THE EFFECTS OF A MIDDLE SCHOOL MAGNET PROGRAM ON EIGHTH GRADE STUDENT PERFORMANCE

by

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(ABSTRACT)

Magnet schools were developed in the early 1970s when a large number of urban school districts began seeking alternatives to court-ordered desegregation mandates (Levine and Steel, 1994). Since that time, numerous studies have been conducted on the effectiveness of magnet schools in providing a racially balanced learning environment as well as increasing academic achievement. The purpose of the causal-comparative study was to determine if the math and science magnet program at a middle school affected achievement, attendance, and parent perceptions.

This study conducted three different analyses. A chi square analysis of the student population was conducted to determine racial balanced on attendance data from the school years 1993-94 through 1996-97, and if the racial balance of the magnet program mirrored that of the district. Three-way ANCOVA analyses, with a 2x2x2 factorial design were performed on attendance and the five components of the 1997 Stanford Achievement Test Form 9-TA results for the eighth grade population at the targeted middle school enrolled during the 1996-97 school year. Complete data for 177 eighth grade students was

utilized. Attendance and achievement served as the dependent variables. The independent variables tested were group membership (magnet, non-magnet), gender (male, female), and race/ethnicity (black, white). Socio-economic status (SES) and Literacy Passport Test (LPT) scores served as the covariates in the study. A survey of school effectiveness was sent to a random sample of parents. A t-test was performed to determine if there was a statistically significant difference between the perceptions of parents of magnet students and parents of student not enrolled in the program on school effectiveness.

The racial balance of the magnet program did not mirror that of the district. There was more of an equally distributed number of blacks and whites in the magnet program. Within the district, approximately 68% of the student enrollment was black, the white enrollment was approximately 31%. Magnet students achieved statistically significantly higher scores on each of the five components of the Stanford Achievement Test Form 9-TA than non-magnet students. Gender and race/ethnicity differences were statistically significant in science achievement in that male and white students achieved higher scores than female and black students. There was a statistically significant difference in attendance between magnet students and non-magnet students. Magnet students attended school more than non-magnet students. There was no significant difference in perceptions of parents of magnet and non-magnet students. Both groups felt that the school was very good. Implications for future avenues of research were also suggested.

DEDICATION

This dissertation is dedicated to my husband, Dewitt, and my children, Seth and Megan. I give my deepest expression of love and appreciation for the encouragement that you gave and the sacrifices you made during this graduate program. Thank you for the support and company during late nights of typing.

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Realizing that this study is meaningless, without the acknowledgment of the One who made it all possible, thanks be unto God for keeping family and friends in good health, and giving me peace of mind throughout the completion of this study.

TABLE OF CONTENTS

LIST OF TABLES

THE EFFECT OF A MIDDLE SCHOOL MAGNET PROGRAM ON EIGHTH GRADE STUDENT PERFORMANCE

Introduction

Magnet schools were created in the early 1970s when a large number of urban school districts began seeking alternative methods to implement court-ordered desegregation mandates (Musumeci & Szczypkowski, 1993). Designed as highly quality special schools, magnet schools were meant to attract students from all racial/ethnic and socio-economic (SES) segments of a designated community and, thereby, promote voluntary desegregation. Magnet schools were strategically placed in minority neighborhoods which were racially isolated to encourage students of other races to enroll in those schools (Steele & Levine, 1994). Initially, magnet schools were implemented for the "elimination, reduction, and prevention of minority isolation in elementary and secondary schools with substantial portions of minority group students." The Magnet Schools Assistance Program has included as an objective of magnet schools, "the improvement of academic achievement among children attending the magnet schools" (Steele & Eaton, 1996).

The magnet schools of Portsmouth, Virginia were designed to reduce the racial isolation that remained after the rezoning of the school division, to increase parent participation, and to improve academic achievement. On January 21, 1993, the Board formally approved magnet programs in four schools within the district, one of which was

Hunt-Mapp Middle School. In addition to the primary goals, other goals specific to the Hunt-Mapp Aerospace Technology Middle School were to:

- increase student achievement in the areas of math and sciences;
- maintain a high rate of attendance for those students in the program; and,
- improve parent perception and participation.

Problem Statement

The purpose of this causal-comparative study is to determine the effects of the Aerospace Magnet Program at Hunt-Mapp Middle School on eighth grade student performance as it relates to attendance and academic achievement.

Research Questions

The following major research questions were pursued:

1) Has the Aerospace Technology Magnet Program at Hunt-Mapp Middle School been effective in mirroring the balance of the race/ethnicity student composition of the school division?

2) Is there a difference in the amount of participation of students in the Aerospace Technology Magnet Program at Hunt-Mapp Middle School?

3) With the eighth grade students at Hunt-Mapp Middle School, is there a statistically significant interaction among group membership (magnet enrollment, non-magnet enrollment), gender (male, female), and race/ethnicity (black, white) with respect to math and science achievement as measured by the Stanford Achievement Test Form

9-TA after controlling for the initial differences in socio-economic status (SES) and Literacy Passport Test (LPT) scores?

4) With the eighth grade students at Hunt-Mapp Middle School, is there a statistically significant interaction among group membership (magnet enrollment, non-magnet enrollment), gender (male, female) and race/ethnicity (black, white) with respect to reading, language arts and social studies achievement as measured by the Stanford Achievement Test Form 9-TA after controlling for the initial differences in SES and LPT scores ?

5) With the eighth grade students at Hunt-Mapp Middle School, is there a statistically significant interaction among group membership (magnet enrollment, non-magnet enrollment), gender (male, female) and race/ethnicity (black, white) with respect to attendance after controlling for the initial differences in SES and LPT scores ?

6) Is there a statistically significant difference between parents (parents of students in the magnet program, parents of students not in the magnet program) with respect to their perceptions of Hunt-Mapp Middle School as viewed by the correlates of effective schools research?

Significance of the Study

While many national studies have been conducted on the effectiveness of magnet programs, none have been generated in Portsmouth. Portsmouth decision makers will be able to use the data presented in this study to provide information regarding the value of implementing a magnet program. Budget, curriculum, instruction, and other policy areas

could be affected by the results of this study in determining the feasibility of expanding the magnet program within the district.

Definition of Key Terms

For the purposes of this study, the following definitions apply:

1) Magnet school and magnet school program are used to refer to individual schools or programs within a district which offer a special curriculum not generally available in other schools in a district, to create an incentive for students to enroll in schools outside of their neighborhood attendance zone.

2) Program within a school (PWS) is a magnet program that serves some but not all of the students in a school.

3) Elimination of minority isolation is the desegregation objective for minority-isolated schools that aim to reduce minority enrollments to below 50% of the total enrollment (that is, for the school to cease being minority-isolated).

4) Student achievement is defined as the score that an individual student received on the Stanford Achievement Test Form 9-TA.

5) Socio-economic Status (SES) will be based on the federal lunch program. Students who received free or reduced lunch will represent “low” SES, and those students who are not eligible will represent “high” SES.

6) Attendance is the number of days a student is on roll in a school for the 1996-97 school year.

7) Enrollment is the total of students in membership in a school by the September 30th count.

8) Desegregation is defined as a plan aimed at reducing racial isolation in schools and improving racial balance.

Limitations of the Study

This study considered the results of one magnet school program, namely The Aerospace Technology Magnet School Program at Hunt-Mapp Middle School in Portsmouth, Virginia. Generalization of this study will be limited. Possible threats to the internal/external validity of the study include the following:

- Hawthorne effect-which is related to external validity. Students in the magnet program at Hunt-Mapp Middle School are located on the third floor of the school, therefore they are separated from the rest of the school population for their academic classes. They may perceive that they are receiving special attention which may improve their performance.
- Compensatory rivalry by the control group-the non-magnet students may perform beyond their usual level because they may perceive that they are in competition with the magnet students.

Organization of the Study

This study is divided into five chapters. This first chapter included the introduction, the statement of the problem, the purpose statement, the research questions, the significance of the study, the definition of terms, and the limitations of the study. The second chapter presents a review of literature documenting the history of magnet school. A historical overview of the development of magnet schools in Portsmouth, Virginia, is included. A discussion of achievement and its relation to gender and racial/ethnicity, along

with information concerning parent perceptions as it relates to school effectiveness also will be reported. The third chapter describes the selection of the student and parent sample, the procedures developed to collect data, and the method used to organize the data for analysis. Chapter four presents the results of the analyses as well as an explanation of charts and tables. Chapter five presents the summary, discussion, and conclusions drawn from this study. Finally, recommendations for further investigations and future avenues of research are developed.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The primary purpose of this chapter is to synthesize the literature on the effectiveness of magnet schools. A historical overview of magnet schools will be presented along with background information on the development of the magnet school programs in Portsmouth, Virginia, and specifically at Hunt-Mapp Middle School. In order to provide a comprehensive overview of the topics associated with magnets schools, this chapter has been organized to also include the topics of student achievement as it relates to student race/ethnicity, gender differences, and attendance. Parent perceptions on school effectiveness will also be presented. A summary of the literature review will culminate chapter two.

Historical Overview of Magnet Schools

Magnet school programs can offer diverse educational choices at the elementary, middle, and secondary levels. Ideally, these programs draw students from all attendance areas and offer specialized instruction in a particular area. Magnet schools offer students and parents the opportunity to select the focus of their educational program. This choice is offered by some districts as an attempt to meet the diverse needs of students and create racial balance within the selected school (Metz,1988).

Blank (1989) concluded that the magnet school concept is a recent innovation in American educational history that has been associated with school reform and reorganization, especially in urban districts. In contrast, Hunter (1994), stated that the

magnet school movement is “by no means a new revolutionary approach to educational reform....it has a historical foundation and has been extensively studied and analyzed with regards to its feasibility and success” (pp. 9-10).

Historically, magnet schools have their roots in the concept of district-wide specialty schools, such as the Bronx School of Science, the Boston Latin School, Chicago’s Land Tech, and San Francisco’s Lowell High School, some of which have been in existence since the turn of the century. (Steele & Levine, 1994; Blank & Archbald, 1992).

The Boston Latin School’s admissions policy reserved 35 percent of the seats in the school for African-Americans and Hispanics. In 1995, a white student challenged the policy because she was denied admission to the city’s Boston Latin High School because of the quota. In August 1996, U. S. District Judge W. Arthur Garrity ordered Boston Latin to accept the student for the fall, of 1996 pending a trial in the case. In that decision, the Judge stated that the current quota might well be unconstitutional (Hendrie,1996). However, as the effort is made to record its history, there is a realization that controversy exists. Based on the federal court, magnet schools are defined as those “... having a distinctive program of study to attract a cross-section of students from all racial groups voluntarily” (Estes, Levine, & Waldrip, 1990 p.99).

Hunter (1994) and Ascher (1990) purport that the Boston Latin School, founded in 1635, was really the first magnet in the United States. Hunter continues that in 1870, Dunbar High School was founded as a magnet because black parents were able to select this school for their children, no matter where they lived in the District of Columbia.

During this period, magnet schools were generally non-neighborhood schools selected by parents because of some perceived trait, such as an excellent academic reputation. On the contrary, according to Waldrip, the first true magnet school was created in Tacoma, Washington, in 1968; and in 1969, the Trotter School of Boston, Massachusetts, was second (Clinchy, 1995). No matter which was first, there is little dispute about why most magnet schools exist today or about which case directed its focus.

White flight from urban to suburban school districts, has caused practically everyone, including the federal courts, to seek out alternative educational programs that encourage voluntary desegregation rather than force desegregation through court ordered busing. To achieve this process, innovative educational programs labeled magnet schools have emerged (Rossell, 1985). They grew out the need to comply with the Supreme Court's historic Brown v. the Board of Education decision of 1954 and their need to desegregate schools (Ascher, 1990; Ascher & Burnett, 1993; Clinchy, 1995; Gordon, 1989; Steel & Levine, 1994). In its decision, the U. S. Supreme Court unanimously outlawed segregation and declared that racially separate schools are inherently unequal. This ruling overturned the high court's previous decision in Plessy v. Ferguson, which had allowed state-imposed segregation, calling such schools "separate but equal" (Gordon, 1989, Alexander, 1993).

Magnet Schools and Desegregation

Magnet schools pledged to help bring about desegregation while still providing students and parents with a choice of educational settings and institutions by attracting students of all racial groups to distinctive, high quality course offerings that were not

available in neighborhood schools. Lower courts that applied the Brown decision issued desegregation orders to school districts across the country. Districts that had maintained historically all-black and all-white schools were ordered to open doors to all comers. In some districts, desegregation meant redrawing school boundary lines, which meant busing students to outlying districts.

The creation of magnet schools is clearly associated with desegregation and integration of schools. Significant court cases affecting the establishment of magnet schools include Brown v. Board of Education (1954), Green v. County School Board of New Kent County (1968), and Swann v. Charlotte-Mecklenburg Board of Education (1971) (Gordon, 1989).

In Brown v. Board of Education, the U. S. Supreme Court effectively abolished the policy of separate but equal; which meant doing away with separate educational facilities for black and white students. Braddock & Crain (1984) contend that the initial conception of the impact of school desegregation as expressed in 1954 in the Brown decision has run its course. They state that, "the schools are the place in which society socializes its next generation of citizens....the U. S. can not afford segregated schools, if this nation is genuinely committed to providing equality of opportunity to every citizen" (Braddock & Crain, 1984 p. 264).

