


**The Effects of Selected Variables on Test Performance
for Mildly Handicapped Students**

by

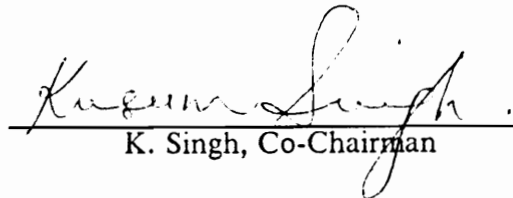
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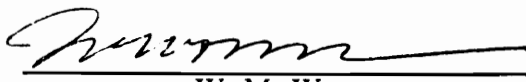
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(ABSTRACT)

This study examines selected variables as they relate to the performance of sixth-grade learning disabled (LD) and behaviorally-emotionally handicapped (BEH) students on minimum competency tests administered by the North Carolina public schools. The sample consisted of 313 LD and 79 BEH subjects who attended the 1988 Basic Education Program Summer School in 38 selected school districts. Data were collected describing the independent variables including students' race, sex, handicapping condition, parent education level, and school and teacher characteristics including instructional time, class size, teacher training, and teacher certification. The dependent variables for the study included language, reading, and mathematics performance scores on the Minimum Skills Diagnostic Tests (MSDT). Data were analyzed by utilizing a multiple regression model to describe the relationships between selected demographic and school variables and language, math, and reading gain scores on the MSDT and by utilizing dependent t tests for differences between the means for pre- and post-test performances. Although gains were made by LD and BEH students on the MSDT, it was concluded that the student and school variables used in the study were not predictive of achievement.

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CHAPTER 1

INTRODUCTION

From the onset of the current educational reform movement, questions about school accountability and the assessment of student outcomes have been a focal point for debate. The use of minimum competency testing programs in over 80% of the states has indicated one response to this national focus (Pipho, 1985).

The current practice of using minimum competency test (MCT) scores as criteria in promotion decisions has created problems for both academically disadvantaged and handicapped students. Recognizing that increasing numbers of school districts are under legislative mandate to demonstrate their students' mastery of basic skills, some studies have examined the implications of this assessment requirement for older handicapped students (Candor-Chandler, 1978; McCarthy, 1980; Safer, 1980; Smith & Jenkins, 1980). However, little research has been focused on the performance of elementary students with specific handicapping conditions on standardized tests and statewide MCTs of basic skills.

This study will examine the performance of learning disabled (LD) and behaviorally-emotionally handicapped (BEH) students on specific MCTs that are administered to elementary students as part of an annual assessment program and promotion standard in North Carolina public schools. The study will describe and investigate the relative effects of student and district characteristics after summer school

instruction on achievement in mathematics, reading, and language as measured by the Minimum Skills Diagnostic Tests.

In order to fully comprehend the specifics of the research problem, it is necessary to consider the context of North Carolina's testing and summer remediation programs and the regulations and ramifications for mildly handicapped students.

Minimum Competency and Promotion Testing Program in North Carolina

North Carolina has several forms of MCTs presently being used. Like a majority of the states, the tests have been used at the high school level since the early 1980s to determine whether a student will graduate with a regular diploma. The North Carolina General Assembly responded to a national debate over school reform, begun after the publication of A Nation at Risk (National Commission on Excellence in Education, 1983). It passed the Secondary School Reform Act of 1984 which focused on accountability, instructional continuity, and equity. This major legislation included a comprehensive program of instruction grounded in basic skills. The Basic Education Program for North Carolina's Public Schools (BEP) included detailed curriculum objectives and general standards for all students. Two components of the BEP established standards for student performance based on mastery of minimum competencies in reading, language, and mathematics and provided a free summer school program for students who had not mastered the specified standards. The student performance in grades 3, 6, and 8 is assessed in a three-phase promotion testing program which was implemented for the first time in 1986.

Research findings by Berlin and Sum (1988) have indicated that basic skills deficiencies are an underlying factor in the nation's social, economic, and educational

problems. Consequently, considerable research went into the planning, implementation, and evaluation of the testing program and the BEP Summer School. Both programs have been carefully monitored for three years. During program evaluations, success has been measured by a reduction in retentions and an improvement in CAT scores as well as administrator, teacher, and parent judgments according to reports by the Research and Testing Services (1988) and the Division of Testing (1988) in addition to a long-term follow-up study by Ward (1989). However, LD and BEH students have not been looked at specifically so it is not known if factors that are positively related to the performance of the general population have the same relationship to the performance of this special population.

Basic Education Program Summer School

It has been documented that problems are exacerbated during the summer months for those students who already have basic skills deficits (Heyns, 1978). The purpose of the BEP Summer School Program is to address the summer loss phenomena through intensive basic skills instruction including providing further diagnostic data on strengths and needs, more individual attention by reducing class size, teacher training in a variety of instructional methods and in an integrated learning approach, and increased school/home communications. According to the Division of Auditing and Accounting, the state funded the 1988 program at a cost of \$16,724,284 for instruction and administration and \$1,343,888 for transportation for a total state expenditure of \$18,068,172 not including local monies (Division of Testing, 1988, p. 1). Most of the expenditures were for instructional staff. Based on data from the Department of Public Instruction Infor-

mation Center, 85,291 students in grades 1-12 were served in the summer school (Division of Testing, 1988, p. 1).

Utilizing the proliferation of research on effective schools and effective instructional practices for at-risk students, North Carolina had established links among the following areas: Minimum competencies, promotion standards, dropout prevention/at-risk plans, and remedial instruction. Recognizing that the summer school population may have unique needs, the research on characteristics of successful summer school programs and at-risk students was examined (Instructional Services, 1988).

Specifically, the effective schooling research and other studies identified schooling practices and characteristics associated with measurable improvement in student achievement (Brookover & Lezotte, 1979; Fisher et al., 1978; Glass & Smith, 1978; Klitgaard & Hall, 1974; Weber, 1971). The following implemented characteristics that reflected the research base and differentiated summer school from the regular school year were used in this study: Low student:teacher ratios, staff training in monitoring student progress and planning differentiated instruction, and time-use strategies that could increase student time-on-task.

The time allotted for the summer school sessions varied in the 140 school systems. The length ranged from 20 to 30 days and the amount of instruction time ranged from 3 to 5 3/4 hours per day. The total number of instructional hours ranged from 60 to 137 hours ($M = 81.7$).

The class size also varied from classroom to classroom although school districts were encouraged to maintain a class size of no more than 15 students. The average student/teacher ratio ranged from less than 6:1 to greater than 16:1.

Teacher participation in summer school staff development training programs provided by the state was highly recommended. However, some systems opted to offer

training at the local level. The focus of this training was maximizing learning time, teaching innovative strategies, and implementing monitoring techniques.

Recognizing that the word "mainstreaming" has a myriad of contexts and connotations (see definitions) and that "least restrictive environment (LRE)" is the proper term (Jones, 1981), LD and BEH students were generally served in the regular education program or "mainstreamed" in summer school classes. Although it was not a requirement that a teacher be certified in an area of special education in order to teach in summer school in most districts, a few districts established local criteria for teacher certification when selecting staff to serve students with special needs.

In spite of the positive outcomes measured by strong MSDT gains and teacher, administrator, and parent judgments, some questions have been raised regarding the value of a short-term remediation program, the inclusion of the handicapped in these programs, and the sustained effects of achievement gains (Brown, 1988; Graves, 1988; Ward, 1989). Parallels can be recognized between the summer program characteristics adopted and the individualized approaches, smaller classes, training in varied techniques, and intensive basic skills instruction used for teaching skills to the mildly handicapped (Bickel & Bickel, 1986; Goodman, 1985; Paul & Epanchin, 1982; Rich, 1982; Stephens, 1977; Vaughn & Bos, 1987).

The Handicapped and MCTs in North Carolina

In developing MCTs and the promotion testing program, the staff of the Division of Research and Testing has worked with the Division of Exceptional Children to provide information and plan for all handicapped students (Research & Testing Services & Division for Exceptional Children, 1987). Issues debated during this process included

legality, appropriateness, test reliability and validity, and procedural modifications. The controversy over MCTs has special implications for handicapped students since the Education for All Handicapped Children Act of 1975 (P.L. 94-142), now Individuals with Disabilities Education Act (P.L. 101-476), and Section 504 of The Rehabilitation Act of 1973 (P.L. 93-112) required that they be afforded equal educational opportunities. These issues and options have been extensively explored during the emergence of the Minimum Competency Movement (Candor-Chandler, 1978; Ewing & Smith, 1981; Grise, 1980; Jaeger & Tittle, 1980; McCarthy, 1980; Olsen, 1980; Smith & Jenkins, 1980). In spite of procedural modifications, many mildly handicapped students (e.g., educable mentally retarded, LD, BEH) have, almost by definition, had difficulty taking standardized tests.

Demographic information on summer school attendance revealed that the LD and BEH populations were enrolled in significant numbers. For example, in 1986, LD students were reported to comprise approximately 26% of the summer school group whereas LD students comprised approximately 5% of the students tested statewide in the Annual Testing Program (Research & Testing Services, 1987).

Performance of Handicapped Students on the MSDT

The statewide results on the performance of exceptional children in grades 3, 6, and 8 taking the MSDT were reported by North Carolina in 1987 and 1988. In 1987, using the MSDT: Phase 2 Short Form and a cut-off of 70% correct, LD and BEH students averaged 52% and 51% respectively correct compared to 57% correct for the non-exceptional students. On MSDT: Phase 3 Short Form they averaged 60% and 63% correct compared to 70% correct for the non-exceptional students. The results in 1986 were similar. Therefore, while gains were reported, the LD and BEH population's mean

score did not reach mastery level and their performance was significantly lower than most other handicapped populations and the non-handicapped students.

Study Variables

Research on effective teaching and effective schools has identified characteristics that have an effect on improving learning and achievement. Debate over findings that suggest student performance is more directly related to conditions outside the control of the school than to those within the purview of the school was stimulated by the Coleman report (1966) and other such reports of that era (Jencks et al., 1972) and served to renew interest in the nation's schools. In response to the equity in education studies by Coleman, Jencks, and others, researchers challenged these assumptions with findings of studies on school effectiveness indicating that schools can make a difference in improving student achievement (Klitgaard & Hall, 1974; Weber, 1971). Coinciding with and following the publication of A Nation at Risk (1983), a plethora of reports made recommendations for school improvements (Goodlad, 1984; Gross & Gross, 1985; Nathan, 1983; National Academy of Education, 1984).

