39)	53.90	(4.06)	3.81	14.18	000***

\*\*\* Note:  $p < 0001$ .

Table 14

General Education Academic Instruction Students Reading,  
Math, and Writing Essential Learner Outcome Scores Compared  
to Cut Scores

Source Of Data	Essential Learner Scores		Cut Scores		Effect Size	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Reading	64.42	(8.27)	44.32	(2.01)	3.52	11.84	000***
Math	53.48	(10.90)	31.32	(2.01)	3.43	11.13	000***
Writing	78.87	(7.29)	55.06	(4.35)	4.09	15.61	000***

\*\*\* Note:  $p < 0001$ .

Table 15

## Student Extra-Curricular Activity Participation Levels

Group	Student Activities								$X^2$
	A		B		C		D		
	N	%	N	%	N	%	N	%	
Montessori Academic Instruction	17	(74)	15	(71)	21	(72)	35	(47)	
General Education Academic Instruction	6	(26)	6	(29)	8	(28)	39	(53)	
Totals	23	(100)	21	(100)	29	(100)	74	(100)	9.80*

A = Clubs; B = Organizations; C = Associations; D = Sports

\* Note:  $p < .05$  for Observed verses Expected cell

frequencies with  $df = 3$  and a tabled value = 7.815 for  $p < .05$ .

## CHAPTER 5

## Conclusions and Discussion

The purpose of this study was to evaluate the achievement and social involvement of students who completed eight years of public school Montessori Academic Instruction (MAI) to determine their current levels of 10th-grade transition adjustment into a traditional high school program, compared to the achievement and social involvement of their general education peers who completed eight years of General Education Academic Instruction (GEAI) before entering high school.

*Conclusions*

The following conclusions may be drawn from the study for each of the seven research questions: *Research Question #1*: There was no statistically significant difference between MAI students posttest Grade Point Average scores which were measured at the above average level compared to GEAI students posttest Grade Point Average scores which were also measured at the above average level. *Research Question #2*: Montessori Academic Instruction students' posttest reading, language, and math NRT NCE achievement test scores on average were measured within the High Average range with no statistically significant main



effect. *Research Question #3*: General Education Academic Instruction students' posttest reading, language, and math NRT NCE achievement scores on average were measured within the High Average range with no statistically significant main effect. *Research Question #4*: There was no statistically significant difference between MAI students' posttest NRT NCE achievement reading, language, and math dependent measures compared to GEAI students' posttest NRT NCE achievement reading, language, and math dependent measures. *Research Question #5*: Montessori Academic Instruction students' posttest ELO reading, math, and writing posttest scores were statistically significantly greater than the established cut scores required for them to demonstrate mastery in reading, math, and writing. *Research Question #6*: General Education Academic Instruction students' posttest ELO reading, math, and writing scores were statistically significantly greater than the established cut scores required for them to demonstrate mastery in reading, math, and writing. *Research Question #7*: Montessori Academic Instruction students' reported extra-curricular activity frequencies for (a) club participation, (b) organization participation, and (c) association participation were greater than the frequencies

reported by GEAI students while MAI students, reported a greater frequency of (d) sports participation than MAI students. Study conclusions were that MAI students were prepared for successful high school transition as indicated by the achievement and social involvement dependent measures and could, therefore, be expected to continue experiencing both academic success and social involvement. This conclusion could also be anticipated for the randomly selected GEAI students from this school district found to be equally prepared for successful high school transition.

#### *Discussion*

Some of Montessori's ideas, particularly those in regard to adolescent youth, were clearly hypothetical (Haines, 2000). Montessori called her essential reform of secondary education a "school of experiences in the elements of social life" (Kahn, 2003, p. 107; quoting Montessori, 1948). Adolescence is a time when academics often come second behind social issues. School programs are developed to achieve a balance between both to support student development through this transition period. Montessori programs, which have moved from private to public schools and have expanded educational offerings to secondary students (Dohrmann, 2003) has remained

particularly committed to this balance. The public questions, as they should, the performance of new programs such as the Montessori Program when tax dollars are utilized to support this program. The Midwestern school district in this study has a long history of demonstrable excellence in all academic areas and provided parental choice as the primary rationale for developing and implementing the Montessori program. The study findings provide data which could be interpreted as documenting the first five years of MAI program integrity consistent with but not superior to the districts long standing GEAI program for the participants.