Although the 1954 Supreme Court decision in Brown v. Board did not instantly end school segregation, it destroyed the constitutional foundation upon which legalized segregation in the South rested, and made future gains possible. This case ended the notion of 'separate but equal facilities.'

Forty years later, some individuals feel that society is struggling to provide equal access and equal opportunity for all students. In April 1993, a Woodstock forum addressed the progress of African-American education since Brown v. Board of Education. The panelists' views were mixed. Some felt that society continues to fight discrimination, insufficient funding to provide an education to youth, and discovering strategies for effective teaching and learning. Others point out the achievement of Blacks with higher test scores, greater college enrollment, and the increase in attainment of college degrees and successful careers. All panelists felt that politics greatly influence education in that politicians have control of the entire system. Even with the control, politicians are said to be so detached from education, that they do not understand what the needs of schools are (Woodstock, 1993).

The Green v. New Kent County (1968) case ruled that freedom of choice, that is, allowing students to attend the school of choice, was not effective in desegregating public schools and, therefore, not allowed. In Swann v. Charlotte-Mecklenburg (1971), the Supreme Court ruled that a district court has the authority to order a desegregation plan that imposed the transporting of students from their neighborhood school to another school in the district in order to achieve desegregation (Gordon, 1989).

School desegregation received much notoriety in the 1960s and 1970s and, researchers turned to the study of magnet schools and effective schooling the 1980s (Ascher & Burnett, 1993). Magnet schools are a popular strategy for increasing inter-social exposure in the public schools. One of the major motivations for the creation of magnet schools is white resistance to participating in racially balanced schools (Ascher,

1990). Foster (1973) stated in an early evaluation of magnet schools as a strategy for desegregation that, "the magnet concept is a message to the white community which says in effect: this is a school that has been made so attractive educationally (magnetized), that you will want to enroll your child voluntarily, in spite of the fact that he will have to go to school with blacks" (p. 7).

In urban school districts where there is a large population of minority students and what are considered black schools, the question comes to mind--what student composition ratio can make a historically black school in a mixed or predominately black neighborhood attractive to white students? The magnet school offers methods of drawing white students and parents out of the comforts of suburbia to a school that attracts them to educational innovations, competent staff, and a sense of belonging. Ascher & Burnett (1993) noted that white parents were quick to share their concerns about poor facilities, lower quality of instruction, and threats of danger from which their children are presumably safe in the white middle-class schools.

Problems of Magnet Schools

One major concern of parents in the desegregation of schools, was the distance that their children had to travel to and from school. If some children must travel long distances to school, while others live in the surrounding neighborhoods, those students who live close by, mostly white, will tend to feel that they own the school while others feel like visitors (Metz, 1994). Also students who ride the bus to school may be limited in the amount of extra curricular activities in which they may participate. Desegregation gives black children access to the better educational facilities and programs that white parents

used their influence to obtain for their own children (Metz, 1986). Desegregation, therefore, changes the political balance in society as it requires children of different races to share the same schools and classrooms and so to have access to the same privileges. Resistance to desegregation must be understood as being in part resistance to this equalization, not just to racial contact.

Metz (1988) contends that "magnet schools can desegregate across lines of social class, achievement, and race, and serve all their students well"(p. 55). Several researchers support the notion that for the good of the society, white children need to be in desegregated school as well as neighborhoods just as much as minority children do (Metz, 1988; Ascher & Burnett, 1993; and Estes et al., 1990) Gamoran (1996) believes that schools with distinct purposes, "provide social capital for those students who cannot find it in their homes and neighborhoods" (p. 4).

In a policy study by Clewell & Joy (1993) in Montclair, New Jersey school district, several plans for providing choice in education to the public were evaluated. Montclair, New Jersey has successfully desegregated its elementary schools through a voluntary magnet school plan based on choice in education. The purpose of the Montclair study was to evaluate the effectiveness of the district's plan by providing racial balance, quality. and diversity across schools.

Montclair's magnet system is a voluntary plan which allows parents to select a school, rather than being assigned one. There are several reasons for affording parents within the community choice in school programs, they are: the promotion of educational excellence, the increase in parental school involvement, an increase in varied program

offerings, and improvement of racial balance throughout the district's schools. As a result of the implementation, schools characterized by extreme racial imbalance before the magnet plan became racially balanced as a result of choice initiatives (Clewell & Joy, 1993).

According to the researchers, school faculties in Montclair School District also became mixed, thus providing minorities with positive role models to follow. Diversity among school programs was preferred by most parents in the community. What was seen as one of the most successful aspects of the magnet program was that disparities between scores of varying racial groups was diminished as a result of the program (Clewell & Joy, 1993).

Research suggests that to achieve real integration, a city must move beyond monitoring enrollments at the school level (Ascher & Burnett, 1993). There are basically two types of magnet school structures, full-site magnet and program within a school (PWS). In full site magnet schools, all students are transfer students mixed together in the magnet program. In the PWS, only part of the school is comprised of transfer students who have access to the magnet curriculum. PWS magnets are usually situated in schools that were mostly minority prior to desegregation efforts. These programs achieve overall building desegregation by attracting enough white transfer students to balance the number of neighborhood minority students already in the school (Steele & Levine, 1994 and West, 1994).

West (1994) offers support for the claim that many magnet schools are overflowing with racially segregated classrooms. Racial desegregation with PWS is

partially damaging to the minority students who constitute the non-magnet portion of the school, because it "labels them as inferior to the white transfer students who constitute the bulk of the magnet students within the school" (West, 1994 p. 1).

The schools which develop reputations as 'good' tend to be in the areas with more affluent families who have more education and more prestigious occupations; therefore, the social class of the clientele is higher. Metz (1986, 1988) stated that it is an open secret that schools are not the same despite the appearance of standardization. Realtors encourage houses to prospective clients according to their school attendance area when the school has a local reputation for high quality. Magnet schools were initiated as a means of deterring white flight by providing high quality special programs that would encourage parents to keep their children in the local schools (Musumeci & Szczpkowski, 1993).

Magnet School Assistance Program

In addition to the fact that the magnet schools were created as a desegregation strategy, and grew through federal support, the development of magnet schools in America's education should also be accredited to the concerns of education decision-makers in their efforts to improve the quality of education. Significant support came to the magnet school movement came in 1976 when Congress passed an amendment to the Emergency School Aid Act which specifically allocated funds to be utilized by districts for magnet programs as a part of the desegregation process (Hunter, 1994 and Ascher, 1990). By the 1981-82 school year, there were 1,019 magnet schools in 138 school districts and by 1983 theme-based programs existed in all areas of the nation with a particularly high

proportion of schools in the Southeastern urban districts (Steele, 1994). In 1981 however, there was a repeal of the amendment supporting magnet schools which drastically reduced federal funds by $375 million for the 1982 fiscal year (Ascher, 1990).

Funds have been made available under a Magnet Schools Assistance Program (MSAP) which was first enacted on August 11,1984 (Steele & Levine, 1996). Through this federal support program, magnet schools have received substantial assistance from the federal government. In the first grant cycles (1985 - 1991), over $739 million was awarded to school districts to support the development and implementation and/or expansion of magnet programs (Steele, 1994). The stated purposes of MSAP are to:

- eliminate of minority group segregation and discrimination among students and faculty in elementary and secondary schools;
- encourage the voluntary elimination, reduction, or prevention of minority group isolation in elementary and secondary schools with substantial proportions of minority group students; and
- encourage the development of courses of instruction within magnet schools that will substantially strengthen the knowledge of academic subjects and the grasp of tangible and marketable vocational skills of students attending such schools. (Ascher, 1990 and Steele & Levine, 1994, 1996).

Local educational agencies must submit a proposal which outlines the program and specify the plan of action which will be needed to accomplish the project. The process is very competitive, and all local educational agencies must adhere to the federal guidelines and objectives that are stated by MSAP. If approved, the local educational agency will be a part of a grant cycle receiving funds to support the magnet school programs within the district. There are two school districts within the state of Virginia which are currently receiving federal support, Roanoke City School District and Alexandria Public School District (Steele & Levine, 1996).

Selectivity

Direct comparison of academic achievement between magnet and non-magnet students is a sensitive procedure (Jirtle, 1986). The political ramifications of finding significant achievement differences between these students can be considerable. If achievement gains are greater for magnet students that for non-magnet students, the issues of equity and "brain drain" of the "creaming" of the high achievers from non-magnets to magnet arise. On the other hand, if achievement gains are greater for non-magnet students than for magnet students, the issue of wasted resources may arise. Finally, if achievement gains are comparable for magnet and non-magnet students, many people may be pleased with the apparent equity of the school system; others may decide that if all school types are equal, they will send their children to the schools closest to their homes (Jirtle, 1989, Hunter, 1994).

It has been argued that magnets frequently do "cream" off good students at the expense of non-magnets and therefore contribute to isolation by achievement and economics, if not by race, in the remainder of the district's schools. The problem of creaming has generally been tackled by studying admissions criteria. Dentler (1990) found nearly two-thirds of the magnets in his study to be selective by some admissions criteria, although half of the magnets with the highest achievement were not selective; and Blank (1989) found that only 15 percent of his sample used such "highly selective" criteria as test scores. However, as it has often suggested that even when a magnet school has no admissions criteria, most of the students are selected because simply having to choose a magnet, selects out those students who "choose not to choose," and with very rare

exceptions, students with failing grades, or records of bad behavior or truancy, do not get selected in magnets (Ascher and Burnett, 1993).

Magnet Schools and Academic Achievement

Blank and Archbald (1992) found in their research that magnet schools have been shown to produce renewed motivation for education among students, parents, and teachers in some magnet schools have improved the academic performance of students. Improved academic achievement for all students is considered a key objective for magnet programs. It is seemingly the promise of improved academic achievement through greater resources and higher quality educational programming that helps motivate parents to pursue an integrated educational experience for their children (Ross, 1994).

Despite continuing debate, there is evidence that desegregated schools improve minority students' achievement, especially when the students attend desegregated schools from the earliest grades (Metz, 1988). Because magnet schools have a double objective, voluntary racial integration and racial integration, research on magnet school generally focuses on the accomplishment of these objectives.

As to whether magnet schools are effective, the answer is not clear. Two major researchers have differing views. Both Blank (1984, 1989) and Dentler (1990) used 1983 data on 45 magnet schools in 15 urban districts. Blank stressed the educational achievement of magnets reporting 80 percent of the magnet schools had average reading and math achievement scores above their district average. Within the study, Blank concluded in his findings that, "magnet schools can and do provide high-quality education in urban school districts....we found a wide variation in educational quality within the total

sample" (Blank, 1984 p. 270). Dentler however, concluded that magnets vary as much as non-magnets in their ability to deliver educational quality. To support his findings, Dentler cited data from schools for which there were reading and math achievement scores:

- 26 of the 45 magnet schools equaled or exceeded the mean reading scores from their districts, 14 exceeded the district's average by 10 or more points, and seven exceeded it by at least 30 points. The reading scores of six magnet schools were below average.
- Most magnet schools equaled or exceeded district averages in math, 13 of them by 10 points or more, and six by at least 30 points. Seven fell below average in math (Inger, 1991).

Hill, Foster, and Gendler (1990) performed a third study which included inner-city public and Catholic schools as well as three magnet schools. They found that the magnet schools and the Catholic schools far exceeded the 'zoned' schools in graduation rates, percentages of students completing an academically demanding college prep course, percentages of students taking the SAT, and SAT scores. Gamoran (1996) continues to support the conclusion of Hill and his associates. In his study, Gamoran suggests that students learn more in public magnet schools than they do in either public comprehensive high school, private schools or Catholic schools. Gamoran based his study on data collected on 4,000 urban high school students. Gamoran (1996) contends that, "higher achievement may also result from students' greater sense of membership, or social bonding in private and specialized public schools" (Gamoran, 1996 p.3).

Gamoran compared achievement growth of students in magnet schools, Catholic schools, and secular private schools to that of students in public comprehensive schools during the first 2 years of high school. He used 1988 and 1990 data from the National Educational Longitudinal Study. It was found that Catholic and private students' raw

scores in mathematics, sciences, reading, and social studies had a distinct advantage over the public school magnet. Gamoran statistically controlled for the initial difference in schools' socio-economic mix and students' prior academic achievement.

As a result, magnet school students made greater gains over two years in reading, social studies, and science than students in Catholic and private schools. Catholic students gained more math knowledge (Gamoran, 1996). The differences were small, however they were significant. He concluded,

"Magnet schools are more likely to serve disadvantaged students than comprehensive schools, yet rate at least as well in academic climate, social attachment, and course taking. For the average student, magnet schools appear to produce higher achievement, at least in reading and social studies" (Gamoran, 1996 p.14).

Researchers Musumeci and Szczypkowski (1993) were involved in a three year study with fourteen magnet school programs in New York State. The study focused on the racial balance in the magnet programs, student performance, and planning and development procedures utilized during program implementation. Musumeci and Szczypkowski found that magnet schools dramatically reduced racial isolation throughout the districts studied.

Within their three year study, Musumeci and Szczypkowski concluded that magnet schools were shown to provide students with more integrated learning environments. They found that district-wide academic achievement increased in the magnet schools which also included a reduction in the disparities in levels of achievement between students of varying racial and ethnic backgrounds. In accordance with more equal

achievement among students of varying racial and ethnic backgrounds, disparities in levels of achievement between male and female students narrowed in magnet school programs (Musumeci & Szczypkowski, 1993).