Of the themes emerging from the resulting research, the following related to the study variables: (a) small student/teacher ratio or class size; (b) time allocation; and (c) staff training programs.

The independent variables of this investigation included (a) race, (b) sex, (c) handicapping condition, (d) parent education level, (e) instructional time, (f) student:teacher ratio or class size, (g) teacher staff development training, and (h) teacher certification. Socioeconomic status (SES) was defined by parent education (highest level attained by either of student's parents) because other indicators, i.e., father's occupation,

free and reduced lunch, and income data, were not available (Badian, 1984; cf. McCarthy, 1970). Effective schools projects have computed disaggregated analyses for reading and mathematics on the basis of SES using mother's level of education (Edmonds & Fredericksen, 1978). The two handicapping conditions were selected as variables because they represented the largest proportion of the exceptional children population attending summer school, and they may be affected differently relative to the other factors.

The following factors were instrumental in the selection of the independent variables: (a) identification by the State Department of Public Instruction as related to the purpose and outcome of summer school; (b) identification in the research literature as related to student achievement; (c) identification as variations from school system to school system; and/or (d) identification as background variables affecting the accuracy of predicting school achievement.

While many unanswered questions remain, educators and researchers know much more today compared to twenty years ago about what factors under the control of the school relate positively to student achievement. Variables associated with the use of instructional time, conceptualized by Carroll (1963) and Bloom (1976) and implemented during the Beginning Teacher Evaluation Study (Fisher et al., 1978) as time allocation and academic learning time (ALT), have been examined extensively in the research. A significant positive relationship has been demonstrated between ALT and student achievement (Anderson, Evertson, & Brophy, 1979; Arehart, 1979; Borg, 1980; Fisher et al., 1980; Leinhardt, Zigmond, & Cooley, 1981). Other studies have examined variations in time allocations. Ysseldyke, Thurlow, Christenson, and Weiss (1987) suggested that programs should allow for different time allocations in order to promote academic gains for exceptional students and to move them "toward a caught-up status" (p. 54).

In addition, well planned and presented inservice programs have been helpful in facilitating positive change in teachers' attitudes and educational growth (Dupuis, Askov, & Lee, 1979; Hunter, 1978). Research on teacher effects can contribute to the development of a knowledge base which can then be put into practice (Brophy, 1988). North Carolina and other states have specified that all teachers of children with special needs must meet certification requirements for the exceptional areas in which they teach.

Another characteristic of successful school programs identified to increase achievement test scores was a reduction in class size. Research has demonstrated that decreases in class size can improve the teacher's ability to individualize instruction to increase student participation, and to foster achievement (Bourke, 1986; Glass & Smith, 1978; Wright, 1977). The Glass and Smith meta-analysis found that the relationship between student achievement and class size did not differ appreciably across school subjects, student ability levels, and other demographic characteristics of the classroom.

In this study the following variables were analyzed relative to student performance in reading, language, and mathematics as measured by the MSDT: race, sex, handicapping condition, parent education level, instructional time, class size, teacher training, and teacher certification.

Statement of the Problem

North Carolina has established an agenda for the equality of education and the improvement of basic skills, implemented in part through the promotion testing program and BEP Summer School. LD and BEH students comprise populations which have been significantly affected by this agenda. Although academic and affective gains have been reported for all summer school students, additional questions relating to program eval-

uation should be considered. School variables can contribute to the accuracy of prediction of achievement test scores. However, whether or not the causal influence is great enough to make a difference in student performance on the MSDT remains to be studied. What are the school factors which affect performance on the MSDT? To what extent are these variables causative and manipulative? What is the nature of the statistical interaction between LD and BEH students and the school factors? Are LD and BEH students affected differently by these factors?

LD and BEH students' performance has improved on the MSDT (Division of Testing, 1988) according to Phase 2 and Phase 3 test scores and a two-year follow-up study of the at-risk students attending BEP Summer School (Ward, 1989). Bloom (1976) and Edmonds (1979) have emphasized "equality of outcomes" as a goal for most learners in spite of background characteristics. Wehledge and Rutter (1987) have addressed the problem of providing equity in public schooling for school dropouts. In many studies the need to establish the relative contribution of the teacher and the school on learning has been viewed as particularly important with respect to policy makers and public audiences, since most school funds are earmarked for personnel and instructional costs. This investigation examines whether, in combination, selected variables could predict student achievement on the MSDT.

Research Question

The following variables were analyzed relative to the reading, language, and mathematics performance of mildly handicapped students as measured by the MSDT: race, sex, handicapping condition, parent education level, instructional time, class size, teacher training, and teacher certification. Given these variables, the most important

question investigated was: When one controls for the influence of demographic factors, i.e., race, sex, handicapping condition, and parent education level, do instructional time, class size, teacher training, and teacher certification account for a significant proportion of the variance in student achievement on reading, language, and mathematics as measured by the MSDT after summer school instruction?

Purposes of the Study.

This study should result in the following:

1. Information about student background, classroom, and school characteristics for a particular group of students which may assist in summer school program planning to improve student achievement.
2. Providing North Carolina with needed research pertaining to the relative effect of the independent variables on student performance on the MSDT.

Significance of the Study

This study will be of value for several reasons. First, since school districts in North Carolina currently have some flexibility in establishing policy regarding instructional hours, class size, and teacher training requirements for summer school, an investigation of the variables and their effect on student performance should prove important. Second, with the flexibility provisions under Senate Bill 2 (1989), school districts are considering using summer school funds in different ways. Recognizing projected fiscal

shortfalls in state revenues, this study could provide guidelines for different models. If, as Wang, Reynolds, and Walberg (1988) and Leinhardt, Bickel, and Pally (1982) found, there are few differences between the mildly handicapped learner and the remedial learner, then these same identified school characteristics could make a difference in programming and teacher effectiveness as measured by performance on the MSDT for other BEP Summer School students.

In addition, research on statewide MCTs of basic skills has been limited for populations in general. For handicapped students, it has mainly been restricted to the areas of exemptions, modifications, legalities, and technical issues. Grise, Beattie, and Algozzine (1982) evaluated the performance of fifth grade LD students using test modifications on Florida's MCT. Santilli and Fisher (1985) looked at the performance of handicapped students on the Virginia MCT. Strosnider (1986) examined the performance of LD and mentally retarded students on Maryland's MCTs. In North Carolina McKinney (1980) and Serow and O'Brien (1983) researched high school handicapped students and MCTs.

Impara (1980) found that the uses of MCTs mainly center around one or more purposes: certification (grade promotion or high school graduation), student diagnosis or placement, or assessment for reporting and planning. Since North Carolina has addressed these purposes and at least considered the concept of competency-based education as described by Spady (1977), a study examining the effect of school factors should contribute to the research on the MSDT and the summer school program.

The need for more data to improve and monitor programs for the handicapped has been indicated by Algozzine, O'Shea, Stoddard, and Crews (1988) and Vitarello (1988). Researchers (Wehledge & Rutter, 1987; McDill, Natriello, & Pallas, 1987) have demanded the inclusion of school characteristics associated with successful education of

at-risk students in program development and remediation efforts. This need indicated that more study was warranted in North Carolina.

Finally, few studies have addressed the BEH population and MCT. In a report on the needs and barriers to effective service delivery for the Division for Exceptional Children (1987), unresolved issues regarding the annual promotion testing program, summer programs, and competencies as well as failure to make early identifications were reported for these students. Current research within North Carolina was not found to address these issues.

In summary, North Carolina schools are committed to a program for demonstrating mastery of competency standards. This research should address the important issue of how best to serve the needs of handicapped students within this program by examining the relative effects of school factors on student performance.

Limitations of the Study

This study was limited to the target population of North Carolina's LD and BEH sixth graders who failed to meet state or local promotion standards. The sixth grade was selected because there were more LD and BEH students in the summer school group and it is a transition grade. The study was also limited to the 38 school districts representing each of North Carolina's eight educational regions who enrolled BEH and LD students in the grade 6 BEP Summer School Program. It was further limited to LD and BEH students rather than all the exceptional children taking the test because these students comprised the largest percentage of handicapped children eligible to attend summer school by both state and local standards. Another limitation was the socioeconomic status indicated by parent education level. The SES indicators were ob-

tained from teacher coding on CAT and MSDT Student Questionnaire and confidential records were not accessible.

Definition of Terms

Handicapped -- (as defined in 20 U.S.C. 1401 (a) (1)) means mentally retarded, hard of hearing, deaf, speech or language impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, or other health impaired children, or children with specific learning disabilities, who by reason thereof require special education and related services.

Special Education -- (as defined by 20 U.S.C. (a) (16)) means specifically designed instruction, at no cost to parents or guardians, to meet the unique needs of a handicapped child, including classroom instruction, instruction in physical education, home instruction, and instruction in hospitals and institutions.

Specific Learning Disability -- (as defined in G. S. 115C; .1501 N. C. Procedures for Children with Special Needs (A) (11)) Specific learning disability is an inclusive term used to denote various processing disorders presumed to be intrinsic to an individual (e.g. acquisition, organization, retrieval, or expression of information; effective problem-solving behaviors).

For the purpose of special education services, a student classified as learning disabled is one who, after receiving instructional intervention in the regular education setting, has a substantial discrepancy between ability and achievement. The disability is manifested by substantial difficulties in the acquisition and use of skills in listening

comprehension, oral expression, written expression, reading, and/or mathematics. A learning disability may occur concomitantly with, but is not the primary result of, other handicapping conditions and/or environmental, cultural, and/or economic influences.