It should be noted that the MAI data may have been influenced by the commitment teachers must make in order to become certified Montessori instructors. This training is often at the teacher's expense, which implies a strong commitment to this method of instruction. For example Hunt-Hagen (1997) compared the opinions of certified public school teachers who had also completed Montessori training to determine which method better prepared them for classroom teaching. On 11 out of the 12 survey items responded to the Montessori model of teacher training was perceived to be superior to traditional teacher training

(Hunt-Hagen, 1997). Because Montessori curriculum is not standardized but rather sets forth a set of classroom conditions the findings of this study can neither be generalized nor compared directly with other Montessori programs (Dohrmann, 2003; Schapiro, 1993). Schapiro also states that students in good Montessori classrooms have usually done quite well on standardized test. Moreover, Montessori students traditionally have come from high socioeconomic families who support and value education. Children from these families tend to achieve regardless of the type of schooling received (Schapiro, 1993).

Montessorians, who traditionally do not embrace National and State Standards and testing requirements, are now finding it untenable to ignore these mandates (Morrison, 2002; Schapiro, 2001). This study supports the fact that proponents of MAI have nothing to fear from objective evaluation of student achievement and social involvement outcomes. This study showed no differences in high school NRT and CRT assessments between the MAI and GEAI student groups. Proponents of MAI have always had the reputation for excellence in education (Dohrman, 2003; Morrison, 2002). This study provides support for

acknowledgement of MAI as a relevant academic option in today's educational environment.

School program competition across districts may have varied effects including increased student motivation, effort, and interests (Belfield, 2003). School education choice options may encourage students to enroll in a school program that they, or their parents, believe better suits their preference. This study supports the opinion that different programs can equally prepare students for successful high school transition. By comparing two educational programs, MAI and GEAI, results of this study indicate that educational outcomes using GPA, NRT, and CRT assessments showed no difference between the groups academic achievement and classroom performance. Students in the MAI group reported greater engaged in extra-curricular activities while students in the GEAI group reported greater engaged in sports. Further research is needed to determine if program competition may improve outcomes and have a beneficial effect on the academic outcomes of students in public schools (Belfield, 2003).

The transition to high school has often resulted in negative consequences for some students (Akos & Galassi, 2004). Academic (Mitman & Packer, 1982) and social

difficulties (Diemert, 1992) have both been identified as the primary issue in transition studies (Akos & Galassi, 2004). High school reforms are evident in the movement to smaller learning communities, academies, schools within a school, and house structures for ninth grade students (Paige, Neuman & D'Amico, 2001).

The good news, based on the findings of this study, is that both methods of instruction, MAI and GEAI, equally prepared students for high school transition. Good instruction, it seems, is just that, good instruction. Instruction starts with the teacher and if the students are engaged and participating, and the content is meaningful and appropriate, the students will learn. Further research is needed across many districts with programs similar to the course offerings of this mid-western school district to fully compare the MAI instructional methods to other innovative public school options. This study compared one program with another and found no data to reject the null hypothesis that both programs equally prepared these teenagers for successful high school transition. Another district with more variety in their instructional methods or variety in teaching staff and the students themselves may have produce different results. It is essential that

low SES parents, who place value on educational programs, be provided opportunities to enroll their children in well thought-out MAI and GEAI instructional options. It is of vital importance to determine through longitudinal research if the positive outcomes found in this study for economically advantaged students can be replicated for students with fewer economic advantages, who have strong parent support and a commitment for their educational success. We must assume that all parents in all school districts want educational success and viable educational options for their children and MAI should be considered one of these options.