Larson, Witte, Staib, and Powell (1993) also conduced an evaluative study of the secondary magnet schools in Montgomery County, Maryland. This study examined the effectiveness of the magnet programs at achieving the school system's objectives of racial balance and increasing student achievement. The evaluation designed, examined, and compared data from both magnet and non-magnet programs. Racial balance was shown to be effective, with many white students attending what were considered primarily minority schools prior to the implementation of the magnet program. Math and science scores increased in the magnet schools while differences in scores between races decreased. In addition, program quality throughout magnet schools was shown to improve. Although the magnet programs being examined focused primarily on academic excellence, student attitudes toward the school programs also improved (Larson et al., 1993).

Magnet schools have been suggested as a solution to the problems of urban education (Metz, 1988). They have served to provide urban communities with superior means of delivering instruction to all students. Results of the evaluations indicate that magnet school programs help to facilitate improved educational services to urban communities, by:

- helping to desegregate schools through voluntary choice initiatives,
- increase academic performance of all students,
- decrease disparities in achievement between racial, ethnic, and gender groups,

- increase parental and community involvement and support for school programs,
- increase the effectiveness of staff development programs, and
- increase student, teacher, parental and community perceptions of school programs.

Recommendations of magnet school evaluations include: careful strategic planning for program implementation, leadership and staffing, the gradual introduction of magnet programs within the district, the elimination of district wide attendance zones, increased parental participation in school programs, and provisions for increased staff development to better enable educators to facilitate more effective specialized and interdisciplinary instructional opportunities (Musumeci & Szczyokowski, 1993; Clewell & Joy, 1993, Larson et al., 1993, Jirtle, 1986, Green, 1989, Metz, 1986,1988, Blank, 1989, Clinchy, 1995, and Gamoran, 1996).

Appendix 1 presents several studies that compare students and teachers of magnet school programs with those that are not enrolled in magnet program. Group membership (magnet, non-magnet) is considered the independent variable; other variables may be compared.

Middle Schools and Achievement

The middle school movement emerged from the study of early adolescence psychology in the early 1960's. As early adolescence came to be viewed increasingly as a crucial phase of human development, scholars began to advocate the creation of a special educational environment in which students ages 10 - 14 could experience the changes inherent in this phase. The junior high school model was considered to be too rigidly organized in the image of the senior high school to achieve this purpose.

Early adolescent children move from concrete to formal operations, and typically seek answers to a range of problems. They may be independent learners, but at the same time they want to be shielded from defects or mistakes that prompt ridicule. Their opinions and values are subjected to experiences that challenge and may alter them. Their rapid physical growth may make stamina brief; and their social preoccupation with others and with themselves can affect their attention spans (Wall, 1981).

Middle school educational theory diverges on the desired tone and pace of the middle school environment. One approach is that the developmental changes described above require a safe, protective environment. A second approach is that a safe, protective environment for 10 - 14 year olds will generate boredom and thereby interfere with developmental processes. A consensus exist that middle school environment should provide a transition from the self-contained elementary classroom to the departmentalized structure of the high school.

Research suggests that the middle schools include of three grade levels to prevent students from having to change school after a shorter period of time (Brown, 1981). The most common middle school grade combination appears to be 6 - 8.

Gains in academic achievement for middle school students may be hampered by three factors:

- the giving of homework is often more emphasized than the asking of questions that lead to learning;
- the curriculum content often overlaps with that of elementary school to the extent that speed in completing material becomes a goal so that the student or class can move on to something new; and
- the idea that different topics are studied differently is often not imparted to students (Ward, 1982).

Research indicates that the developmental diversity among middle school students makes individualized instruction more important at this level than at any other. Problem-solving activities that emphasize "right thinking" over "right answers" are crucial to the cognitive development of the middle school students (Wall, 1981). The attention given to the problems identified, coupled with the middle school's attention to the cognitive development levels of individual students can be predicted to have a positive effect on the academic achievement of students in grades six through eight.

History of Desegregation and Magnet Schools in Portsmouth, Virginia

In the fall of 1962, Portsmouth Public Schools began to desegregate its previously racially separate schools. The first desegregation plan featured freedom of choice for all grade levels and for students of all races. This plan was approved by the former federal Department of Health, Education, and Welfare (HEW). In 1965, the freedom of choice plan was challenged by the NAACP. As a result, in 1969, the district was ordered to design and implement a new assignment plan for students and faculty. The federal courts ordered the district to use all available techniques to convert the district to a racially unitary district and to dismantle the vestiges of the dual school system. The district complied and was declared UNITARY on August 10, 1971.

The School Board adopted a new voluntary desegregation plan in 1991, to deal with demographic and housing changes. The plan re-configured the schools into K-5 elementary schools, 6-8 middle school, and 9-12 high schools. This plan called for the closing of one high school and the converting of another high school into a middle school.

On October 15, 1992, the School Board adopted a plan for the use of magnet schools for the purpose of desegregation and for the improvement of academic achievement. On January 21, 1993, the Board formally approved magnet programs at one high school, one middle school (Hunt-Mapp Middle School), and two elementary schools. The district felt that with the combination of compulsory and voluntary methods of desegregation, would result in a more effective way of increasing community support for schools.

Portsmouth Public Schools proposed to eliminate, reduce, or prevent minority group isolation in elementary and secondary schools with substantial portions of minority students by meeting three objectives:

- "1. By June 30, 1995, as a result of school closing and the implementation of a school magnet for math, science, and technology at Norcom High School, the district will have reduced minority group isolation at the school by establishing a minority representation in the student body that is less than 75%.
- 2. By June 30, 1995, as a result of school closing and the implementation of a school magnet for math, science, and technology at Hunt-Mapp Middle School, the district will have reduced minority representation in the student body that is 67%.
- 3. By June 30, 1995, as a result of the implementation of a Math/Science/Technology Magnet Program at Douglass Park Elementary School and a Montessori Magnet Program at Park View Elementary School, the district will have reduced the minority percentage to less that 80% at Douglass Park and to 68% at Park View" (Parent, 1993 pp. 40-41).

Portsmouth Public Schools proposed to improve academic achievement in the target magnet school sites by offering special academic help to students who participate in the magnet school programs by meeting three objectives:

- "1. By June 30, 1995, as a result of implementation of the magnet school program at I. C. Norcom High School, the average SAT score will have increased to 800; the percentage of students taking AP courses will have increased to 10%,

with 50% attaining a score of 3 or higher; the average percentile score on the Test of Achievement and Proficiency at the 11th grade will be at least 55.

- 2. By June 30, 1995, as a result of the implementation of the special magnet programs at Douglas Park Elementary School and Park View Elementary School, the mean composite score on the Iowa Test of Basic Skills administered in the Spring of 1994 will be equal to or will exceed the district average at the fourth grade level.
- 3. By June 30, 1995, as a result of the implementation of the special magnet program at Hunt-Mapp Middle School, the mean composite scores on the Literacy Passport Test and mean composite scores on the Iowa Test of Basic Skills will equal or exceed the district average" (Parent, 1993 pp.41-42).

Official student enrollment is obtained each year on the last school day of September. The following tables provide data on overall student enrollment, information on demographic characteristics by gender, race/ethnicity, and socio-economic status. The data collected is based on the student enrollment count for September 30th for each year (State of the Division Report, 1997). Table 1 shows a decline in the overall enrollment in Portsmouth Public Schools from the 1993-94 school year through the 1996-97 school year. A report of the enrollment in Portsmouth Public Schools over a two year period (1995-96 through 1996-97) is shown in Table 2. During the 1992-93 school year, 32.70% of the students in Portsmouth were white; 66.10% of the students were black, and 1.2% were classified as other (Table 3). Table 4 shows that during the 1992-93 school year, 41.81% of the students in Portsmouth Public Schools paid for their lunches and 58.19% of the students received free or reduced lunch.

Table 1
Overall Enrollment for the Middle Level: 1993-94 to 1996-97

	1993-94	1994-95	1995-96	1996-97
Middle School	4,596	4,625	4,153	4,059
Grade 6	1,362	1,363	1,344	1,296
Grade 7	1,433	1,383	1,336	1,341
Grade 8	1,490	1,690	1,365	1,245
Total for the District	17,921	17,779	17,891	17,845

Table 2
Enrollment by Gender and Level: 1995-96 to 1996-97

	1995 - 1996		1996 - 1997	
	Male	Female	Male	Female
Middle School	2,083	2,070	2,065	1,994
District Total	9,043 50.6%	8,848 49.4%	9,053 50.7%	8,792 49.3%

Table 3
Enrollment by Race/Ethnicity and Level: 1995-96 to 1996-97

	1995 - 1996		1996 - 1997	
	Black	White	Black	White
Middle School	2,925	1,169	2,807	1,185
District Total	12,159 68.0%	5,487 30.7%	12,005 67.7%	5,482 30.7%

Table 4
Enrollment by Socio-Economic Status and Level: 1995-96 to 1996-97

	1995 - 1996		1996 - 1997	
	Free or Reduced lunch	Pay for lunch	Free or Reduced lunch	Pay for lunch
Middle School	2,581	1,572	2,458	1,601
District Total	11,027 61.6%	6.864 38.4%	11,009 61.7%	6,836 38.3%

Background of Portsmouth City Schools

In 1993, Portsmouth, Virginia, which is located in the Hampton Roads area of Southeast Virginia, was a city with a population of 103,907. The city covers 29.9 square miles of land and is surrounded on three sides by 15.6 square miles of waterway. Portsmouth had an ethnic population that was 51% white, 48% black, and 1% Hispanic and other. There had been a general decrease in the population of the city by .6% while the population of Virginia had increased by 12%.

Portsmouth has six public housing projects consisting of 1,906 units with approximately 5,440 residents. In 1993, 2,589 of the children were under 18 years of age. There are an additional 1,520 subsidized units throughout the city. Also, during 1993 twenty thousand residents of the city receive public assistance. Portsmouth ranked third in the state communities with of youth living in poverty (Lowe, 1992, Schools Profile and Review, 1997). It also ranked 11th in the state for percentage of youth population (Schools Profile and Review, 1997). The city had a civilian labor force of 50,801 with an unemployment rate of 6.7%. The largest employer of the city is the Norfolk Naval

Shipyard. In 1993 defense cuts and tough competition led to a reduction in the work force by 1200 or more (Keller, 1993).

Portsmouth serves many students who are from homes with little education, family poverty, and low social economic status. According to Schools Profile and Review (1997), the community and student information for 1995-96 results for Portsmouth Public Schools are:

- 67% of the adults in the district are reported as having a high school education as compared to 75% in the state of Virginia.
- 15% of the families within the district are below the federal poverty level.
- The 1994 Median Adjusted Gross Income is $17,512 which is a drop from the previous year of $121.00.
- 58% of student within the division had approved applications for free or reduced price lunch during the 1995-96 school year, as compared with 32% for the state of Virginia (Schools Profile and Review, 1997 p.7).

The 1995-96 Composite Index of Local Ability-to-Pay for education is a weighted division level measure that includes local adjusted gross income, local sales tax, local value of real property, and it reflects both the student population and the local population. According to a preliminary Virginia's Educational Disparities (1997), Portsmouth's fiscal effort , or the district's amount of funding spent on public education is $1.3729. Portsmouth is ranked number 65, which is a high level of effort. However, with a ranking of 117, Portsmouth's ability to pay for public education is low. Portsmouth's Local Composite Index is $37.440.

Hunt-Mapp Middle School Magnet Program Development

Hunt-Mapp Middle School has approximately 1,200 students enrolled. There are approximately 400 students in the magnet program. Hunt-Mapp Middle School is a partial site magnet program, which is called a program within a school (PWS). The

program was designed so that parents would see Hunt-Mapp Middle as a part of a K-12 program that provides students with an outstanding basis for rigorous studies leading to lucrative careers in math, science, and technology. In view of the significant amount of interest in aerospace shown by parents in a parents' survey issued in 1993, the middle school has an aerospace theme (Parent, 1993). Students who are zoned for Hunt-Mapp Middle and those students who are outside of the attendance zone are enrolled in the magnet program.

All students must file an application to be in the program at Hunt-Mapp Middle School. This application is submitted based on an interest in the aerospace theme. Students must have a C average, good attendance, and a good behavior record. Between 60 and 70 percent of all students in the program have been on the honor roll and have perfect attendance. Parents are supportive and complimentary of the teachers and efforts to encourage the students. Many parents say they have seen an positive attitude change in their children i.e., they like school more and an increase in homework completion.

In the program, students learn about technological systems, desktop publishing, multi-media presentations, spreadsheets, and computer programming. The program also consists of learning activities employing aerospace exploration studies and research integrated into the core curriculum through laboratory experimenting, networking, communication, and intensive subject-related field projects. These studies are unique to Hunt-Mapp for middle school students.

Instruction, field trips, and the classroom decor reflect the aerospace theme. Students have benefited from learning experiences and mentorships in conjunction with

community resources. Supporting agencies include the National Aeronautic and Space Administration (NASA), Norfolk Naval Shipyard (NNSY), The Chesapeake Bay Foundation, Virginia Marine Science Museum, The Living Museum, and The Air and Space Museum. Students study weather analyses and prediction and principles of flight. The students also built a wind tunnel to test air flow over different shapes and model planes which students constructed themselves.