Behaviorally-Emotionally Handicapped -- (as defined in G. S. 115C; .1501 N. C. Procedures for Children with Special Needs (A) (3)) One who, after receiving specially designed educational support services and intervention strategies in the regular educational setting, still exhibits patterns of situationally inappropriate interpersonal or intrapersonal behavior of such frequency, duration, and intensity to disrupt the student's own learning process. Frequency, duration, and intensity are long standing patterns of behavior which occur regularly and often enough to consistently interfere with the student's own learning process. A behavioral/emotional handicap is evidenced by one or more of the following characteristics which cannot be attributed primarily to physical, sensory, or intellectual deficits:

- (a) inability to achieve adequate academic progress (not due to a learning disability);
- (b) inability to maintain satisfactory interpersonal and/or intrapersonal relationships;
- (c) inappropriate or immature types of behavior or feelings under normal conditions;
- (d) a general pervasive mood of unhappiness or depression;
- (e) a tendency to develop physical symptoms, pains, or fears associated with personal or school problems.

The term does not include the socially maladjusted student unless it is determined that he/she is also behaviorally-emotionally handicapped.

Mainstreaming -- (as defined in Jones, 1981, according to definition of The Council for Exceptional Children, 1976). Mainstreaming is a belief which involves an educational placement procedure and process for exceptional children, based on the conviction that each such child should be educated in the least restrictive environment in which his educational and related needs can be satisfactorily provided. This concept recognizes that exceptional children have a wide range of special educational needs, varying greatly in intensity and duration; that there is a recognized continuum of educational settings which may, at a given time, be appropriate for an individual child's needs; that to the maximum extent appropriate, exceptional children should be educated with nonexceptional children; and that special classes, separate schooling, or other removal of an exceptional child from education with nonexceptional children should occur only when the intensity of the child's special education and related needs is such that they cannot be satisfied in an environment including nonexceptional children, even with the provision of supplementary aids and services (p. 43).

CHAPTER 2

REVIEW OF LITERATURE

In an effort to explore adequately the factors influencing student performance in the summer school program, the literature review is eclectic, drawing on theories and research related to basic skills instruction, effective schools and effective teaching correlates, and minimum competency testing. First, the chapter looked at the current wave of reform and the resultant emphasis on basic skills in general. Second, research on effective schools and effective teaching was reviewed. Third, effective practices and programs for improving basic skills were examined. Next, the chapter included information relative to specific school factors which could influence student success in summer school programs. Finally, research relative to the performance of handicapped students on Minimum Competency Tests (MCTs) was examined with emphasis on the performance of learning disabled (LD) and behaviorally-emotionally handicapped (BEH) students.

The Importance of Basic Skills Attainment in Our Future

As the 1980s ended, and entry into the twenty-first century is forthcoming, important social, economic, demographic, and political changes have affected and will

continue to impact the nation's workplaces, schools, and homes. In preparation for these changes, a renewed interest in basic skills attainment has emerged.

Reports stressing a need for educational reform have come from different sectors. The National Commission on Education (1983) entitled its report A Nation at Risk: The Imperative for Educational Reform. The Committee for Economic Development (1984) in Strategy for U.S. Industrial Competitiveness argued that the quality of education will determine if students can adjust to technological changes in the future's labor market. As a Ford Foundation project, Berlin and Sum (1988) presented a persuasive paper which showed how inadequate basic skills are intertwined with problems of youth joblessness, school dropouts, teenage parenting, public assistance, and a reduction in work-force productivity growth. Inherent in their agenda for future action was a strong case for improving basic skills through quality programs, including a system of summer educational opportunities and remedial education efforts.

The Economic Impact

Young workers who had a limited education suffered the most from the real earnings stagnation of the 1970s and early 1980s. According to the U. S. Bureau of Census report (1986), young males aged twenty to twenty-four in 1984 had real median incomes that were one-third less than young males of the same age group in 1973.

Educational attainment was also related to the largest declines in mean earnings. Although all males were adversely affected, within each age group, males with the least education experienced the greatest decline in mean earnings (Berlin and Sum). In report after report, employers stressed the growing importance of education and literacy in the labor market. In addition to achievement in school, employers valued attainment as indicated by the last grade completed. Christopher Jencks and his colleagues (1972) re-

ported that after controlling for the influence of other variables, a direct association existed between increases in test scores and annual earnings.

The Educational Impact and the Achievement Gap

The performance gap between students in the United States and foreign students has been well chronicled in the media. Based on our growing global economic interdependence, it has been documented that international competitors have brisker rates of productivity growth. Economists, businessmen, and others are naturally concerned about education and basic skills. As Lester Thurow (1985), Dean of the Sloan School of Management, observed:

To get American productivity growing again white-collar workers and service workers are going to have to be at the forefront of the productivity revolution. Getting them there is going to be a management and sociological challenge of the first magnitude. (p. 82)

In addition to the achievement gap between the United States and its foreign competitors, an achievement gap existed on the domestic level. Based on data reported by Berlin and Sum (1988), minorities and the poor are concentrated in the bottom fifth of the test score distribution on virtually every major standardized test. This analysis held true for the National Assessment of Education Progress (NAEP) reading, writing, and mathematics tests; the "High School and Beyond" data; a national sample of fourteen to twenty-one year olds who took the Armed Forces Qualification Test (AFQT); the Educational Testing Service (ETS) assessment of the literacy proficiencies for young adults; and the Scholastic Aptitude Tests (SATs) and Graduate Record Examinations (GREs).

The Impact of Social Problems

Non-economic reasons cause additional concerns about low levels of basic skills. Social problems such as poverty, high school dropouts, teenage pregnancy, crime, and teen joblessness and unemployment are intertwined with the basic skills crisis. In the results of the AFQT, Borus (1980) reported a direct relationship between basic skills levels and these special problems: teenage parenting, youth joblessness, and school drop-outs. Although causality can not be determined since the factors of skills, schooling, and poverty are interrelated, Berlin and Sum (1988) reported the following information:

. . . simple relationships between test scores and an array of socioeconomic problems reveal that, as compared to young people with above-average basic skills, those with low basic skills (the bottom 20 percent) were nine times more likely to become mothers out of wedlock, and four times more likely to become welfare dependent. These relationships hold for all sex, race, and income groups. (p. 35)

Impact of Mother's Educational Level

Jencks and his colleagues (1979) cited family background variables, most importantly, the mother's level of educational attainment, as crucial determinants of life opportunities for young people. As an example of the impact of intergenerational transmission of low basic skills, Bumpass and McLanahan (1987) found that living in a household headed by a mother increased the chances of dropping out of school by more than 122 percent for Whites and by 30 to 55 percent for Blacks and Hispanics.

Effects of Summer Vacations

Students, especially disadvantaged youth, experienced a loss of basic skills during the summer months. This loss was a critical factor in their long-term performance as reported by Barbara Heyns (1987) who studied over 3,000 Atlanta students and over 20,000 Title I participants for two school years and summers. Findings from several studies (Heyns, 1978, 1987; Sipe, 1987) indicated that 80 percent of the difference between advantaged and disadvantaged youth in year-to-year learning occurred over the summer when advantaged students had travel and educational opportunities whereas the disadvantaged watched more television and received less exposure to standard English. This evidence had implications for year-round schooling and summer school interventions since both groups appeared to learn at the same rate during the school year.

In summary, evidence about the importance of the environmental variables mandated multiple interventions in order to make a difference in the lives of children. In spite of the notion that educators are engulfed by school reforms, the various reports and Excellence Movement, Effective Schools Movement, and legislative mandates are all focusing on results. Evidence is mounting that investments in basic skills that succeed in raising the average test scores of academically at-risk children are cost effective, and their attainment is related to graduation, employment, and a lessening of social problems. It is clear that if the United States is going to have a competitive work force, strengthening the quality and quantity of primary, secondary, and postsecondary education of Americans is necessary and basic skills instruction must play a role in that process. Therefore, the related literature on effective teaching and schools is reviewed in Chapter 2 to establish a basis for this study. Research on the variables is included to provide a basis for the research questions and methodology used in the study. Inter-

ventions that facilitate closing the performance gap for BEH and LD students are also examined.

Effective Teaching and Effective Schools Research

The fundamental question relative to research on teacher and school effectiveness may well be: How much difference do teachers and schools make? Although the answer is clouded because the variables are numerous and the interactions and relationships are complex, it is important to this study to investigate bodies of research related to the possible answers.

Teachers and Schools Make Little Difference

A body of research has supported the idea that teachers and schools contributed little to student outcomes. This perspective is derived from several sources. First, there are theories of the new hereditarians which emphasized genetics as the major factor in determining the cognitive and even economic attainment of students. The leading researcher in this area is Jensen (1979); others who propagated this theory included Eysenck (1971) and Herrnstein (1973). Based on their contention, the environment had little relationship to intelligence and achievement since it frequently contributed to less than 20 per cent of the variance in these factors. Because teachers are a part of the environment, their impact would therefore be minimal.

The second major theory is expounded by the environmentalists represented by researchers including Deutsch, Hent, Smilansky, and others. Their studies have focused on human growth and development and deemphasized the role of genetics. The depri-

vation theory is often cited as a explanation for the limited cognitive development of lower-class children. Research by Bloom (1964) is often stated as a basis for the environmentalist's focus on the importance of early learning. By taking a stand on programs at a preschool level and attempting to disprove the hereditarians, this group often implied that schools and teachers can make little difference in student outcomes during the later school years.

Next, the large scale research of Jencks et al. (1972), Coleman et al. (1966), and Mosteller and Moynihan (1972) promulgated the following thesis: The variables indicating a student's socioeconomic and racial or ethnic background are the most important variables associated with student achievement. Other variables such as students' cognitive abilities, prior achievement, and motivation were also reported as important factors. These data were interpreted as indicating that teaching and schools had relatively little impact on student performance.

Another investigation examined the influence of teachers on student achievement. Popham (1971) conducted studies that compared students taught by experienced teachers with students taught by individuals with no teaching experience. He concluded that teacher training and the perceived expertise that comes with it had little influence on student achievement.

Finally, much information was published by established researchers (Biddle, 1967; Heath & Nielson, 1974; Tavers, 1973) who maintained that teacher and school effectiveness is difficult to define and measure precisely. They cited examples of standardized tests that do not measure what is taught in the classroom and lists of teacher behaviors that do not correspond with the processes going on in the classrooms.

Teachers and Schools Do Make A Difference

An opposing viewpoint has been substantiated by bodies of knowledge supplied by researchers who re-analyzed the preceding study data or reported new findings indicating teachers and schools can influence student learning and outcomes. Ryans (1960) conducted an extensive study that included 6000 teachers in 1700 schools. Although his research as well as many of the following studies was based on correlational rather than experimental data, the findings indicated that teacher behaviors do have a relationship to student behaviors.