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## APPENDIX A - Letter to Parents and Students

Dear Parent and Student,

My name is Shelley Corry and I am an Assistant Principal at Central Middle School. I am currently working on my Doctorate in Educational Administration and now ready to begin collecting data for my dissertation. Your student has been randomly selected to participate in this study. I am hoping that you and your child will participate in this study, as its goal is to determine if we are adequately preparing Montessori students for their transition into high school.

The title of my dissertation is: *A Comparison of Montessori Student to General Education Students as they Move From Middle School into a Traditional High School Program*. Your child was selected as a control group. He/she matches the demographics of a child in the Montessori group. The comparison data will be collected this June from GPA, ELO scores, Terra Nova scores, and the attached survey questions. All data collected will be strictly confidential and will not identify any individual student, but instead will look at the sample as a whole.

If you chose to exclude your student from this project, please complete the information on the bottom of this form and return it to me in the enclosed stamped and addresses envelop. If you or your student elects not to participate, no data will be collected from them or included in the study.

If you choose to participate, please complete the enclosed survey questions and return in the stamped and addressed envelop. That will denote your participation and give access to student academic information.

Again, I am hoping that you will choose to participate in my study. The information gathered will make high school transition even better.

Sincerely yours,

Shelley Corry  
Assistant Principal  
Central Middle School  
895-8225  
[scorry@mpsomaha.org](mailto:scorry@mpsomaha.org)

\_\_\_\_\_ I DO NOT want my child to participate in this research study.

Students name (please print) \_\_\_\_\_

Parent's Signature \_\_\_\_\_

Please return this portion to me, no later than July 1<sup>st</sup>, if you do not want your student to participate.



## APPENDIX B – Student Involvement Survey

Dissertation Title: A COMPARISON OF MONTESSORI STUDENTS TO GENERAL EDUCATION STUDENTS AS THEY MOVE FROM MIDDLE SCHOOL INTO A TRADITIONAL HIGH SCHOOL PROGRAM.

**Question #4:** Do students who were in the Montessori Program prior to attending high school participate in as many extra-curricular and/or non-school activities in high school as those students who attended general education programs before attending high school?

Please List the extra-curricular and non-school activities that you have participated in during your 9<sup>th</sup> and 10<sup>th</sup> grade in high school in the groups below.

Clubs


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Organizations


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Activities


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Sports


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I, \_\_\_\_\_ give Shelley Corry permission to use my GPA, ELO scores, Terra Nova scores, and the above responses for her research study comparing Montessori to general education students in the areas of achievement, academic progress and social involvement. I understand that the data will be blinded and student names will not be included in the written dissertation.

Student Signature \_\_\_\_\_

Parent Signature \_\_\_\_\_

Please return in the enclosed stamped and addressed envelope.  
Thank you.

Shelley Corry  
Central Middle School  
895-8228  
scorry@mpsomaha.org

APPENDIX C — Institutional Review Board For the Protection  
of Human Subjects Study Letter

NEBRASKA'S HEALTH SCIENCE CENTER

Institutional Review Board (IRB)  
Office of Regulatory Affairs (ORA)

August 11, 2005

Shelley Corry  
c/o John Hill  
KH 414  
UNO - Via Courier

IRB#: 236-05-EX

**TITLE OF PROTOCOL: A Comparison of Montessori Students to General Education Students as They Move From Middle School Into a Traditional High School Program**

Dear Mrs. Corry:

The IRB has reviewed your Exemption Form for Exempt Educational, Behavioral, and Social Science Research on the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46:101b, category 1, 2, and 4. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable sections of the IRB Guidelines. It is also understood that the IRB will be immediately notified of any proposed changes that may affect the exempt status of your research project.

Please be advised that the IRB has a maximum protocol **approval period of three years** from the original date of approval and release. If this study continues beyond the three year approval period, the project must be resubmitted in order to maintain an active approval status.

Sincerely,

*Ernest Prentice, PhD/MDK*

Ernest D. Prentice, Ph.D.  
Co-Chair, IRB

EDP/gdk

Academic and Research Services Building 3000 / 987830 Nebraska Medical Center / Omaha, NE 68198-7830