The magnet students have communicated with students all over the country by way of the internet about similar projects they were participating in. The magnet students presented a Cooperative Achievement in Science and Technology Project (CAST) in Washington, D. C. in 1995, to scientists and technologists all over the country.

Through the Astronauts Club, students built remote control ultralight airplanes, and in cooperation with NASA personnel and local airport experts, students were taught how to control the flight of the models. In partnership with the Chesapeake, Virginia Ultralight Club, the Hunt-Mapp Ultralight Club built an ultralight airplane during the 1996-97 school year.

There are twelve teachers involved in the magnet program, four at each grade level, six through eight. In order to implement this strategy, teachers were trained and staff development workshops are held for magnet teachers during the school year and in the summer to provide additional approaches in the delivery of instruction. Teachers received computer training in order to guide their students through two computer projects per year using all available resources. Many of the teachers have taken NASA sponsored

classes to train them to integrate the aerospace theme into the teaching of the district's curriculum.

The program is characterized by a strong curriculum based upon SSC (Scope, Sequence, and Coordination) and by teaching math that includes the mathematical concepts in Algebra I and Geometry. These courses are normally offered at the high school level. All eighth grade students that are enrolled in the magnet program are taking the same academic courses: English 9, Algebra I, World Geography, (9th grade courses), and 8th grade science.

Aerospace Magnet Educational Programs

Since the late 1960's, a new era of aviation and aerospace magnet educational program implementation has emerged. By the 1990s, many of the nation's public school systems have implemented aviation and aerospace instructional program which have proven themselves to be successful vehicles for instilling in students the knowledge, skills, and attitudes necessary to either enter rewarding careers in aviation and aerospace industries or to pursue post-secondary educational opportunities (Alicia Coro, 1994). She also stressed the importance of using technology based hands-on problem-solving activities to effectively improve student academic achievement and enhance student motivation. The utilization of hands-on problem-solving activities has added to the motivational value of various aerospace education curricula.

The Survey of Magnet Schools Analyzing a Model for Quality Integrated Education (1983) was the first national survey of aviation magnet schools. Eighteen schools completed the survey. Schools included both new and long-standing programs

with a general emphasis on responding to community and industrial needs in the area of career education. All programs surveyed were shown to have low drop-out rates and increasing or stable enrollments. Most schools surveyed included local businesses and industries in program implementation and all schools surveyed utilized Federal Aviation Administration resources. In addition, most schools surveyed had active advisory committees and program articulation with feeder schools and colleges. Community awareness for program initiatives was shown to be generally high, with partnerships and internship programs common. It was also shown that proactive leadership played an important role in levels of program success. Although the survey showed that magnet school programs can be effective in improving educational quality and assisting with school desegregation in urban schools, programs throughout the nation were shown to vary widely in quality and effectiveness. Even though variations in the schools surveyed as evident, with the information derived, a conceptual model of an "ideal design" for an urban magnet aerospace program of instruction could be constructed.

In the "ideal magnet aerospace program", district wide access for students is available on the basis of voluntary preference. The curricular theme is definite, appealing, and distinctive, and the school principal and staff are willing to provide, and capable of providing instruction within the chosen theme. In addition, in an ideal program, school districts must periodically review the curriculum for rigor, fairness, and accountability. It is also crucial that school facilities are placed geographically on sites chosen for their racial, ethnic, and socioeconomic neutrality. In addition, student enrollment must reflect the demographics of the communities it serves. Transportation to and from the school

program must be provided for, and school security must be adequate. Finally the ideal aerospace magnet program must be properly funded during early implementation phases if success is to be encouraged. From survey analyses, Blank, Dentler, Baltzell, and Chabotar (1983) developed a ten-step strategy for developing effective magnet school aerospace education programs:

- 1. Identify district education problems to be addressed,
- 2. Establish the district's desegregation and education objective for the program,
- 3. Design the overall strategy for meeting desegregation and education objectives,
- 4. Appoint strong leaders for program implementation,
- 5. Identify and develop program resources,
- 6. Design individual school programs and select staff,
- 7. Write and develop curriculum,
- 8. Program and school publicity and recruiting,
- 9. Motivating and organizing students and staff, and
- 10. Maintain support for program.

Achievement, Gender, and Race/Ethnicity

The use of magnets for the purpose of school desegregation is over fifteen years old, and according to Gordon (1989), has yet to be proven effective. No desegregation planner should disclaim the desirability of desegregating a school system, because the existence of schools is for the purpose of teaching and learning. Learning and academic achievement should be for all students and in today's society, there is a need to bridge the achievement gap that lies along the racial and gender lines.

Since the report, A Nation at Risk, political and educational leaders have been involved in various attempts to reform and restructure American education. In 1989, the Governors of the nation, met in Virginia and committed themselves to a nationwide

program of educational reform. They developed six Goals to guide their efforts for improving the nation's educational system. There is a continued impetus to improve student achievement. Goal Three addresses student achievement and citizenship. According to Goal Three,

> "By the year 2000, all students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter including English, mathematics, science, foreign languages, civics, and government, economics, arts, history, and geography, and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning and productive employment in our nation's modern economy" (Goals Panel, 1991 p.2).

A stated objective of this goal is the academic performance scores for minority students will more closely mirror that of the student population as a whole.

The progress of the nation has been charted for five years, using 1990's data as baseline measures of progress. The year 1990 is also the year that the National Education Goals were officially adopted (Goals Panel, 1995). There has been some progress since the initial year. The 1995 Scorecard, which is a midway point, provides an opportunity to reflect on the progress that has been made and determine what needs to be done. The Scorecard indicates that national performance has improved in five areas but unfortunately declined in seven (Goals Panel, 1995).

Measuring students' progress toward higher achievement has been the purpose of the National Assessment Educational Progress (NAEP) since its beginning in 1969. In 1994 trend assessments in science, mathematics, reading, and writing have been analyzed and reported. Trends in average performance differences between white and black students, white and Hispanic students are noted (NAEP, 1994). NAEP analyzed student

achievement trends in three age subgroups: 9, 13, and 17; and three grade level subgroups: 4, 8, and 11.

Based on 1994 data, there has been an overall pattern of narrowing gaps in mathematics and reading between black and white students. Both the 1970 and 1994 gaps for 13 year-olds in reading were not significantly different. The gap between black and white males decreased slightly until 1986; since that time, it returned to a non-significant level. The average writing scores' gap remained relatively the same at each grade level. Despite the narrowing of the gap, white students at all grades and ages assessed had average scores in each area that were higher than the average scores of black students. The same assessment was made for trend analysis between white and Hispanic students (NAEP, 1994).

On average, Americans tend to stay in school longer than anyone in the world. The typical American worker has attended more years of school, and is more likely to have graduated from college than his or her counterpart in almost any other country (Education Commission of the States, 1995). Forgione (1997) reported findings that were contrary to popular myths:

- United States' eighth graders have more hours of instruction than other countries,
- United States' eighth graders do as much homework as other countries; and
- Japanese eighth graders watch as much television as U. S. eighth graders (Forgione, 1997).

However, American students continue to perform poorly in comparison to their international peers. One way of gauging overall performance is to compare students in the United States with other countries which compete in a global economy. This type of

comparison is a premier indicator for business leaders. Studies in the past have shown that younger American students do better by international standards than older students and slightly better in reading than in math and science (Forgione, 1997).

The Third International Math and Science Study (TIMSS) of 1995 was coordinated by the International Association for the Evaluation of Educational Achievement (IEA). This study was considered to be the world's largest, most comprehensive, and most rigorous international comparison. There were more than a half million students tested at three grade levels in 41 countries, which is far more than any previous study (Forgione, 1997). TIMSS compared student achievement, teaching, curricula and the lives of students and teachers.

Because economic progress relies on the expertise of mathematicians, scientists, doctors, and engineers, in additions to national differences in average performance economists often ask how well America's best students measure up to international standards. According to TIMSS, both Korean and Japanese eighth graders were more than six times as likely as American eighth graders to be among the top ten percent of all math students from 41 countries who participated. More specifically:

- The U. S. was below average in mathematics - 20 countries outperformed the U. S.; 13 countries performed similar to the U. S.; and 7 countries performed below the U. S.
- In comparison with the major trading partners, Japan, France, Canada performed above the U. S. in eighth grade mathematics, and England and Germany performed similar to the U. S.
- The U. S. was above average in science - 9 countries outperformed the U. S.; 16 countries performed similar to the U. S.; and 15 countries performed below the U. S.
- In comparison with the major trading partners, Japan performed above the U. S. in eighth grade science, England, Canada, and Germany performed similar to the U. S., and France performed below the U. S. (Forgione, 1997).

The TIMSS report also concluded that mathematics taught in the U. S. is not as challenging as it is in other countries; and what is taught in the eighth grade, is generally taught in the seventh grade in other countries. U. S. teaches procedures and not understanding, and teachers in this country rarely develop mathematical concepts (Forgione, 1997).

Parent Perceptions and School Effectiveness

A crucial factor in a child's schooling is the impact of the parents' attitudes toward school. The home environment has been shown to have a direct influence on increasing affective, behavioral, and cognitive learning (Wahlberg, 1984). The effectiveness of a school and the district as a whole, determine what happens in the classroom. The perceptions of parents on the effectiveness of a school is paramount.

What determines a school's effectiveness? The Effective Schools Movement in the United States has steadily grown and emerged to be one of the most respected methods of evaluating school improvement (Murray, 1995). Ronald Edmonds (1982) identified an effective school as one which there is:

- Strong leadership
- An orderly, humane climate
- Frequent monitoring of student progress
- High expectations and requirements for all students, and
- Focus on teaching important skills to all students.

Several researchers and educators expanded the original list to include characteristics such as:

- Safe and orderly environment that is not oppressive and is conducive to teaching and learning,

- A clear school mission through which staff members share a commitment to instructional goals, priorities, assessment procedures, and accountability,
- Instructional leadership by a principal who understands and applies the characteristics of instructional effectiveness,
- A climate of high expectations in which the staff members demonstrate that all students can master basic skills,
- Increased student time-on-task,
- Frequent monitoring of student progress, and improved student performance and instruction based on the results, and
- Positive home-school relations in which parents support the school's basic missions and play an important part in helping achieve it (Levine and Ornstein, 1993; Levine, 1993 and Butterworth, 1992).

These characteristics became an integral part of the general effective schools' correlates to help determine student success and to identify major concerns.

Effective schools recognize that parents are partners, not adversaries. Administrators and teachers should seek to involve parents in meaningful ways in their children's education. Parents, will in turn, volunteer their time and talents. Because effective schools are not the same, and may be very of what the school's mission and their role in its fulfillment. This will lead to positive attitudes, perceptions and a productive working relationship within the school. Gauthier and other researchers believe that in effective home-school relations, "parents understand and support the basic mission of the school and are made to feel that they have an important role in achieving this mission" (Gauthier, Pecheone, and Shoemaker, 1985 p.391).

In a recent environmental survey of middle school parents (Foster-Harrison and Bullock, 1997), parents were asked to identify qualities they believed were important for the school to be considered inviting, warm, and friendly for parents and students. The number one choice for parents of six, seven, and eight grade students is a "clean, neat building". Eighth grade parents continued by indicating that "a welcome sign, examples

of students' work on the walls, and directions to the office" are qualities for a friendly, inviting, and warm school (Foster et al., 1997).

The National Commission on Excellence (1987) conducted a study which involved approximately 1,000 parents of 10 to 14-year olds. The question was asked, "What matters to them in reference to their children and school?" (Peel and Foster-Harrison, 1997) Similar answers were received, which are summarized as:

- "I want to know that my child is safe!
- I want to know that my child knows at least one adult well enough to go to if support is needed.
- I want to know that the school is concerned about helping my youngster develop constructive friendships.
- I expect that the school will provide my youngster with opportunities to get involved in activities.
- When my child comes home from school, I want to know there have been enough good experiences to want to return the next day.
- I want to know the school is teaching what my child will need to be prepared for high school.
- I want teachers to keep me informed on progress.
- When I visit the school, I want to feel welcomed by teachers and administrators.
- I'd like to know that the school is making every effort to provide opportunities for parents to be informed about what to expect from youngsters over these years" (p.43).

Blank (1984), in a study of magnet schools, found evidence that magnet schools create higher levels of parent and community interest than do other schools. Levine et al. (1980) found that magnet schools have more parent support and involvement because they are voluntary and because parents that enroll their students tend to be more interested in their child's education. In Blank's study, he found that the level of involvement of magnet school parents was only slightly higher than that of other parents. However, their level of satisfaction with the quality of education provided by the magnet schools was consistently higher (Blank, 1984).

Summary

Magnet schools are designed to offer a curriculum or methods of instruction that is so attractive that students will choose to attend rather than be force to do so as in the case of mandatory busing. Magnet schools were created as an instrument for desegregation/integration purposes and are most effective when they are used as a part of a district wide effort in this concern.

Acceptance of the magnet school concept has been widespread. Green (1989) reported that it is due to four major reasons:

- an attractive alternative to force busing,
- increased curricular offering and varied teaching methods,
- interest in quality public education, and
- career education (Green, 1989).