Good and Brophy (1987) have reviewed a number of studies on teacher behavior and classroom learning in order to suggest ways in which teachers can have a positive influence on student achievement. The use of time in the classroom, classroom management techniques, teacher expectations, and staff development in effective schools are examples of techniques for improving classroom teaching.

In the area of teacher product-process studies, a number of researchers (Gage, 1984; Medley, 1978; Rosenshine, 1971) have reviewed correlational research. It is significant to note that many studies have identified common elements of quality instruction. Parallelism of results indicated that a number of teaching behaviors appeared to enhance the effectiveness of teachers.

A number of important findings have resulted from research provided from the Beginning Teacher Evaluation Study (BTES) which began in 1972 in the California schools. The most consistent finding was that students achieved more when they were given greater opportunity to learn (Fisher et al., 1978). Both the quality and quantity of learning time are important in improving student outcomes. These findings have been replicated in other studies (Anderson, Evertson, & Brophy, 1979; Arehart, 1979; Borg, 1980; Leinhardt, Zigmond, & Cooley, 1981).

Summary

Since the late 1960s and early 1970s research and thinking have generally supported the notion that teaching can make a difference. In addition to disputing the methodology of the earlier reports, Gage (1984) stated, "Research has shown repeatedly that it is possible to change teaching practices - not for all teachers or for all practices, but for enough teachers and enough practices to make an educationally important difference" (p. 89).

Gage further upheld the proposition that correlations or differences do not need to be large in order to be substantial. Although previous learning may account for most (65 to 80 percent) of the variation in student achievement, it is nevertheless imperative that efforts to examine relationships between variables continue if teaching and schools are to improve. For the purposes of this study it is possible that the magnitude of the relationship between single dimensions of teacher and school factors may be minimal, but the interaction effects of the multiple variables may be important.

Improving Basic Skills for Mildly Handicapped Students

Effective Educational Practices

Mainstreaming. The integration mandate of The Education for All Handicapped Children Act of 1975 (PL 94-142) emphasized the least restrictive environment concept. Responding to concerns about empirical evidence on the efficacy of pull-out programs for students, professionals (Wang, Reynolds, & Walberg, 1985, 1988) studied the empirical data base developed from the mid-1970s to the mid-1980s on the practice of in-

tegrating students with special needs in regular classes, popularly termed mainstreaming. The results reported by Wang and associates in general supported claims for the effectiveness of mainstreaming in improving the performance, attitudes, and process outcomes of handicapped students.

Previous reviews (Carlberg & Kavale, 1980; Madden & Slavin, 1982) had indicated that only academic outcomes of handicapped students in mainstreamed settings were positively effected. The data from the forementioned reviews had only noted the positive effects of mainstreaming for certain handicapping conditions. In the findings of Carlberg and Kavale (1980), for example, the placement of learning disabled and emotionally handicapped in special education classes benefitted them more than other students and the placement of educable mentally retarded students in regular classes led to improved academic achievement.

However, the research by Wang had limitations in spite of the positive findings. Fuchs and Fuchs (1988) found insufficient evidence in the studies to support Wang's Adaptive Learning Environmental Model (ALEM) as a successful large-scale, full-time mainstreaming program.

The impact of practices noted in the effective teaching literature has been examined by Wang, Walberg, and other researchers to assess their implications for adapting to individual student needs. This focus on general education practices during the past decade has shown progress both in research on effective teaching (Good & Brophy, 1987) and on effective educational practices for individual differences and diverse populations (Walberg, 1984; Wang & Lindvall, 1984; Ysseldyke & Algozzine, 1982).

Typical Special and Remediation Interventions. Numerous programs in both special and regular education have historically stressed remediation concepts. Pianta (1990) argued for the use of preventive services as a viable alternative to the reform of special and regular education. In the research, Cowen (1980) distinguished between the

three forms of preventive service delivery: primary prevention, secondary prevention, and tertiary prevention (or remediation). Tertiary prevention is defined as an intervention following a negative outcome, for example, after a student has failed to meet some criteria. Special education services, Chapter I programs, and summer school remediation programs would fall into this category. Remedial interventions that emphasized disabilities, identification of processes, assessments, and labeling are all characterized by failure. The documentation of this failure is the mechanism by which students gain access to the services. According to Cowan, tertiary prevention or remediation is employed to reduce the consequences or adverse effects of the disability or negative outcomes. Most federal funds are targeted toward remedial programs.

Evaluations of Title I of the Elementary and Secondary Education Act (now Chapter I) programs found that students who participated had reading and mathematics test scores that were about 15 to 20 percent better than those of similarly disadvantaged students. The program was particularly effective in grades one to three.

If the current system of special and regular education were totally effective, then there would be no need for the evolution of alternative forms of education. In reality, such alternatives surface and are widely used. Preschool education programs have received a national impetus and high quality preschool programs are viewed today as an investment at an early age for lifetime benefits for at-risk students.

In P.L. 99-457, The Education of the Handicapped Act Amendments of 1986 (EHAA), the basic rights established under the landmark Education for All Handicapped Children Act of 1975 were extended to preschoolers. Many states have instituted or expanded services available for children birth through age five with special needs. In the three years since the passage of P.L. 99-457, the number of preschool children who are receiving special education and related services has grown by over 20% to 362,443 children (U.S. Department of Education, 1990).

In North Carolina, P.L. 99-457 has recently been implemented in many areas, but it is not mandated until July, 1991. Currently, services are being provided to handicapped three to five-year olds in over 75% of the school systems. However, North Carolina, as evidenced by the effective dates for mandate, was in the last group of states to expand these services to the birth-through-five category (U.S. Department of Education, 1990).

School Factors and Program Variables

Class Size

The general issue of class size and its impact on student achievement and other factors seemed to have been settled by extensive research and meta-analysis in this area (Glass, Cahen, Smith, & Filby, 1982). Smaller classes promoted higher student achievement, better attitudes, different instructional practices, and improved teacher satisfaction. This has allowed studies during the last part of this decade involving class size to focus on classroom processes and further analysis of various grouping strategies and instructional techniques.

After a review of the literature, it is clear that the issue of class size and its relationship to achievement has been discussed for centuries. A major source of studies about class size involved research from Teachers College, Columbia University. Olson (1970) studied class size with reference to indicators of quality.

Research conducted in Toronto (Wright, 1977) compared factors found in small classes (16 or 23 students) with large classes (30 or 37 students). This study found indications of greater student participation, quieter classroom environment, and more posi-

tive student attitudes. It should be noted that although other measures were not affected by class size, the small class was comprised of greater numbers than the below 16 students in other studies.

The first meta-analysis by Glass and Smith (1978) dealt with the impact of class size on student achievement. After reviewing over 300 documents and analyzing approximately 80 studies relating to class size and achievement, a clear and strong relationship emerged between the two factors which did not differ appreciably across different school subjects, student intelligence levels, and several other obvious demographic features of classrooms. This meta-analysis led to the conclusion that more is learned in smaller classes.

Criticisms of the research focusing on the class size needed to make an impact on achievement and on the methodology (Hedges, 1981) did not change the general interpretation of the meta-analyses in this area (Glass, Cahen, Smith, and Filby, 1982). Although Educational Research Service (ERS) has maintained that class size could be increased from 20 to 40 pupils without noticeable effect on achievement, they concluded in 1978, however, that smaller classes can have a positive influence on pupil achievement in reading and math at primary levels and for low-achieving or socially disadvantaged students. Hedges and Stock (1983) published a re-analysis of the Glass/Smith meta-analysis and concluded that the statistical techniques used were appropriate for the results of the study.

Field studies (Glass, Cahen, Smith, and Filby, 1982) sponsored by the Far West Laboratory were conducted in two different sites. Changes noted when class size was reduced were increased student attention rates, greater individualization, enrichment of the curriculum, and fewer discipline problems.

While accepting the premise that smaller classes promote higher achievement, better attitudes, different instruction practices, and higher teacher satisfaction and mo-

rale, Bourke (1986) gathered data in Australia on the relationship between class size and achievement and identified specific teaching practices linking this relationship. He found that the practice variables that substantiated this link were teachers' grouping practices, frequency and type of interaction with students, questioning behavior, homework amounts, and noise level tolerated during classes. As expected, student ability affected class size, teaching practices, and student achievement, but class size and teaching practices were also directly linked to achievement.

A study carried out in the Virginia Beach Public Schools (Carrington, Mounie, & Lovelace, 1982) in a Class-load Relief Model Pilot Program negated claims of achievement gains experienced by students when class sizes were lowered based on a weighted formula. This study was conducted by the school system at the request of the School Board and did not employ the same methodology as the research analyzed by Glass and Smith.

In conclusion, for those who want major changes in education in general or in a specific teacher's behavior, class size is not the panacea. Small classes do, however, give a teacher the opportunity to implement a strategy more effectively and more completely. For this reason, other variables which could affect student achievement were examined.

Teacher Certification

According to research on teacher education and certification, student achievement gains are significantly related to hours of education courses completed by teachers (Hall, 1984). Beery (1960) examined the efficacy of teacher education programs at colleges and universities and, after systematic observations of beginning teachers, concluded that fully certified beginning teachers were consistently rated as more effective than provisionally certified teachers.

Extensive studies of beginning provisionally and professionally certified teachers in Georgia were conducted by Bledsoe, Cox and Burnham (1967). Comparatively, the following characteristics and performance of the professionally certified group were recorded: They were less likely to drop out of the teaching profession, had increased job satisfaction, had more competence overall, and had more competence specifically in a number of skill areas.

Investigations have compared teachers who were teaching "out-of-field" or lacked the necessary certification in the area for classes they were teaching with "in-field" teachers (Hawk, Coble, & Swanson, 1984). The assumption is that individuals who possessed certification in a particular area (in-field) have more background and knowledge in an area and therefore will be more effective in teaching than one who does not possess area certification (out-of-field). Based on an analysis of their data, students instructed in math by in-field teachers showed greater achievement than students taught by out-of-field teachers.

Opponents of teacher education programs and certification argue that there is little difference between the effect that the experienced teacher and the inexperienced teacher have on student outcomes (Bausell & Moody, 1972; Popham, 1971). This emphasis was reflected in changed state certification requirements in some states. However, the preponderance of research supported the case for teacher education programs with more depth and resources. Currently the trend has focused on more thorough and extensive preservice and continuing teacher education (Greenberg, 1983).

Instructional/Allotted Time

Instructional time is another factor extensively investigated in teacher and school effectiveness research which has been identified as positively related to student achieve-

ment. Academic learning time (ALT) was first examined during the 1950s in the Beginning Teacher Evaluation Study (Fisher et al., 1978). It is defined as the amount of instructional time students actually spend engaged in relevant academic tasks performed with high success. Therefore, the three components of ALT that are directly observable in the classroom are the amount of instructional time, student engagement or time-on-task, and student success rate. There is research evidence that, alone or in combination, these three components are significantly positively related to student achievement (Anderson, Evertson, & Brophy, 1979; Arehart, 1979; Borg, 1980; Fisher, et al., 1978; Good & Grouws, 1979; Leinhardt, Zigmond, & Cooley, 1981; Rosenshine, 1980). According to the research, the most simple direct way to improve achievement is to allocate more time to academic activities.

Although the original studies identifying and measuring ALT were conducted in regular classrooms, recent research findings have indicated that instructional time variables also influenced the achievement of students classified as mildly handicapped and/or students otherwise identified as requiring compensatory and/or other remedial education services (Leinhardt, Zigmond, & Cooley, 1981; Wang, Reynolds, & Walberg, 1985, 1988). However, in replicating the Leinhardt and associates research on process-product relations in resource room programs rather than self-contained classrooms, different results were found by Haynes and Jenkins (1986). In a large-scale field study of reading instruction in special education resource room programs for mildly handicapped students, they studied the relationship between time allocated to reading tasks and student achievement. They concluded that the amount of direct reading instruction was low in these programs and therefore not predictive of achievement.

Teacher Training

During the past decade much progress has occurred in our understanding of both teacher training and development and school improvement. Hopkins (1990) distinguished at least six areas of focus that coexist under the general heading of teacher development, e.g., effective teacher, teacher as researcher, models of teaching, staff development, teacher's work, and teacher's personality. The previously identified characteristics of school improvement indicated that the two areas are interdependent.

In the last 15 years process-outcome research linking teacher behavior to student outcomes (and especially to student achievement gains) has made enormous strides. These results have now grown into a sizable collection of replicated correlational findings, many of which have been validated experimentally (Brophy & Good, 1986; Evertson, 1982; Hunter, 1978). Preservice and inservice teacher training is documented as a factor related to teacher competencies that can affect pupil outcomes (Medley & Crook, 1980; Good & Grouws, 1979).

For the most part, the implications of these findings underscore the important role of teachers in stimulating student achievement gains. They also lay the groundwork for developing concepts and principles describing effective practices and for improving the professional knowledge base (Brophy, 1988; Goodlad, 1984). One of the school characteristics considered to be essential in effective schooling practices is professional development (Levin & Lezotte, 1990).

Some studies have indicated that the school, not the district, is the unit of change if improved student achievement is the goal (Brookover & Lezotte, 1979; Edmonds, 1979; Purkey & Smith, 1982). The importance of practice-oriented school-site staff development in providing equitable education has been highlighted in effective schools research (Levine & Lezotte, 1990). Regardless of the setting for the training, staff

development should focus on helping school personnel improve job performance, professional practice, and student achievement (Wood & Thompson, 1981).

Before analyzing the BEP Summer School, the professional literature was reviewed to identify characteristics of successful summer school programs. One important characteristic was well organized staff development activities providing strategies for meeting instructional objectives (Instructional Services, 1988). Therefore, summer school teachers were provided training at either the Regional Educational Center given by Department of Public Instruction staff or at the local sites given by local staff development personnel. The workshops emphasized techniques that had proven most effective with lower ability students. Methods for promoting self-esteem, for establishing high expectation for academic success, and for using manipulatives rather than basal texts were emphasized (Division of Testing, 1988).

In a large-scale study conducted by Good and Grouws (1979), the following question was investigated: Do teachers who have been trained in specific behaviors produce higher academic achievement in their students? Based on the results found in the Missouri study, the answer was a resounding "yes." The findings were confirmed in other experimental studies (e.g., Anderson, Evertson & Brophy, 1979; Hunter, 1978). The results were also consistent for elementary grades through middle grades.

Minimum Competency Testing

Influenced by significant decreases in student achievement, reports of social promotions, and general discontent with the American educational system, minimum competency testing (MCT) was seen by many as an opportunity to ensure educational standards and mandate changes in student performance. Although debates have con-

tinued over a definition of competence, the demand for accountability and outcome-based education has led to the increased use of MCT (Spady, 1977). Over 40 states are giving minimum competency tests (MCTs) for purposes including standards for high school graduation, grade promotion, and remediation (Pipho, 1985).

According to the Phi Delta Kappan 22nd Annual Gallop Poll, 67% of the public surveyed indicated that children should be promoted only if they passed examinations (Elam, 1990). In the same poll, poor curriculum/poor standards was identified as one of the four major problems facing the public schools today. The cry for MCT has been analyzed as more of a political movement than an educational movement to set minimum skills standards (Jaeger & Tittle, 1980). Tests are being used by policymakers and the media to rank school districts in many states, including North Carolina. One response to this public pressure has been the increased use of MCT at the elementary level.

Handicapped Students and Minimum Competency Testing

The earlier research on handicapped students and MCT focused on inclusion/exclusion of this special population in the development of standards and test modifications, the predicted increase in dropout rates, and the limitations on curriculum opportunities (Candor-Chandler, 1978; Ewing & Smith, 1981; Safer, 1980; Smith & Jenkins, 1980). In another study the relationship between the individual education plan and the MCT requirement for graduation was questioned (McCarthy, 1980).

Since test modifications are frequently recommended for handicapped students, researchers have discussed and examined the impact of their usage on test results (Amos, 1980; Morrissey, 1980). Grise, Beattie, and Algozzine (1982) conducted a study in Florida that examined the effects of test modifications on the performance of third-grade learn-

ing disabled (LD) students. They concluded that test modifications enhanced the ability of LD students to achieve mastery on the competency test.

In a Maryland study, pupil characteristics were found to discriminate between success and failure for handicapped students on MCTs (Strosnider, 1986). However, a caution was included for interpretation of the results because of normality limitations. Recommendations included the addition of socioeconomic status as a variable and intensive remediation efforts for students who failed the test. Santilli and Fisher (1985) found when examining the performance of handicapped high school students on Virginia's MCTs that sex and ability were significant variables as related to passing MCTs. They recommended further research in the areas of predictors.

Handicapped Students and MCT in North Carolina

Several studies have been conducted in North Carolina that examined the performance of secondary handicapped students on MCTs. Serow, Davies, and Parramore (1982) attempted to identify factors that related to student improvement on reexaminations. Program characteristics were found to relate more to improvement after the remediation assistance than pupil characteristics. Remediation assistance provided during the school year was more successful with white students than with black students.

McKinney (1983) reported on the performance of handicapped students on the North Carolina minimum competency test in reading and mathematics given in the late 1970s. After analyzing the scores of 3,043 eleventh-grade handicapped students, he reported that some handicapped students (i.e., learning disabled) performed better than others (i.e., mentally retarded) on the MCT. Other studies examining the performance of secondary handicapped students on MCT have reported similar findings (Serow, Davies, & Parramore, 1982).

CHAPTER 3

METHODOLOGY

Selected theories and research on demographic, teacher, and school characteristics as they relate to student performance were reviewed in Chapters 1 and 2. The purpose of this study was to investigate the relative importance of student, classroom, and school variables as related to the achievement of learning disabled (LD) and behaviorally-emotional handicapped (BEH) subjects in reading, language, and mathematics as measured by the Minimum Skills Diagnostic Tests (MSDT) after summer school instruction.

This chapter describes the target population and subjects of the study, the instruments from which scores and data were derived, the procedure for collecting the data, the collection of data, the coding methods, and procedures utilized in analyzing the data.

Subjects

The population selected for this study was 750 LD and 85 BEH sixth grade students who participated in the 1988 BEP Summer School. The total enrollment in the 1988 Basic Education Program Summer School was 81,291 students in grades 1-12 (Di-

vision of Testing, 1988, p. 1). The Division of Testing (p. 5) also reported that these students were served by 8,092 instructional personnel. According to demographic information from the California Achievement Test and MSDT Student Information Questionnaires, 2,657 (15.8%) LD and 348 (2.1%) BEH students attended in grades 3, 6, and 8 out of a population exceeding 22,370 students (Division of Testing, p. 8). See Appendix A for other demographic information. Sixth graders representing every school district in North Carolina were pretested during the MSDT: Phase 2 statewide assessment and over 9,708 sixth grade students attended summer school (Division of Testing, p. 7).

Because the survey design included responses from school districts on school variables and because representative subgroups of mildly handicapped students were desired, the LD and BEH subjects used in this study were selected from 38 school districts in North Carolina using the following procedure. First, data on the 835 LD and BEH students who attended the Grade 6 BEP Summer School statewide were requested in January, 1988 and provided by the Division of Testing in May, 1989. Since the study was designed to investigate subgroups, only districts which had both BEH and LD students attending summer school were sampled. Utilizing the Division of Testing data set on the targeted population of 835 students, 38 school districts out of the 140 districts in the state were identified as having both LD and BEH students attending summer school. The selected school districts from each of the eight regional education centers were found to be representative of the 140 large/small, rural/urban, and western/piedmont/coastal school districts serving the student population in North Carolina.

In order to equalize the selected subgroup proportions, all BEH students were included in the sample and LD subjects were randomly selected from the computer list-

ing by district based on a student ratio of nine LD students for each BEH student selected. This ratio approximated the summer school participants' ratio for the subgroups.

From the 38 school districts selected, data on 313 LD subjects and 79 BEH subjects (Grade 6) between the ages of 11 and 14 were studied. However, missing data on variables resulted in different *ns* for the analysis. All subjects were classified as learning disabled or as behaviorally-emotionally handicapped by state eligibility criteria and according to special education student definitions (Division for Exceptional Children, 1988). As is typical for students with the handicapping conditions included in the sample, males (81.6%) greatly outnumbered females (18.45%). Also, more males (64%) than females (36%) attended summer school (Appendix A).