While magnet programs provide urban districts with the channels of helping desegregate schools through voluntary choice initiatives, other benefits include:

- increased academic performance of all students,
- decreased disparities in achievement between racial, ethnic, and gender groups,
- increased parental and community involvement and support for schools, and
- increased effectiveness of staff development programs.

In planning for implementation of magnet schools or programs, it is paramount to have input from the key stake-holders - parents, students, teachers, principals, and district curriculum personnel if the magnet schools are to meet community needs and expectations.

Parent and community interest and participation in magnet schools is higher than in non-magnet schools. Parents welcome the magnet schools because they afford them a choice in their child's educational opportunities. As a result, parent satisfaction of their

child's education in magnet schools is consistently higher that than of non-magnet school parents.

In the following chapter, Chapter 3, Methodology, the procedures to be followed during the study will be outlined. The purpose of the methodology section is to acquaint the reader with a description of the research methodology used in this study, a description of the subjects under study, descriptions of the instruments used to measure dependent variables, and a description of the statistical procedures to be followed within the study.

CHAPTER III
METHODOLOGY

Introduction

As a part of the magnet school initiative within a large school in the southeastern region of the United States, the Aerospace Technology Magnet Program was implemented at one of four middle schools within the division. The purpose of this causal-comparative study was to determine if the Aerospace Technology Magnet Program (ATMP) is effecting achievement, attendance, and the perceptions of parents. The variables identified and chosen for this study were selected after a review of literature on magnet school program and achievement was completed. The following design was proposed to assess the degree to which the Aerospace Technology Magnet Program at Hunt-Mapp Middle School has been effective in Portsmouth Public Schools. This chapter provided information related to the subjects to be studied, data that was collected, and how it was analyzed.

Subjects

The school district consisted of three high schools, four middle schools, nineteen elementary schools, and three special centers. The student population studied was selected from those eighth grade students that attended the middle school within the district which had the Aerospace Technology Magnet Program as a part of overall educational program. Data was collected for eighth grade students enrolled in the school during the 1996-97 school year. This particular middle school had an eighth grade enrollment of 373 students. The majority of the eighth grade students were African-

American (75%). The second largest racial group was White (25%). Females represented 51% of the eighth grade population (193), and 49% of the eighth graders were males (179). There were 12 eighth grade classes, four of which were included in the magnet program. Seventy-one percent of the students at the school received free or reduced lunch.

Data was collected on eighth grade students enrolled in the magnet program and those eighth grade students not enrolled. Data was collected indicating each student's socio-economic status. Demographic information was collected on gender, race/ethnicity, and the students' sixth grade Literacy Passport Test scores. Parent data was collected from a survey that was sent home to a sample of parents of students that attend Hunt-Mapp Middle School.

Statistical Analyses

The effectiveness of the Aerospace Technology Magnet Program was objectively measured relative to its effect on academic achievement, attendance and perceptions of the program. Statistical analyses focused on three different independent variables which consist of group membership, gender, and race and three dependent variables - achievement, attendance, and perceptions of the program. Independent variables were measured on the nominal scale of measurement, and the dependent variables were measured on the interval scale of measurement. Socio-economics status (SES) and Literacy Passport Test (LPT) scores were used as a covariates because of their relationship to the dependent variables.

All tests for significance were set at the .05 predetermined alpha level of probability. The data was reported in narrative and tabular form. Statistical Package for the Social Sciences (SPSS) was used to process all data because of its comprehensive and integrated capabilities in managing, analyzing and displaying data (Gall, Borg, and Gall, 1996). The following sections of this chapter list the types of analyses and procedures for each research questions stated in Chapter I.

Racial Balance

How effective has the Hunt-Mapp Middle School Magnet Program been in mirroring the balance of the racial/ethnic student composition of the district?

Procedure. A chi square analysis, non-parametric statistical test, was used to examine the effectiveness of the Hunt-Mapp Middle Magnet Program in mirroring balance of the racial/ethnic composition of the district. The percentage of students enrolled in the program from 1993-94 through 1996-97 was examined for racial composition with specifically the black and white students in the program. Data were collected for each year on the total number of students in membership by the September 30th count. It was compared with the racial composition of that of the three other middle schools in the district to find out if the percentages of the program mirrors that of the district. The chi-square analysis was used to make this determination between expected and observed frequencies at the predetermined alpha level of .05.

Participation

Is there a difference in the amount of participation of students in the Aerospace Technology Magnet Program at Hunt-Mapp Middle School?

Procedure. Descriptive data were gathered to explain the amount of participation over the four years that the magnet program was in existence at Hunt-Mapp Middle School. Information was also gathered on the number of students that were on the waiting list for the program.

Achievement

In determining the effectiveness of Hunt-Mapp Middle School Magnet Program in improving, the following research questions was stated:

How well do students in the Hunt-Mapp Middle School Magnet Program, black and white students, and male and female students perform academically as measured by the Stanford Achievement Test?

a. Is there a statistically significant difference in math achievement on the Stanford Achievement Test (after controlling of the initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group membership?

b. Is there a statistically significant difference in science achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group membership?

c. Is there a statistically significant difference in reading achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group membership?

d. Is there a statistically significant difference in language arts achievement on the Stanford Achievement Test (after controlling for the initial difference in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group membership?

e. Is there a statistically significant difference in social studies achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group?

Procedure. The Stanford Achievement Test Form 9-TA, developed by Hartcourt-Brace Education Measurement and selected for statewide administration, was used because of its strong reliability and validity properties. Extensive item calibration was employed by the developers of the Stanford Achievement Test (SAT) to develop scaled scores which were comparable across forms and levels of the test. Reliability studies of the SAT have consistently reported high reliability. Of the 280 Kuder-Richardson coefficients reported, 68% are above .90 and 97% are above .80. SAT validity was achieved by the use of statistical procedures to eliminate items that did not meet predetermined psychometric specifications (Conoley and Impara, 1995). A panel of minority-group educators reviewed the tests to evaluate possible ethnic, sex, socio-economic, cultural, or regional bias.

The test data were collected in the summer of 1997 based on the administration that was collected in the spring of 1997. Analysis employed were five separate three-way ANCOVA's for the dependent variables. The dependent variables are, math achievement, science achievement, reading achievement, language arts achievement, and social studies

achievement. Independent variables were group membership, (those enrolled in Hunt-Mapp Middle School Magnet Program and those not enrolled in the program), gender (male and female), and race/ethnicity (black, white). The covariates in this study were socio-economic status and the LPT scores.

Attendance

The following research questions were answered through analysis of the attendance data:

How effective is the Aerospace Technology Magnet Program in increasing student attendance?

a. Is there a statistically significant difference in attendance (after controlling for initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group?

Procedure. The 1996-97 attendance data was obtained for students enrolled in the Aerospace Technology Magnet Program for the period of 1993-94 through 1996-97 for student not enrolled in the program. The average attendance of the groups were compared. A three-way ANCOVA was used to determine if there is a significant difference.

School Effectiveness

How effective is the Aerospace Technology Magnet Program relative to the perceptions of parents to the correlates of school effectiveness?

Procedure. To address this area a survey was developed to secure data concerning perceptions of attitude towards how effective the Aerospace Technology Magnet Program is at meeting its goals. It will test the null hypothesis: There is no statistical significant difference between parents (magnet and non-magnet) and gender (male, female) with respect to perceptions of the magnet program.

Existing school effectiveness survey instruments were reviewed and the researcher decided on Dayton, Ohio's survey, with modification. To ensure content validity, a group of educators, the researcher (assistant principal), supervisor of assessment and evaluation, and director of researcher and student services, independently placed the items on the survey in three categories: teacher effectiveness/expectation, safe and orderly climate, and home school partnership. A discussion was done on certain items and it was determined that a fourth category, instructional leadership, was needed based on the effective school correlates (Levine, 1990). The items were reviewed again which resulted in 100% agreement. The items were tallied to see how many were in each category.

Eight items were associated with teacher effectiveness/expectation; safe and orderly climate had six; and five items were linked to home school partnership. There were only two items for instructional leadership. The group identified 12 potential items

in order to have more items in the instructional leadership category. The items were agreed upon for the additional statements under instructional leadership. The survey was developed using a five-point grading Likert scale, which will have more discrimination among the items.

The survey instrument was reviewed by seven experts in order to gain feedback on the domains and the structure. Final revisions were then made to the survey instrument. For each item, descriptive statistics (e.g. means and percents) were provided for Hunt-Mapp Middle School overall and those overall in the magnet program and those not in the magnet program. A cover letter was created to accompany the survey which was sent home to a 20% random sample of parents at Hunt-Mapp Middle School.

A t-test was performed to determine if there was a statistically significant difference between the perceptions of the parents of students in the magnet program at Hunt-Mapp Middle School and the parents of students not enrolled in the magnet program.

Summary

The purpose of this study was to determine the effectiveness of participation in the Aerospace Technology Magnet Program at Hunt-Mapp Middle School. This purpose of this chapter was to acquaint the reader with a description of the research methodology which was used in this study, a description of the subjects under study, descriptions of the instruments used to measure the dependent variables, and a description of the statistical procedures that was followed. After reviewing the literature on magnet school program

and achievement, variables were identified and selected for this study. A chi square analysis was used to determine the effectiveness of the magnet program in mirroring the racial/ethnic balance of the school district. A series analysis of covariance tests were employed in measuring the differences in student achievement and attendance. Descriptive data and a t-test employed to explain results from a parent survey based on their perceptions of the school's effectiveness. Chapter four presents the results of the analyses and explanation of charts and tables.

CHAPTER IV
ANALYSIS OF THE DATA

Introduction

The primary purpose of this study was to determine the effects of the Aerospace Magnet Program at Hunt-Mapp Middle School on eighth grade student performance as it relates to attendance and academic achievement. A secondary was to determine the perceptions of parents of Hunt-Mapp Middle School as viewed by the correlates of effective schools research.

This chapter will provide a background of descriptive characteristics of students upon which data was obtained. Also research questions and corresponding null hypotheses upon which analyses were conducted will be detailed.

Descriptive Analysis

Overall Sample

Data were collected on 212 eighth grade students that attended Hunt-Mapp Middle School during the 1996-96 school year. Eighty-nine (42%) of those students were involved in the magnet program and 123 (58%) were non-magnet students. Of the 212 students, 124 (58.5%) were on free lunch, 12 (5.7%) were on reduced lunch and 76 (35.8%) students paid for their lunch. There were 102 (48.1%) males and 110 (51.9%) females, with 154 (72.6%) black students and 58 (27.4%)white students. There was one Asian student that was enrolled in Hunt-Mapp Middle School for grades 6-8 and for the purposes of this study, the student was included with the white students (See Table 5).

Table 5
Descriptive Analysis of Overall Student Sample

	N (%)	N (%)	N (%)	Total
Group	Magnet	Non-Magnet		
	89 (42%)	123 (58%)		212
Gender	Male	Female		
	102 (48.1%)	110 (51.9%)		212
Race/Ethnicity	Black	White		
	154 (72.6%)	58 (27.4%)		212
SES	Free Lunch	Reduced Lunch	Paid Lunch	
	124 (58.5%)	12 (5.7%)	76 (35.8%)	212

The total LPT scores yielded a mean score of 790.56, with a standard deviation of 46.62. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 38.59 (sd 13.72), science component mean score of 47.34 (sd 19.01), reading component mean score of 47.10 (sd 17.28), language arts component mean score of 44.27 (sd 18.63), and a social studies component mean score of 52.26 (sd 17.34). Overall, the students were absent from school on an average of 7.69 days out of 181 days of attendance (See Table 6).

Table 6
Statistical Frequency Data

	Mean	Standard Deviation
Total LPT Scores (Covariate)	790.56	46.62
Stanford Achievement Test		
Math	38.59	13.72
Science	47.34	19.01
Reading	47.10	17.28
Language Arts	44.27	18.63
Social Studies	52.26	17.34
Absences	7.69	11.71

There were 40 (44.9%) male students involved in the magnet program and 49 (55.1%) female students. Sixty-two (50.4%) males and 61 (49.6%) female students were non-magnet students in the study. The total number of blacks that were enrolled in the magnet program were 56 (62.9%) and 33 (37.1%) white students in the magnet program. Thirty-three (37.1%) students in the magnet program received free lunch with 91 (74.0%) of non-magnet students receiving free lunch. Both the magnet and the non-magnet programs had 6 students each on reduced lunch status, yielding a percentage of 6.7 for the magnet students and 4.9 for the non-magnet students. Fifty (56.2%) magnet students paid for their lunch and 26 (21.1%) non-magnet students paid (see Table 7).

Table 7
Analysis by Group Membership

		Magnet	Non-Magnet
Gender	Male	40 (44.9%)	62 (50.4%)
	Female	49 (55.1%)	61 (49.6%)
Race/Ethnicity	Black	56 (62.9%)	98 (79.7%)
	White	33 (37.1%)	25 (20.3%)
SES	Free Lunch	33 (37.1%)	91 (74.0%)
	Reduced Lunch	6 (6.7%)	6 (4.9%)
	Paid Lunch	50 (56.2%)	26 (21.1%)

For the magnet students, the total LPT score yielded a mean of 820.52 with a standard deviation of 29.39. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 47.29 (sd 11.95), science component mean score of 58.31 (sd 15.33), reading component mean score of 57.38 (sd 15.20), language arts component mean score of 57.31 (sd 13.03), and a social studies component mean score of 62.84 (sd 14.45). Overall, the students were absent from school on an average of 2.62 days out of 181 days of attendance (See Table 8).