Instruments Used

California Achievement Tests

The California Achievement Tests (CAT E and F) are designed to measure achievement in the basic skills areas commonly contained in state and school system curricula. The series is frequently used because it is both norm-referenced and objective-referenced. The subject areas measured are reading, spelling, language, mathematics, and study skills (California Achievement Tests, 1986).

Although the results of the CAT were not utilized in this study directly, information from the Student Information Questionnaire (SIQ) was used to provide demographic information on the student sample and to construct study variables (Appendix D). Teachers or test administrators were instructed to complete the SIQ questions after the test battery had been administered. It was clarified that this information would be

used only for special evaluation reporting, group reporting, and for the generation of the North Carolina Annual Testing Program (NCATP) Minimum Skills Diagnostic Testing Program Rosters which listed those students scoring below the 25th national percentile on the CAT Total Battery (Division of Accountability Services, 1991).

The question on educational levels specified the highest level attained by either of the student's parents and requested that the best estimate be made when reporting these data. A caution was added that while accuracy may not be obtained for each student, judgments when aggregated provided a good estimate for group comparisons. Instructions specified that the item be omitted when an informed judgment could not be made.

For the question related to categories describing students' classification as exceptional, the teacher was referred to the section entitled Special Education Student Definitions and to assistance from the Director for Exceptional Students in the school system (Division of Accountability Services, 1991). Only one response was to be coded for each student.

The students' social security numbers (SSN) were used as identification numbers for "linking" students' CAT test data with their MSDT results. This information is a requirement for conducting longitudinal and related research studies, but only group data were reported in these efforts.

Minimum Skills Diagnostic Tests (MSDT)

The MSDT were developed to assess an individual's degree of mastery of basic skills necessary for successful performance at the next grade level and to provide a detailed diagnostic profile of each student's strengths and weaknesses. Under state promotion standards (Basic Education Program, 1988), evidence of mastery of specific

competencies in reading, language arts, and mathematics are required for the promotion of students in grades 3, 6 and 8.

In Phase 1 of the 1988 testing program, students in the “gateway” grades took the nationally normed California Achievement Tests (CAT). Students who scored at or above the 25th percentile on the Total Battery met the state requirement for grade promotion and were eligible for promotion if they also met local standards. Students who had been retained previously at their current grade span (K-3, 4-6, and 6-8) or who were classified as Trainable Mentally Handicapped, Educable Mentally Handicapped, or Severely/Profoundly Mentally Handicapped were exempted from the state promotion standard. Any non-exempted students who scored below the 25th percentile on the CAT proceeded to Phase 2.

In Phase 2 students took the North Carolina Minimum Skills Diagnostic Tests (MSDT). MSDT: Phase 2 consisted of three tests of approximately 100 items each which measure mastery of competencies in reading, language arts, and mathematics (Appendix E). The untimed tests were administered near the end of the school year in approximately two-hour sessions on each of three days. Students scoring at or above a total score of 70% correct on these tests then met state standards for promotion and were promoted if they also satisfied local standards. Students failing to meet this criterion were retained unless they fell into the categories described in the preceding paragraph or successfully completed a summer school program in which they had another opportunity to develop the required skills. These students received first priority for remedial instruction in the Basic Education Program (BEP) Summer School. Any student who failed to meet local standards in grades 3, 6, and 8 was also eligible to attend the state-funded BEP Summer School and consequently took the MSDT: Phase 2.

At the end of summer school, students in the specified grades took the MSDT: Phase 3 which is an alternate form of MSDT: Phase 2. The test information and scores

were used to evaluate the summer school program. The results were also used by teachers and principals in the decision-making process for promotion or retention based on whether students had attained specific objectives and on local school district standards including teachers' judgment, grades, attendance, and maturity.

Alternate forms of the MSDT (A and B) were used in Phase 2 of the testing program. In 1988 Form A was used for Phase 2 testing. Each form contained three subtests corresponding to the three subject areas (reading, language arts, and mathematics). In Grade 6, each subtest consisted of 100 items presented in objective sequence. The pretests were designed to be administered in a group setting over three testing sessions that lasted approximately two hours each.

Given a choice between using a long or short form of the MSDT for posttest assessment, a majority of the school systems used Form B, the shorter 100-item version. The short forms, consisting of a random selection of items on Phase 2 tests, were identical in objective coverage to the pretests and designed to have the same means and standard deviations. They were intended to provide information for evaluating the summer school program and measuring the overall achievement of students in the content areas as well as providing individual diagnostic information and input for promotion/retention decisions.

Validity. In order to accomplish the purposes of minimum competency testing, the test scores must be valid. Although the various components of test validity are recognized as being interrelated, they are described separately in Technical Characteristics of the North Carolina Minimum Skills Diagnostic Tests (Division of Research, 1988). For curricular validity, the curriculum was defined through a cooperative effort by curriculum specialists, teachers, administrators, university professors, and others. The minimum competency objectives were adapted from the objectives stated in the North Carolina Standard Course of Study for Grade 6 under the subject areas tested. For in-

structional validity, the items were written that tested the basic minimum competency objectives in reading, language arts, and mathematics according to the levels adopted by the State Board of Education for Grade 6.

A number of operations defined content validity of the item pools including creating a pool of 600-items per grade level for each subtest and matching the items to minimum competency objectives. After reviewing, editing, and analyzing the sample items, 5400 items were available in the item pools for use in test development. The items were purchased from a test development company. Then 36 MSDT field tests were assembled at each grade level and given to samples of students selected from all school districts in the state. Next, the field test data were analyzed using the classical psychometric mode and the one-parameter Rasch model (BICAL program). Based on this psychometric analysis and review by curriculum specialists, separate item records were created.

The content validity of the tests was also determined in a lengthy process and involved a decision to use two forms of the MSDT. Subject area specifications were defined and met. Then test items were chosen by random selection from the usable items for each objective. Once the items had been assembled into test forms, they were reviewed by a curriculum supervisor and two teachers from each of the eight educational regions.

The final equating was based on statistics obtained at the first test administration in 1986 when Form A was used for students in grades 3, 6, and 8 scoring below the 25th percentile on CAT Total Battery, Form E. To facilitate standardization of samples, Form B was also administered to random samples of students required to take Form A.

In order to assess construct validity, the MSDT: Phase 2 (pretest) is administered at the end of the school year and prior to the beginning of the summer school program or intervention. At the end of the summer school program the MSDT: Phase 3

(posttest) is administered to assess student improvement. All gains in percentage of correct responses from the pretest to the posttest reported in 1986 (Form A) and 1987 (Form B) are statistically significant at the .01 level. Other procedures could have been used to establish the construct validity of the test.

Criterion-related validity of the test was established by examining the performance of students in summer school and its relationship to the promotion/retention decision, an independent measure of achievement. The difference in gain scores between students promoted and retained was only significant at the third grade level (Long Form MSDT:Phase 3). Although the information was not conclusive about the criterion-related validity of the MSDT, the results were interpreted as positive since the other differences in gain scores were in the hypothesized direction.

The classical scoring model was used to score the MSDT. It gives a unitary weight to each item. Total scores for each subtest are given as well as diagnostic scores for each objective.

Reliability. Reliability information including descriptive statistics, the standard errors of measurement, and the alpha reliability coefficients from the administration of the first test of record (May 1986) to Grade 6 of the MSDT (Forms A and B) is provided in the technical manual (Division of Research, 1988, p. 10). The alpha reliability estimates range from .88 to .92 in grade 6 compared to a range from .88 to .97 for all grade levels.

The alternate form reliability estimates are based on the first field-test administration in 1985 involving samples of students (approximately 500 at each grade level for each grouping of subtests). Because this analysis was based on a subgroup sample of students who scored below the 30th percentile on the CAT (Form E), it is reported to account for the alternate form reliability being slightly less than expected. Using an

equipercentile analysis, minimal adjustments were made to equate Form B to Form A resulting in increases in the alternate form reliability for all equated subtests.

Content of the Tests. The MSDT for grades 3, 6, and 8 each contain three subtests: reading, language arts, and mathematics. In Phase 2 for grade 6 each subtest contained 100 items with objectives represented randomly by item and presented in objective order.

Procedure for Data Collection

From the State Department of Public Instruction data set on LD and BEH sixth grade students who attended the 1988 BEP Summer School and took the MSDT, the school districts in each of North Carolina's eight educational regions that had BEH students attending summer school were identified. In order to equalize the sample size, LD participants were randomly selected from the computer listing by district based on a student ratio of nine LD students for each BEH student selected since this ratio approximated the summer school participants ratio.

Next, the following information was obtained from the 1988 CAT and MSDT computer files: Race, sex, and handicapping condition of student, parent education level reported for student, and reading, mathematics, and language scores on MSDT: Phase 2 (pretest) and MSDT: Phase 3 (posttest) for student.

A questionnaire (Appendix C) was designed to gather information regarding sample characteristics and aid in the determination of relationships between demographic and school variables and student performance. It was intended to survey responses regarding the following classroom and school variables: teacher certification, teacher experience, teacher training for summer school program, class size, and time al-

located for instruction. The questionnaire was pretested in three school districts. Several question forms were changed based on the results of the pretesting.

After field testing the questionnaire, summer school coordinators and directors of exceptional children from districts selected to participate in this study were asked to complete and return the questionnaire or to respond during a telephone interview to the questionnaire items. The lack of variance in reporting teacher experience, i.e., all systems reported using experienced teachers and could not give specific information on exact years of experience without access to personnel records or social security numbers, excluded teacher experience from the variables used in the analysis.

Some of the survey information was verified by visits to several summer school sites for interviews with personnel. Information obtained from the North Carolina Department of Public Instruction (NCDPI) Information Center on the number of teaching personnel in summer school and instructional time reported in the sampled school districts was also used to verify responses received from the summer school coordinators or exceptional children program administrators.

Data Collection

The Division for Testing in the State Department of Public Instruction supplied CAT and MSDT computer files from which the following information was obtained: race, sex, handicapping condition, parent education level, and total performance scores on MSDT: Phase 2 and Phase 3. To insure confidentiality, students were assigned an identification code. The NCDPI Information Service was contacted and supplied information obtained from the systems regarding summer school programs.