Table 8
Statistical Frequency Data For Magnet Students

	Mean	Standard Deviation
Total LPT Scores (Covariate)	820.52	29.39
Stanford Achievement Test		
Math	47.29	11.95
Science	58.31	15.33
Reading	57.38	15.20
Language Arts	57.31	13.03
Social Studies	62.84	14.45
Absences	2.62	3.53

The total LPT score yielded for the non-magnet students resulted in a mean score of 765.26, with a standard deviation of 43.43. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 31.81 (sd 10.92), science component mean score of 38.78 (sd 17.17), reading component mean score of 39.08 (sd 14.34), language arts component mean score of 34.10 (sd 15.83), and a social studies component mean score of 44.00 (sd 14.77). Overall, the students were absent from school on an average of 11.35 days out of 181 days of attendance (See Table 9).

Table 9
Statistical Frequency Data For Non-Magnet Students

	Mean	Standard Deviation
Total LPT Scores (Covariate)	765.26	43.43
Stanford Achievement Test		
Math	31.81	10.92
Science	38.78	17.17
Reading	39.08	14.34
Language Arts	34.10	15.83
Social Studies	44.00	14.77
Absences	11.35	14.00

Selected Sample

Some students were deleted from the final analysis of data because of missing data. This deletion included students who did not take all portions of the Literacy Passport Test or all components of the Stanford Achievement Test because of absences. This resulted in a total of 177 (83%) of the initial 212 eighth grade students involved in the study. Eighty-four (47.5%) of those students were enrolled in the magnet program at Hunt-Mapp Middle School and 93 (52.5%) were non-magnet students. There were 88 (49.7%) male students and 89 (50.3%) females students with 128 (72.3%) black students and 49 (27.7%) white students. Ninety-five (53.7%) students received free lunch, 12 (6.8%) received reduced lunch, and 70 (39.5%) students paid for their lunch (See Table 10).

Table 10
Descriptive Analysis of Selected Student Sample

	N (%)	N (%)	N (%)	Total
Group	Magnet	Non-Magnet		
	84 (47.5%)	93 (52.5%)		177
Gender	Male	Female		
	88 (49.7%)	89 (50.3%)		177
Race/Ethnicity	Black	White		
	128 (72.3%)	49 (27.7%)		177
SES	Free Lunch	Reduced Lunch	Paid Lunch	
	95 (53.7%)	12 (6.8%)	70 (39.5%)	177

Of the 177 students, the total LPT score yielded a mean score of 790.33, with a standard deviation of 46.71. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 39.52 (sd 13.68), science component mean score of 48.86 (sd 18.85), reading component mean score of 48.20 (sd 17.29), language arts component mean score of 45.25 (sd 18.91), and a social studies component mean score of 52.99 (sd 17.31). Overall, the 177 students were absent from school on an average of 6.51 days out of 181 days of attendance (See Table 11).

Table 11
Statistical Frequency Data For Overall Selected Students

	Mean	Standard Deviation
Total LPT Scores (Covariate)	790.33	46.71
Stanford Achievement Test		
Math	39.52	13.68
Science	48.86	18.85
Reading	48.20	17.29
Language Arts	45.25	18.91
Social Studies	52.99	17.31
Absences	6.51	9.39

For the remaining magnet students, the total LPT score yielded a mean of 820.32 with a standard deviation of 29.27. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 47.48 (sd 11.90), science component mean score of 58.47 (sd 15.35), reading component mean score of 57.49 (sd 15.26), language arts component mean score of 57.46 (sd 13.03), and a social studies component mean score of 62.75 (sd 14.52). Overall, the students were absent from school on an average of 2.41 days out of 181 days of attendance (See Table 12).

Table 12
Statistical Frequency Data For Selected Magnet Students

	Mean	Standard Deviation
Total LPT Scores (Covariate)	820.30	29.27
Stanford Achievement Test		
Math	47.48	11.90
Science	58.47	15.35
Reading	57.49	15.26
Language Arts	57.46	13.03
Social Studies	62.75	14.52
Absences	2.41	3.26

The total LPT score yielded for the non-magnet students resulted in a mean score of 763.26, with a standard deviation of 42.90. Of those students taking the Stanford Achievement Test, the math component yielded an overall mean score of 32.34 (sd 10.98), science component mean score of 40.19 (sd 17.51), reading component mean score of 39.81 (sd 14.56), language arts component mean score of 34.21 (sd 16.47), and a social studies component mean score of 44.17 (sd 14.74). Overall, the students were absent from school on an average of 10.21 days out of 181 days of attendance (See Table 13).

Table 13
Statistical Frequency Data For Selected Non-Magnet Students

	Mean	Standard Deviation
Total LPT Scores (Covariate)	763.26	42.90
Stanford Achievement Test		
Math	32.34	10.98
Science	40.19	17.51
Reading	39.81	14.56
Language Arts	34.21	16.47
Social Studies	44.17	14.74
Absences	10.21	11.40

Statistical Analyses

From among the possible tests conducted by this study, null hypotheses were proposed, based upon the review of the literature on magnet schools, student achievement, and effective schools.

Racial Balance

There is no effectiveness of Hunt-Mapp Middle School Aerospace Technology Program in mirroring the district in its enrollment patterns by race/ethnicity.

Over the past five years, the enrollment patterns by race/ethnicity within the district have increased slightly by two percent in black students from 66% to 68% and decrease in white students from 33% to 31%. The percentage of students that were classified as 'other', represented Asian, Hispanic and Native American counted for one percent of the district's student enrollment consistently over the five years. (See Table15)

The enrollment patterns at Hunt-Mapp Middle School by race/ethnicity have fluctuated over the years, with a range of 77% to 72% of those enrolled being black students, and 23% to 26% of white students, and .1% to 2% classified as other. Within the magnet program at Hunt-Mapp Middle, black student enrollment decreased in 1995-96 to 38% while the white enrollment during the same year increased to 62%. Overall the enrollment of the black students were higher than the white students over the five year period. (see Table 14)

Table 14
Student Enrollment by Race/Ethnicity: 1992-93 to 1996-97

	1993-94	1994-95	1995-96	1996-97
District				
Black	11,980	12,089	12,159	12,085
	67%	68%	68%	68%
White	5,728	5,476	5,497	5,482
	34%	31%	31%	31%
Other	213	214	237	278
	1%	1%	1%	1%
TOTAL	17,921	17,779	17,891	17,845
Hunt-Mapp				
Black	940	952	942	830
	77%	77%	74%	72%
White	278	274	324	302
	22%	22%	25%	26%
Other	8	15	18	20
	.1%	1%	1%	2%
TOTAL	1,226	1,241	1,284	1,154
Magnet				
Black	80	201	153	191
	51%	59%	38%	53%
White	77	142	251	167
	49%	41%	62%	47%
Other				
TOTAL	157	343	404	358

Although the magnet program at Hunt-Mapp Middle School did not mirror the district, the percentage of white students increased. This was in keeping with the initial proposal of Portsmouth Public Schools in 1993, “to eliminate, reduce, or prevent

minority group isolation in secondary schools with substantial portions of minority students" (p. 25).

Participation

There is no difference in the amount of participation of students in the magnet program at Hunt-Mapp Middle School over the years.

Enrollment is leveled at approximately 30 students per class, which has created a waiting list because of teacher personnel. As students leave the program for different reasons such as moving, failure to maintain the expected criteria, students from the list are permitted into the program. Table 15 shows the number of students per year that have on the waiting list at the beginning of the school year.

Table 15
Waiting List of Magnet Program Students by Year

Year	Number of students and explanation
1993 - 94	18 students - first year and limited teacher personnel
1994 - 95	10 students - additional teacher at the sixth grade level
1995 - 96	8 students - a new 4-member team was added and this increased the seventh grade to eighth grade level
1996 - 97	15 students

Analysis of Covariance

The data used in this study was based on the results of the Stanford Achievement Test administered to the eighth students at Hunt-Mapp Middle School during the spring of the 1996-97 school year and the attendance data during the same year. Six three-way ANCOVA's were employed for each component of the Stanford Achievement Test and attendance. Therefore the dependent variables are math achievement, science achievement, reading achievement, language arts achievement, social studies

achievement, and attendance. Independent variables were gender (male and female), group membership (magnet and non-magnet), and race/ethnicity (black and white). The covariates in this study were SES and LPT scores.

Math achievement. The overall research question for math achievement was, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet students), and race/ethnicity (black and white) with respect to math achievement on the Stanford Achievement Test after controlling for the initial differences in SES and LPT scores? A total of seven null hypotheses were related to the overall research question, they were:

> There is no statistically significant difference in math achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:
>
> - gender (male and female)
> - race/ethnicity (black and white)
> - group membership (magnet and non-magnet)
> - group membership x race/ethnicity
> - gender x group membership
> - race/ethnicity x gender
> - gender x race/ethnicity x group membership.

The first analysis of covariance (ANCOVA) procedure examined math scores to test the seven corresponding null hypotheses. The ANCOVA summary table for math achievement is shown in Table 16. The data were examined to determine if any main effects, two-way or three-way interactions were significant.

Table 16
Analysis of Covariance for Math Achievement

	Source	SS	df	MS	F	Sig.
Covariates	LPT	2255.81	1	2255.81	20.46	.00*
	SES	196.55	1	196.55	1.78	.18
Main	Gender	29.03	1	29.03	.263	.60
Effects	Race/Ethnicity	264.67	1	264.67	2.401	.12
	Group	1505.77	1	1505.77	13.66	.00*
2-way	Group x	7.30	1	7.30	.06	.79
interaction	Race/Ethnicity					
	Group x Gender	155.94	1	155.94	1.41	.23
	Race/Ethnicity	.33	1	.33	.00	.95
	x Gender					
3-way	Gender x	24.97	1	24.97	.22	.63
interaction	Race/Ethnicity					
	x Group					
Within		18408.81	167	110.23		
Total		32967.65	176	187.31		

*$\wp < .05$

It was hypothesized that there would be no significant difference at the .05 alpha level in math achievement of students enrolled in the magnet program and that are not enrolled in the magnet program at Hunt-Mapp Middle School. This hypothesis was not substantiated. In other words, students involved in the magnet program achieved higher in math than students not involved in the program. Therefore, it was determined that group membership was a significant main effect. The magnet students exhibited significantly greater increases in math achievement than the non-magnet students. There were no differences noted in gender or race/ethnicity with respect to math achievement

on the Stanford Achievement Test. Table 17 shows a summary of the null hypotheses that were rejected or supported.

Table 17
Summary of null hypotheses with respect to math achievement

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Fail to reject
2. There is no statistically significant difference in race/ethnicity (black and white).	Fail to reject
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Fail to reject

*$\wp < .05$

Science achievement. The overall research question for science achievement was, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet), and race/ethnicity (black and white) with respect to science achievement on the Stanford Achievement Test after controlling for the initial differences in SES and LPT scores? Seven null hypotheses were related to the overall research question, they were:

> There is no statistically significant difference in science achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:
>
> - gender (male and female)
> - race/ethnicity (black and white)
> - group membership (magnet and non-magnet)
> - group membership x race/ethnicity
> - gender x group membership

- race/ethnicity x gender
- gender x race/ethnicity x group membership.

The analysis of covariance (ANCOVA) procedure examined science scores to test the seven corresponding null hypotheses. The ANCOVA summary table for science achievement is shown in Table 18. The data were examined to determine if any main effects, two-way or three-way interactions were significant.

Table 18
Analysis of Covariance for Science Achievement

	Source	SS	df	MS	F	Sig.
Covariates	LPT	8166.05	1	8166.05	45.81	.00*
	SES	63.10	1	63.10	.35	.55
Main	Gender	1803.28	1	1803.28	10.11	.00*
Effects	Race/Ethnicity	2571.85	1	2571.85	14.43	.00*
	Group	929.18	1	929.18	5.21	.02*
2-way	Group x	65.13	1	65.13	.36	.54
interaction	Race/Ethnicity					
	Group x Gender	151.72	1	151.72	.85	.35
	Race/Ethnicity	145.10	1	145.10	.81	.36
	x Gender					
3-way	Gender x	751.56	1	721.56	4.04	.04*
interaction	Race/Ethnicity					
	x Group					
Within		29765.20	167	178.23		
Total		62536.33	176	355.32		

*$\wp < .05$

The null hypothesis predicted no significant difference at the .05 alpha level in science achievement between eighth grade students enrolled in the magnet program at Hunt-Mapp Middle School and those eighth grade student not in the magnet program. This hypothesis was not supported by the data and, therefore was rejected. The average

adjusted science score for magnet and non-magnet students were 58.47 and 40.19 respectively. Magnet students performed significantly better in science than the non-magnet students. What was also interesting is that there was a significant difference found also in the gender and race/ethnicity variables. Female students had an adjusted mean score in science of 45.53, and the male students with a higher mean score of 52.24. White students performed significantly higher than black students with an adjusted mean scores of 61.65 over 43.97 for black students. Therefore, there was a significant three-way interaction with respect to science achievement. White male students in the magnet program achieved higher in science than all other subgroups. Table 19 shows a summary of the null hypotheses that were rejected and those that were supported.

Table 19
Summary of null hypotheses with respect to science achievement

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Reject*
2. There is no statistically significant difference in race/ethnicity (black and white).	Reject*
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Reject*

*$\wp < .05$

Reading achievement. The overall research question for reading achievement was, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet), and race/ethnicity (black and white) with respect to reading achievement on the Stanford Achievement Test after controlling for the initial

differences in SES and LPT scores? There were a total of seven null hypotheses related to the overall research questions listed below:

> There is no statistically significant difference in reading achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:
>
> - gender (male and female)
> - race/ethnicity (black and white)
> - group membership (magnet and non-magnet)
> - group membership x race/ethnicity
> - gender x group membership
> - race/ethnicity x gender
> - gender x race/ethnicity x group membership.

The analysis of covariance (ANCOVA) procedure examined reading scores to test the seven corresponding null hypotheses. The ANCOVA summary table for reading achievement is shown in Table 20. The data were examined to determine if any main effects, two-way or three way interactions were significant.

Table 20
Analysis of Covariance for Reading Achievement

	Source	SS	df	MS	F	Sig.
Covariates	LPT	7994.52	1	7994.52	47.89	.00*
	SES	141.24	1	141.24	.84	.35
Main	Gender	2.19	1	2.19	.01	.90
Effects	Race/Ethnicity	367.20	1	367.20	2.20	.14
	Group	676.14	1	676.14	4.05	.04*
2-way	Group x	1.87	1	1.87	.01	.91
interaction	Race/Ethnicity					
	Group x Gender	6.27	1	6.27	.03	.84
	Race/Ethnicity	48.65	1	48.65	.29	.59
	x Gender					
3-way	Gender x	100.57	1	100.57	.60	.43
interaction	Race/Ethnicity					
	x Group					
Within		27874.06	167	166.91		
Total		52659.15	176	299.20		

*$\wp < .05$

The null hypothesis predicted no significant difference at the .05 alpha level in reading achievement of students enrolled in the magnet program and that are not enrolled in the magnet program at Hunt-Mapp Middle School. This hypothesis was not substantiated. In other words, students involved in the magnet program achieved higher in math than students not involved in the program, after adjusting for the initial differences in LPT scores and SES. Therefore, it was determined that group membership was a significant main effect. The magnet students exhibited significantly greater increases in reading achievement (χ = 57.49) than the non-magnet students (χ= 39.81). There were no differences noted in gender or race/ethnicity with respect to reading achievement on the

Stanford Achievement Test. Table 21 shows a summary of the null hypotheses that were rejected and those that were supported.

Table 21
Summary of null hypotheses with respect to reading achievement

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Fail to reject
2. There is no statistically significant difference in race/ethnicity (black and white).	Fail to reject
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Fail to reject

*$\wp < .05$

Language arts achievement. The overall research question for language arts achievement was, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet), and race/ethnicity (black and white) with respect to language arts achievement on the Stanford Achievement Test after controlling for initial differences in SES and LPT scores? Seven null hypotheses were related to the overall research question listed below:

> There is no statistically significant difference in language arts achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:
>
> - gender (male and female)
> - race/ethnicity (black and white)
> - group membership (magnet and non-magnet)
> - group membership x race/ethnicity
> - gender x group membership

- race/ethnicity x gender
- gender x race/ethnicity x group membership.

The analysis of covariance (ANCOVA) procedure examined language arts scores to test the seven corresponding null hypotheses. The ANCOVA summary table for language arts achievement is shown in Table 22. The data were examined to determine if any main effects, two-way or three-way interactions were significant.

Table 22
Analysis of Variance for Language Arts Achievement

	Source	SS	df	MS	F	Sig.
Covariates	LPT	7985.14	1	7985.14	46.70	.00*
	SES	143.58	1	143.58	.84	.36
Main	Gender	13.92	1	13.92	.08	.77
Effects	Race/Ethnicity	344.00	1	344.00	2.01	.15
	Group	3705.74	1	3705.74	21.67	.00*
2-way	Group x	1.37	1	1.37	.00	.92
interaction	Race/Ethnicity					
	Group x Gender	11.68	1	11.68	.06	.79
	Race/Ethnicity	242.66	1	242.66	1.41	.23
	x Gender					
3-way	Gender x	606.70	1	606.70	3.54	.06
interaction	Race/Ethnicity					
	x Group					
Within		28554.03	167	170.98		
Total		62932.98	176	357.57		

*$\wp < .05$

It was hypothesized that there would be no significant difference at the .05 alpha level in language arts achievement of students enrolled in the magnet program and that are not enrolled in the magnet program at Hunt-Mapp Middle School. This hypothesis was not substantiated. In other words, after adjusting for the initial differences in LPT scores and

SES, students involved in the magnet program achieved higher in language arts than students not involved in the program. Therefore, it was determined that group membership was a significant main effect. The magnet students, with an adjusted mean score of 57.46, performed significantly higher in language arts achievement than the non-magnet students whose adjusted mean score was 34.21. There were no differences noted in gender or race/ethnicity with respect to language arts achievement on the Stanford Achievement Test. Table 23 shows a summary of the null hypotheses that were rejected and those that were supported.

Table 23
Summary of null hypotheses with respect to language arts achievement

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Fail to reject
2. There is no statistically significant difference in race/ethnicity (black and white).	Fail to reject
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Fail to reject

*$\wp < .05$

Social studies achievement. The overall research question for social studies achievement was, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet students), and race/ethnicity (black and white) with respect to social studies achievement after controlling for the initial differences in SES and LPT scores? There were a total of seven null hypotheses that were related to the overall research question listed below:

There is no statistically significant difference in social studies achievement on the Stanford Achievement Test (after controlling for the initial differences in SES and LPT scores) for:

- gender (male and female)
- race/ethnicity (black and white)
- group membership (magnet and non-magnet)
- group membership x race/ethnicity
- gender x group membership
- race/ethnicity x gender
- gender x race/ethnicity x group membership.

The analysis of covariance (ANCOVA) procedure examined social studies scores to test the seven corresponding null hypotheses. The ANCOVA summary table for social studies achievement is shown in Table 24. The data were examined to determine if any main effects, two-way or three-way interactions were significant.

Table 24
Analysis of Covariance for Social Studies Achievement

	Source	SS	df	MS	F	Sig.
Covariates	LPT	5682.12	1	5682.12	32.32	.00*
	SES	78.87	1	78.87	.44	.50
Main	Gender	440.07	1	440.07	2.50	.11
Effects	Race/Ethnicity	78.02	1	78.02	.44	.50
	Group	1916.50	1	1916.50	10.90	.00*
2-way	Group x	22.38	1	22.38	.127	.72
interaction	Race/Ethnicity					
	Group x Gender	331.48	1	331.48	1.88	.17
	Race/Ethnicity	4.10	1	4.10	.00	.98
	x Gender					
3-way	Gender x	3.74	1	3.744	.02	.88
interaction	Race/Ethnicity					
	x Group					
Within		29354.28	167	175.77		
Total		52743.88	176	299.68		

* $\wp < .05$

It was hypothesized that there would be no significant difference at the .05 alpha level in social studies achievement of students enrolled in the magnet program and that are not enrolled in the magnet program at Hunt-Mapp Middle School. This hypothesis was not substantiated. Clearly stated, students involved in the magnet program, with an adjusted mean score of 62.75 achieved higher in social studies than students not involved in the program whose adjusted mean score was 44.17. Therefore, it was determined that group membership was a significant main effect. After adjusting for the initial differences in LPT and SES, the magnet students exhibited significantly greater increases in math achievement than the non-magnet students. There were no differences noted in gender or race/ethnicity with respect to social studies achievement on the Stanford Achievement

Test. Table 25 shows a summary of the null hypotheses that were rejected and those that were supported.

Table 25
Summary of null hypotheses with respect to social studies achievement

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Fail to reject
2. There is no statistically significant difference in race/ethnicity (black and white).	Fail to reject
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Fail to reject

*$\wp < .05$

Attendance. Is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet students), and race/ethnicity (black and white) with respect to attendance? There were a total of seven null hypotheses that were related to the overall research question listed below:

> There is no statistically significant difference in attendance (after controlling for the initial differences in SES and LPT scores) for:
>
> - gender (male and female)
> - race/ethnicity (black and white)
> - group membership (magnet and non-magnet)
> - group membership x race/ethnicity
> - gender x group membership
> - race/ethnicity x gender
> - gender x race/ethnicity x group membership.

In response to the research question, an ANCOVA procedure examined attendance data for eighth grade students in the study. The data were examined to determined if any main effects, two-way, or three-way interaction were significant. (See Table 26)

Table 26
Analysis of Covariance for Attendance

	Source	SS	df	MS	F	Sig.
Covariates	LPT	1607.14	1	1607.14	24.45	.00*
	SES	6.75	1	6.75	.10	.74
Main	Gender	72.22	1	72.22	1.09	.29
Effects	Race/Ethnicity	85.24	1	85.24	1.29	.25
	Group	266.83	1	266.83	4.06	.04*
2-way	Group x	2.19	1	2.19	.03	.85
interaction	Race/Ethnicity					
	Group x Gender	73.68	1	73.68	1.12	.29
	Race/Ethnicity	49.12	1	49.12	.74	.38
	x Gender					
3-way	Gender x	56.11	1	56.11	.85	.35
interaction	Race/Ethnicity					
	x Group					
Within		10977.08	167	65.731		
Total		15528.21	176	88.22		

*$\wp < .05$

In response to the research question, is there a statistically significant interaction among gender (male and female), group membership (magnet and non-magnet students), and race/ethnicity (black and white) with respect to attendance after controlling for the initial differences in SES and LPT scores, an ANCOVA procedure was performed. It was hypothesized that there would be no significant difference at the .05 alpha level in attendance of students enrolled in the magnet program and that are not enrolled in the magnet program at Hunt-Mapp Middle School, after adjusting for initial differences in

LPT scores and SES. This hypothesis was not substantiated. In other words, students involved in the magnet program had higher attendance than students not involved in the program. Therefore, it was determined that group membership was a significant main effect. The magnet students attended school more than the non-magnet students. On an average magnet students missed 2.41 days of school as opposed to non-magnet students who missed an average if 10.21 days of school. There were no differences noted in gender or race/ethnicity with respect to attendance. Table 27 shows a summary of the null hypotheses that were rejected and those that were supported.

Table 27
Summary of null hypotheses with respect to attendance

Null Hypothesis	Reject / Fail to Reject
1. There is no statistically significant difference in gender (male and female).	Fail to reject
2. There is no statistically significant difference in race/ethnicity (black and white).	Fail to reject
3. There is no statistically significant difference in group membership (magnet and non-magnet).	Reject*
4. There is no statistically significant difference between group membership and race/ethnicity.	Fail to reject
5. There is no statistically significant difference between group membership and gender.	Fail to reject
6. There is no statistically significant difference between gender and race/ethnicity.	Fail to reject
7. There is no statistically significant interaction among gender, race/ethnicity, and group membership.	Fail to reject

*$\wp < .05$

t-Test

Is there a statistically significant difference between group membership of parents (magnet and non-magnet) with respect to their perceptions of school effectiveness? To address this research question, a survey was developed based on school effectiveness research. It was sent to a 20% random sample of parents of Hunt-Mapp Middle School students, grades 6-8, during the summer of 1997.

Two hundred and thirty surveys were sent home, and data were collected on the 46 (20%) surveys which were returned. Twenty-seven (59%) of the returned surveys were from magnet parents and 19 (41%) were from non-magnet parents. The survey focused on asking parents how effective they felt that Hunt-Mapp Middle School was in accordance with school effectiveness research. The percent of parents both magnet and non-magnet selecting points from a 22 item survey instrument in which they were asked to grade the school on the five-point Likert scale ranging from excellent to failing. For each statement, an overall average was calculated and the a total score for each survey was reported.

A t-test was performed to determine if there is a statistically significant difference in the mean score for parents of magnet students and parents of students not in the magnet program. (See Table 28) The null hypothesis tested was:

> There is no statistically significant difference in parents (magnet and non-magnet) with respect to their perceptions of Hunt-Mapp Middle School as it relates to the correlates of effective schools.

Table 28
Comparing Magnet and Non-magnet Mean Score of Perceptions School Effectiveness

	n	Test	t-value	df	Sig.
Magnet	27				
		Separate Variance test	-.159	33.289	.875
Non-Magnet	19				

*$\wp$ < .05

One would have expected that magnet parents would have higher averages for their perceptions of Hunt-Mapp School because of the choice in selecting the program. This was not the case. While the mean score for the perception of magnet parents (3.9983) was slightly higher than the non-magnet parents (3.9569), it was not statistically

significant. In other words, both magnet and non-magnet parents perceived Hunt-Mapp Middle School to be a "good" school. There was no statistically significant difference in their perceptions. The null hypothesis was not supported at the .05 alpha level.

Summary

The primary purpose of this study is to determine the effectiveness of the Aerospace Technology Magnet Program at Hunt-Mapp Middle School on eighth grade student performance. The number of students involved in the magnet program has increased over the five years the program has been in existence. The racial/ethnic balance within the magnet program did not mirror that of the district which average to be 67% black, 32% white, and 1% other. The racial/ethnic makeup of the magnet program averaged over the five year period to be 50% black and 50% white. The racial/ethnic balance fluctuated in which one year the white student enrollment was 62% while the black enrollment was 38%.