The summer school coordinators or exceptional children program administrators in the 38 school systems were contacted and they supplied information on teacher training in summer school workshops, teacher certification, teacher experience, and class size for the subjects in the research sample. Steps in this part of the data collection process included a pre-letter, initial questionnaire distribution or telephone call, and two follow-up mailings or telephone calls to non-respondents.

Pre-letter

A week prior to the initial contact regarding the questionnaire, a postcard was sent to all participants. The postcard briefly described the purpose of the study and encouraged participation.

Initial Mailing or Telephone Contact

The initial mailing to 13 summer school coordinators occurred on July 24, 1989. In the mailing each packet included an introductory letter of endorsement from a superintendent, an explanatory letter (Appendix B), and the Questionnaire (Appendix C) along with a stamped self-addressed envelope.

A personal telephone call was placed to summer school coordinators in 25 school districts from July 21 to August 11, 1989. The researcher described the purpose of the study and the approach used for sampling, asked survey questions, and probed when inadequate answers were given. The recording of answers was standardized according to the coding categories.

First Mailing or Telephone Follow-up

Three weeks after the initial survey mailing (August 14, 1989), a second packet of materials was sent to participants who had not responded by August 9, 1989. Each packet included a letter (Appendix B), a questionnaire (Appendix C), and a stamped, self-addressed return envelope. Summer school coordinators who had not returned telephone calls were called again.

Second Telephone Follow-up

Six weeks after the initial survey mailing (August 28, 1989), all participants who had not yet responded to the first two mailings or telephone calls were contacted by telephone and interviewed. Several school districts had personnel changes in the summer school positions and no response was obtained from those districts. Those contacted were asked questions from the Data Form pertaining to class size, teacher training, teacher experience, teacher certification, and instructional time for the identified students.

Coding

Subjects in the research sample were assigned an identification code (school system/school code/student) to protect the subject's privacy and to link the data from the Division of Testing and from the school/school system.

1. Race had four categories: Black, Indian, Other, and White. For the purpose of using the variable in regression analysis, it was recoded as a dummy variable: White = 1, Others = 0.
2. Sex was coded 0 for male and 1 for female.
3. The student's handicapping condition was coded 0 for learning disabled and 1 for behaviorally-emotionally handicapped.
4. The parent education level was coded 1 for eighth grade or less, 2 for more than eighth grade, but did not finish high school, 3 for finished high school, and 4 for some education after high school.
5. Teacher attendance at in-service was coded 0 for not attending, 1 for attending the local workshop for summer school training, and 2 for attending the state-funded inservice workshop.
6. Instructional time was computed by multiplying instructional hours per day (actual time spent by students in class related to basic skills found to be deficient on the MSDT) times the days per session of BEP summer school. The total time did not include time allocated for snacks, breaks, lunch, or other activities which were not classified as academic instruction.
7. Class size or student:teacher ratio was recorded as the actual number of students served in the summer school class. The numbers reported ranged from less than 6 to greater than 15.
8. Teacher certification was coded 0 for not having certification in an area of exceptionality, 1 for having a certification in another area of exceptionality, and 2 for having certification in emotionally handicapped/learning disabilities.
9. The dependent variables, language, reading, and mathematics scores, were reported as gain scores or the numerical difference between MSDT: Phase 2 (pretest) and Phase 3 (posttest) scores.

10. In cases of "no response" or "missing data," incomplete cases were eliminated from the statistical analysis. This factor accounted for the difference of ns.
11. Subjects in the research sample were assigned an identification code based on student, school, and district codes to protect the subject's privacy and to link the data sets.

Analysis of Data

The statistical analyses for this study were performed by using the Statistical Analysis System (Statistical Analysis System Institute, 1979) and the Statistical Package for the Social Sciences (Norusis, 1983) computer programs. After all measures had been scored, the data for each subject in the study from the Division for Testing and the questionnaire were coded and recorded on a data form. This information was used to construct a file merging the student data from the 1988 CAT and MSDT with the data from the school districts. This merged file was then transferred to Statistical Package of the Social Sciences (SPSSX).

Specific statistical procedures were selected on the basis of ability to provide information related to the research question. The procedures described were derived from the following research question: When one controls for the influence of demographic factors, i.e., race, sex, handicapping condition, and parent education level, does instruction time, class size, teacher training, and teacher certification account for a significant proportion of the variance in student achievement on reading, language, and mathematics as measured by the MSDT after summer school instruction? Specific statistical analyses related to the research question were:

1. A frequency count based on the demographic responses and number of respondents in each school variable category was used to describe the participants in this state-wide sample of LD and BEH students taking the MSDT.
2. Means and standard deviations were reported for selected variables of the study group.
3. A multiple regression model was constructed to describe the relationships between selected demographic and school variables and language, mathematics, and reading gain scores on the MSDT.
4. Dependent t tests were used to analyze the differences between the means for pre- and posttest performances.

Summary

This chapter reviewed the research methods used in this study. Guided by the stated research question, a target population and sample were described. Then data on the population and sample were gathered from the Information Center and Research Division of the North Carolina State Department of Public Instruction. Next, system level personnel were sent questionnaires and surveyed by telephone to collect data that supplemented the student and school information furnished by the State Department of Public Instruction. Data collection procedures were delineated. Finally, data manipulation and specific statistical procedures related to the research questions were described.

CHAPTER 4

FINDINGS OF THE STUDY

This chapter presents the findings of this study. The first section examines the basic descriptive statistics for the sample. The second section presents information relative to each variable and its power as a predictor for reading, language, and math scores on the Minimum Skills Diagnostic Tests (MSDT). Finally, the results of procedures relating to each research question are presented.

Questionnaire Response

Data collection procedures were detailed in Chapter 3. Briefly there were four steps in the questionnaire process: (1) a pre-letter mailed to summer school coordinators and exceptional children program administrators, (2) the initial questionnaire mailed or initial telephone contact to specified school administrators, (3) the first telephone or mailing follow-up, and (4) the second telephone follow-up (See Appendices B and C for details).

Return percentages for each data collection step are presented in Table 1. The final response rate was 92.10% with 35 out of 38 school districts responding.

Table 1. Survey Response Rates by School Districts

(N = 38)

Step	Number Returned	Percent of Total
Pre-letter Initial Mailing or Telephone Call	23	60.53
First Mailing or Telephone Follow-up	9	23.68
Second Telephone Follow-up	3	7.89
Total	35	92.10

In order to determine if districts with LD and BEH summer school populations were different from districts with LD-only populations, eight districts with LD-only students representing 51 subjects were also surveyed. The final response rate, 87.5% (n= 7), contributed data for 42 subjects. These districts were contacted to provide comparable demographic data. No significant differences were found to exist between classroom and school variables and student data in these districts and in the districts surveyed.

Descriptive Data

The first objective of the study was to provide descriptive data on the selected variables that previous research had shown to be correlates of achievement. Tables 2 and 3 array the distribution and basic statistics regarding the variables.

The responses of the summer school coordinators and/or exceptional children program administrators in addition to computer data from the North Carolina Department of Public Instruction (NCDPI) were used in this study to yield descriptive information on the student sample (Table 2). These data were also used to examine relationships among demographic, classroom, and school variables and mathematics, language, and reading performance scores for the MSDT.

Comparisons, where possible, were made with two sources of demographic information published by NCDPI: Report of Student Performance: The 1988 Basic Education Plan Summer School and Statistical Profile 1988, North Carolina Public Schools.

Table 2. Student Demographics for Sample

(N = 392)

Variable	Frequency	Percentage
Parent Education		
8th Grade or Less	40	10.5
9th-12th Grade	144	37.9
H. S. Graduate	149	39.2
Some Post H. S.	47	12.4
Not reported	12	...
Ethnicity		
American Indian	9	2.3
Black	133	34.2
White	247	63.5
Other	3	...
Sex		
Male	320	81.6
Female	72	18.4
Handicapping Condition		
Learning Disabled	313	79.8
Behaviorally-Emotionally Handicapped	79	20.2

Table 3. Means (M) for Selected School Variables and Test Score Differences

(N = 392)

	Mean
Parent Education	1.530
Class size	12.250
Instructional Time by Hours	82.00
Mathematics Score Difference	12.533
Reading Score Difference	8.727
Language Score Difference	2.810

Note: Using the reporting codes, reported parent education level averaged 12 years, but not necessarily graduation from high school.

Sex -- Males formed 81.6% (n = 320) of this sample and females 18.4% (n = 72). The report of Student Performance (1988) indicated percentages of 66.4 and 33.6 for males and females in BEP Summer School grade 6 respectively. However, LD and BEH populations are reported nationally to be predominately male.

Race -- American Indians formed 2.3% (n = 9) of the sample, Blacks 34.2% (n = 133), Whites 63.5% (n = 247) and Other > 0.1% (n = 3). The Report of Student Performance (1988) indicated percentages of 2.5, 50.1, 46.8, and 0.7 respectively. The sample consisted of primarily blacks and whites.

Handicapping Condition -- Learning disabled students formed 79.8% (n = 313) and behaviorally-emotionally handicapped 20.2% (n = 79) of the study sample.

Parent Education Level -- Of the 380 responses to this item, 10.5% (n = 40) indicated that the highest parent education level in the family was 8th grade or less while 37.9% (n = 144) had more than 8th grade education, but did not finish high school. A total of 39.2% (n = 149) indicated that a parent was a high school graduate and 12.4% (n = 38) reported some post-high school education. In 12 cases parent education was not reported in the NCDPI data (See Tables 2 and 3).

Class Size -- The class size varied among school districts with some school districts having a class size of less than one:nine (3.6%) while others had somewhat greater than the recommended 1:15 (2.8%). The mean class size was 12.25 (See Table 3) with a majority of the districts (80.3%) reporting a ratio of 10 to 15 students to a teacher. School districts were encouraged by the North Carolina State Department of Public Instruction

to maintain a summer school class size of no more than 15 students in order to ensure a low student:teacher ratio.

Certification -- Responses indicated that the majority (54.0%) of teachers instructing their LD and BEH students included in this study were not certified in an area of exceptionality. However, 39.4% of the school districts reported that teachers certified in learning disabilities instructed the LD students. In 14 cases, the certification of teachers was not reported.