It was hypothesized that there would be no statistically significant difference in academic achievement on the Stanford Achievement Test and attendance (after controlling for the initial difference in SES and LPT scores) for group membership, gender, and race/ethnicity. The effectiveness of the Aerospace Technology Magnet Program was objectively measured. Six separate analyses of covariance (ANCOVA's) were performed for the five components of the Stanford Achievement Test Form 9-A and attendance. Independent variables were group membership, gender, and race/ethnicity. Each analysis was initially controlled by using SES and LPT scores as covariates.

Group membership (magnet and non-magnet) proved to be statistically significant at the .05 alpha level in all achievement analyses. What was interesting is that in science

achievement, male students and white student achieved significantly higher. Magnet students attended schools significantly more often than non-magnet students.

How parents feel about Hunt-Mapp Middle School was determined by performing a t-test on the overall mean score of a survey administered to a sample of both magnet and non-magnet parents. There was no statistically significant difference between how magnet parents perceive about Hunt-Mapp Middle and how non-magnet parents view the school. Table 29 indicates which variables were higher and those that were significant.

Table 29
Summary of High Achievement Findings

	Magnet	Non-magnet	Male	Female	Black	White
Math	↑*		↑			↑
Science	↑*		↑*			↑*
Reading	↑*			↑		↑
Language Arts	↑*			↑		↑
Social Studies	↑*		↑			↑
Attendance	↑*		↑			↑

*Significant at the .05 alpha level

In Chapter V, a discussion of the results of the study will be furnished. Data will be interpreted in Chapter V and relations between findings and theory discussed. In addition, Chapter V will also provide the reader with practical recommendations for future research.

CHAPTER V
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The primary purpose of this study was to determine the effects of the Aerospace Technology Magnet Program at Hunt-Mapp Middle School on eighth grade student performance as it relates to academic achievement and attendance. A secondary purpose was to compare the perceptions of parents of magnet and non-magnet students at Hunt-Mapp Middle School as viewed by the correlates of effective schools research. This chapter presents conclusions based on the findings in Chapter 4 and the review of literature in Chapter 2. The discussions of these conclusions is divided into two sections: 1) major findings and 2) directions for future research.

This study reported descriptive data for the four years the Aerospace Technology Magnet Program at Hunt-Mapp Middle School has been in existence. This information provided data on the percentaage of black and white students within the district, the city of Portsmouth, and the magnet program. This study confirmed the previous findings of Larson et. al (1993) and Musumeci and Szczypkowski (1993) which concluded that racial balance goal was effective drawing many white students to attend pre-dominantly black schools. The number of students involved in the magnet program has increased over the years and there has been continued interest evidenced by the number of students reported on the waiting list each year.

This study analyzed the eighth grade Stanford Achievement Test score distributions for the students at Hunt-Mapp Middle School. An analysis of covariance

(ANCOVA) was performed on each composite of the Stanford Achievement Test to determine if there was a significant interaction among the independent variables: group membership (magnet, non-magnet), gender (male, female), and race/ethnicity (black, white). Socio-economic status and LPT scores of students served as covariates in the study because of their relationship to the dependent variables. All analyses were tested at the .05 pre-determined alpha level for significance.

Attendance data for the 1996-97 school year was analyzed for the eighth grade students at Hunt-Mapp Middle School by performing an ANCOVA to determine if there was a statistically significant interaction among the group membership (magnet, non-magnet), gender (male, female), and race/ethnicity (black, white). Socio-economic status and LPT scores of students were used again as covariates. Parents of students at Hunt-Mapp Middle School were surveyed to see if there was a statistically significant difference in the perceptions of the school between magnet and non-magnet parents' views as related to effective schools research.

Major Findings

The findings support the research of Blank and Archbald (1992) and Ross (1994) which indicated that improved academic achievement for all students is a key objective of magnet school programs. On each of the components of the Stanford Achievement Test, eighth grade students enrolled in the Aerospace Technology Magnet Program achieved statistically significant higher than eighth grade students in the regular school program, after adjusting for the initial differences in SES and LPT scores. One of the objectives of the magnet program initiative in Portsmouth Public Schools was to increase the achievement of the black students. In measuring achievement differences by race/

ethnicity, the data showed that white students exhibited a slightly higher increase in math, reading, language arts, and social studies. These differences were not considered statistically significant. However, when science achievement was measured, the difference was statistically significant. Simply, white students obtained a greater increase in science scores their black students. This was the same assessment that was reported with the NAEP report (1994).

In examining achievement differences as reported by gender, it was found that female students out performed male students in reading and language arts. Conversely, male students achieved higher than female students in math, science, and social studies. Statistically significant difference was found in science achievement, in which the male students out performed the female students.

Attendance data reported that magnet students reported to school more than non-magnet students. Female students were out of school more than male students. Also, black students were absent from school more than white students. The only statistically significant difference was found between the magnet and non-magnet students. It may be concluded that students who attend school experience higher levels of academic achievement.

When examining the perceptions of parents about Hunt-Mapp Middle School, it was reported there was no statistically significant difference between the perceptions of magnet parents and non-magnet parents. Both groups of parents felt Hunt-Mapp Middle was a ‘good’ school.

The study produced several conclusions regarding magnet school programs. The Aerospace Technology Magnet Program at Hunt-Mapp Middle School has been

successfully utilized as a method for reducing racial/ethnic isolation. Prior to the study, there was inconclusive evidence regarding differences in achievement of magnet and non-magnet students. Magnet students demonstrated a higher level of achievement on all composites of the standardized test than did non-magnet student. Magnet school programs have served as a successful tool in attracting whites to schools which were predominantly black.

Suggestions for Future Research

The rich data base used for the analyses of the this study could be used to follow the achievement progress of the same 177 students through the high school level. Longitudinal studies should be conducted to determine long term effects of magnet education on student performance. The holding power of magnet programs should be explored to determine the rate of graduation of magnet versus non-magnet students.

A broader study could include a randomly selected group of students in a different school. Threats to internal validity may be attributed to the fact that achievement analyses was done at one school site, resulting in a small sample of students.

Technology is an integral part of the magnet program at Hunt-Mapp Middle School. Computer technology achievement may be measured based on the Stanford Achievement Test measuring computer competency. The impact of computer technology knowledge maybe examined through the first time administration of the computer standards of learning.

Standardized test scores do not pick up the small differences. Analyses can be conducted using the classroom grades as a variable. Course selection of eighth grade students may be examined to gather data of the number of students taking Algebra I.

Summary

Student achievement is but one gauge of educational effectiveness and quality however, it remains the most quantifiable measure of a student's academic progress. A school must maintain academic achievement performance of its students, or it will ultimately lose its ability to 'attract' students. Without sound academic achievement in the basics, the positive image of a school program will become blurred, and all affective benefits of the program will be lost if the program is discredited. The magnet program in this present study has proven its effectiveness in academic achievement, especially with the respect to math and science, the two targeted areas.

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Table 1

Summary of Studies Comparing Magnet to Non-magnet Students

AUTHOR (YEAR)	DEPENDENT VARIABLES	OTHER VARIABLES	POPULATION/ SAMPLE	GEOGRAPHIC LOCATION	DATA COLLECTION	DATA ANALYSIS	RESULTS
Jirtle (1986)	Achievement	Gender Race/Ethnicity	Every student with four consecutive CAT total battery scores who attended one of the 9 middle schools-grades 6-8	Wake County Public School System, North Carolina	California Achievement Test (all subgroups)	ANOVA	Achievement scores declined in the non-magnet. Scores higher for females . Scores were higher for whites that for blacks.
Dickson (1988)	Achievement	Group Membership	High school students .	Arkansas	Metropolitan Achievement Test, 6th edition (all subgroups)	t-Test	A significant difference was found between the academic achievement. Magnet school students scored higher on all subtests in addition to the subtest total and total batteries.
Green (1989)	Achievement	Gender Race/Ethnicity School Ability Index	152 elementary students from three North Alabama school districts were randomly selected. 57 professional employees	Alabama	Stanford Achievement Test Survey	ANOVA Delphi technique Spearman Rank order Correlation procedure	Based on test results generated from the second to fourth grade-no significant difference in reading. Magnet students scored significantly higher in math than non-magnets. Race nor gender were significant. There was a high level correlation existed in ranking factors between professional employees

							and the three school sys
Friedrick (1991)	Achievement	Extra-curricular courses taken throughout the year Work study skills	98 cohorts from high schools within the district and students of Science Academy	Austin, Texas	Longitudinal Study (1985-89) Tests of Achievement and Proficiency Grade Equivalent	Univariate by group regression procedure	No significant difference in mathematics - except for the number of courses completed during the sophomore and senior grades. A significantly increased of special courses completed by the Science Academy students during the junior and senior grades.
Abdul (1991)	Science Achievement Attitudes Curricular experiences Career interest		Three groups of students from 11 high schools: magnet students; students who left the magnet program; and students who decline the invitation to participate	Kalamazoo, Michigan	Questionnaire American College Testing Program (ACT Registration) Scientific Attitude Inventory (SAI)	ANOVA	No significant difference in number of hours students spent studying. Analyses of both ACT science subscores and the attitude towards science did not produce significant differences.
Jackson (1992)	Achievement		Eleventh grade students enrolled in one of eight high schools; students enrolled in district's magnet program	Phoenix, Arizona	Test of Achievement and Proficiency (TAP)	ANOVA	No significant differences were found on the written expression and using sources of information. Magnet students scored higher on math and reading subtests and slightly higher on the TAP total battery composite test.
Yaksick (1994)	Achievement Attendance	Socio-economic Status	Eleven high schools, 14	Pittsburgh, Pennsylvania	California Achievement	ANCOVA	Magnet middle school student performed

	Student conduct		middle schools and 14 selected elementary school were categorized as magnet, non-magnet, or partially magnet		Test (CAT)		higher than non-magnet and partially magnet students. Magnet middle school students appeared to be superior in comparison with magnet elementary and magnet high schools. Magnet schools as a whole appeared to be strongest in achievement but weakest in conduct patterns measured by rates of in-school and out of school suspensions.
Weldon (1996)	Organizational climate and health	Teachers Principals	662 teachers from 18 magnet and 17 non-magnet		Organization Climate Description Questionnaire (OCDQ) Organizational Health Inventory (OHI)	MANOVA	There were significant differences in organizational climate and health in secondary magnet and non-magnet schools. At the elementary level, there was a slight difference in organizational health, but not in organizational climate.

Parent School Effectiveness Survey

Directions: Please "grade" our school. Circle your "grade" for each statement noted below.

	Excellent	Good	Fair	Poor	Failing
1. I feel welcome in my child's school.	A	B	C	D	F
2. My child likes learning in school.	A	B	C	D	F
3. I am satisfied with my child's teacher(s).	A	B	C	D	F
4. I am satisfied with the principal's leadership.	A	B	C	D	F
5. The principal is highly visible.	A	B	C	D	F
6. My child's school is clean.	A	B	C	D	F
7. My child is safe at school.	A	B	C	D	F
8. Homework is given to help learning.	A	B	C	D	F
9. Discipline by teachers/principal is fair and consistent.	A	B	C	D	F
10. The principal is available to listen to me.	A	B	C	D	F
11. Parents are informed of classroom progress.	A	B	C	D	F
12. Parents are treated with respect.	A	B	C	D	F
13. The principal supports learning for all students.	A	B	C	D	F
14. The principal communicates regularly with parents.	A	B	C	D	F
15. Teachers treat students with respect.	A	B	C	D	F
16. Students treat teachers with respect.	A	B	C	D	F
17. Teachers meet the educational needs of my child.	A	B	C	D	F
18. My child is learning.	A	B	C	D	F
19. Students are well-behaved at this school.	A	B	C	D	F
20. The principal encourages support with staff/parents.	A	B	C	D	F
21. The principal recognizes student achievement.	A	B	C	D	F
22. Teachers believe my child can and will learn.	A	B	C	D	F

Did you visit with your child's teacher(s) this year? (Check one.) ❑ Yes ❑ No

Did you visit with your child's principal this year? (Check one.) ❑ Yes ❑ No

Did your child participate in a special program this year? If yes, please check all that apply.

❑ Gifted and Talented ❑ Continuous Progress ❑ Title I ❑ Vocational Education
❑ Magnet ❑ Montessori ❑ Special Education

Thank you for completing this survey. Please return your survey in the enclosed envelope.

MEMORANDUM

TO: Ms. Marie Shepherd
Hunt-Mapp Middle School

FROM: Dr. Mary Yakimowski

DATE: September 3, 1997

RE: **Entitled An Evaluation of the Hunt-Mapp Aerospace Math, Science and Technology Magnet Program**

I am pleased to inform you that Dr. Richard Trumble, Superintendent of Schools, has approved the formal "endorsement" of your external study entitled "An Evaluation of the Hunt/Mapp Aerospace Math, Science and Technology Magnet Program".

As a function of this endorsement, assistance will be provided to you in the collection of student demographic and program information, along with Stanford achievement. attendance, and parent school effectiveness survey results.

Upon completion of your study, we ask that a copy of your dissertation be shared with this office. Given the mutual developed timeline, this study should be completed by April of 1998.

Best wishes for continued successful efforts with this study.

MY/dbh

XC: *Dr. Fisher*
Dr. Bailey