Teacher Participation in Summer School Training -- All of the districts that responded to the questionnaire reported that the teachers instructing the sampled students either attended the state sponsored inservice workshop (45.2%) or the local inservice training (54.8%) for summer school teachers. Although not previously documented, these data appear consistent with the importance placed on staff development provided by the Department of Public Instruction in planning for the BEP Summer School Program (Instructional Services, 1988).

Instructional Time -- According to this sample, the length of the Summer School programs ranged from 20 to 30 days. The number of instructional hours ranged from 3 to 4 and one-half per day. According to the 1988 Summer School Program Report, out of 140 districts, the mean number of hours per day was 3.86 and number of days was 21.29.

The mean time for instruction for the sampled BEH and LD students was 82.0 hours (See Table 3). The total length of instructional time (number of days times number of hours) for the most of the sample (54.4%) fell into the range of 60-75 hours.

These figures appear congruent with the data reported by the 140 school districts indicating the mean for instructional time of 82.59 hours for all summer school students.

Criterion Variables --The means for MSDT score differences (pretest to posttest) varied with mathematics (M = 12.53) having a much higher mean than language (M = 2.81). The mean for reading (M = 8.73) was also higher than the language mean (See Table 3).

Relationships Between Criterion Variables and Selected Demographic and School Variables

Multiple regression analysis was employed to determine the relationships between reading, language, and mathematics student performance on the MSDT and selected demographic, classroom, and school variables. Two regression programs were used: the Statistic Analysis System's (SAS) General Linear Model (SAS Institute, 1979) and Statistical Package for the Social Sciences (SPSSX).

The first regression model used Language as the criterion variable and all predictor variables. The results of this analysis are reported in the multiple regression summary in Table 4. None of the predictor variables are strongly related to the difference in overall language scores. The value of R Square between the criterion (language scores) and the predictor variables was computed to be .00984. This total explained variance of the language score difference (.9%) and was not significant.

The second regression model was run using Mathematics as the dependent variable and no significant relationship was found. The results of this analysis are reported in Table 5. The total model explained .6% of the variance in overall mathematics scores.

Table 4. Multiple Regression Summary for MSDT Subtest for Language

Source	DF	Sum of Sq.	Mean Sq.	F	Signif. F
Regression	7	643.22677	91.88954	0.41	.8363
Residual	356	65755.55099	184.70660		

Estimate	B	SE B	Beta	T	Sig. T
Constant	2.122474	5.206157		.408	.6837
Ethnicity	.740639	1.503208	.026230	.493	.6225
Sex	-1.874878	1.859268	-.053797	-1.008	.3139
Parent Ed.	-.131119	.859139	-.008152	-.153	.8788
Certification	.924326	.767589	.068126	1.204	.2293
Training	.495439	1.517703	.018261	.326	.7443
Time	-.021593	.320561	-.003772	-.067	.9463
Class Size	-.061613	.373352	-.009577	-.165	.8690

Multiple R	R Square	Adjusted R Square	Standard Error
.09842	.00969	-.00979	13.59068

Table 5. Multiple Regression Summary for MSDT Subtest for Mathematics

Source	DF	Sum of Sq.	Mean Sq.	F	Signif. F
Regression	7	481.78927	68.82704	0.337	.9369
Residual	356	72779.24530	204.43608		

Estimate	B	SE B	Beta	T	Sig. T
Constant	13.861395	5.477152		2.531	0.118
Ethnicity	.537332	1.581454	.018117	.340	.7342
Sex	.033382	1.956048	9.119E-04	.017	.9864
Parent Ed.	.380328	.903860	.022512	.421	.6742
Certification	.576743	.807544	.040468	.714	.4756
Training	-1.632948	1.596703	-.057300	-1.023	.3071
Time	-.201279	.337247	.033470	.597	.5510
Class Size	-.080382	.392786	-.011895	-.205	.8380

Multiple R	R Square	Adjusted R Square	Standard Error
.08109	.00658	-.01296	14.29811

The third regression model using Reading as the criterion variable also showed no significant relationship for any of the predictor variables. Only .3% of the variance in reading scores was explained by the model. However, class size and teacher certification correlated more closely with reading performance than with the other dependent variables. The results of this analysis are reported in Table 6.

A correlation matrix presenting intercorrelations of the variables is reported in Table 7. No high correlations were found including the intercorrelations of the three dependent variables.

Dependent T-Tests

Because no significant results were found using the regression procedure and yet summer school data reported student gains, on a post hoc basis, an analysis utilizing dependent t tests was done. These dependent t tests were used to determine if the pre- and post-test scores differed significantly from each other.

Since there was a difference in number of items between pre- and posttest, (posttest was 33 items as compared to the 100-item MSDT: Phase 2 pretest), the posttest was given the same weight as the pretest.

A significant increase from pretest to posttest mean was noted for each tested area for the subjects in the study. See Table 8. The most significant increase occurred in mathematics ($p < .001$). Reading scores from pretest to posttest also revealed a significant difference between the means indicating that summer school interventions in reading and mathematics may be more effective than interventions in the language areas.

Table 6. Multiple Regression Summary for MSDT Subtest for Reading

Source	DF	Sum of Sq.	Mean Sq.	F	Signif. F
Regression	7	2738.10605	391.15801	1.76347	.0936
Residual	356	78964.73163	221.81104		

Estimate	B	SE B	Beta	T	Sig. T
Constant	19.625040	5.705157		3.440	.0007
Ethnicity	.071945	1.647287	.002297	.044	.9652
Sex	-1.487558	2.037475	-.038479	-.730	.4658
Parent Ed.	-.424352	.941486	-.023784	-.451	.6525
Certification	1.422281	.841161	.094500	1.691	.0917
Training	-1.437862	1.663172	-.047777	-.865	.3879
Time	.115677	.351286	.018215	.329	.7421
Class Size	-.780762	.409137	-.109405	-1.908	.0572

Multiple R	R Square	Adjusted R Square	Standard Error
.18307	.03351	.01451	14.89332

Table 7. Intercorrelations Among the 11 Variables

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Race	--	.037	-.020	-.078	.116	.105	-.071	-.072	.012	.020	.012
2. Parent Ed.		--	-.121	-.046	-.039	.008	.044	.024	.045	.026	.007
3. Sex			--	.059	-.106	-.056	.025	.095	-.010	-.064	-.052
4. Size				--	.011	-.340	.204	.243	-.029	-.031	-.148
5. Condition					--	.025	-.152	-.111	-.012	-.038	.019
6. Certification						--	-.014	.076	.037	.068	.125
7. Training							--	.082	-.040	.022	-.061
8. Time								--	.076	.040	.029
9. Mathematics Score									--	.242	.178
10. Reading Score										--	.200
11. Language Score											--

Table 8. T Tests for MSDT Pre- and Posttest Scores

	M (Pretest)	SD	M (Posttest)	SD	t
Language	65.1710	15.823	68.2839	18.449	-4.67*
Mathematics	42.7435	11.941	55.7804	16.519	-18.45*
Reading	56.5026	16.188	65.5059	18.677	-11.97*

* $p < .001$

Note: Six students did not have pre- and post-test data.

Summary

None of the eight independent variables selected for the study contributed significantly to the prediction equation for achievement of LD and BEH students in reading, language, and mathematics as measured by the MSDT after summer school instruction. This research looked at 392 mildly handicapped students who took both phases of the MSDT. Some variations in Ns occurred because of missing data elements. Data were gathered and analyzed in the form of eight predictor variables for each student. Although the regression analysis did not yield significant results, the dependent t tests revealed significant differences between pre- and posttest mean scores in reading, language, and mathematics for the subjects.

CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

An interpretation and discussion of the results of the study are presented in this chapter. The first section reviews the research questions and the methodology. The second section is a summary of the results and conclusions. The third section is a discussion of the results. The fourth section provides implications of the study. The last section presents recommendations for future research.

Review of the Research Questions and Methodology

The study was designed to describe and investigate which student, classroom, and school characteristics are related to the achievement of mildly handicapped students in reading, language, and mathematics. The most important question investigated was: When one controls for the influence of demographic factors, i.e., race, sex, handicapping condition, and parent education level, do such factors as instructional time, class size, teacher training, and teacher certification account for a significant proportion of the

variance in student achievement in reading, language, and mathematics as measured by the MSDT after summer school instruction?

Based on reports from the Division of Testing (1988) on MSDT scores and demographic data for LD and BEH sixth graders, 392 students were identified for this study by selecting a subsample from districts reporting both LD and BEH students attending the 1988 BEP Summer School. The subsample was designed to include all BEH students and randomly selected LD students (1:9). Each of these 38 districts was surveyed to obtain data on classroom and school characteristics. In addition, 11 districts with LD-only students did not differ from data of districts with both LD and BEH students.

Survey distribution and collection of demographic data were implemented by mail and/or telephone interviews and involved four steps: (1) a pre-letter, (2) the initial questionnaire mailed or initial telephone contact to all participants, (3) the first telephone or mailing follow-up, and (4) the second telephone follow-up.

Of the 38 selected districts, 35 responded for a response rate of 92.10%. The responses and State Department data were coded for 392 students and this information was analyzed statistically using the computer facilities at Virginia Tech and Tidewater Community College. Because of invalid numeric fields in the State Department data set, some non-usable returns were deleted from a specific variable analysis.

Summary of Results and Conclusions

The research questions that served as a basis for this study were also used as a foundation for summarizing the results and conclusions. An 8-independent-variable model using a forward and backward multiple regression was constructed. Language,

reading, and mathematics test scores derived from the difference between Phase 2 scores and Phase 3 scores served as the criteria. Race, sex, handicapping condition, parent education level, instructional time, class size, teacher training, and teacher certification served as the predictor variables.

On the basis of the independent variables selected for this study, it was not possible to predict student performance on the MSDT language, reading, or mathematics tests. However, results from the dependent t tests indicated that significant performance gains were made by the sample population in all three areas.

Discussion

The results of the study are consistent with findings by some researchers that certain demographic variables related to performance for normal populations are not significant in studies using handicapped populations (Strosnider, 1986; Santilli & Fisher, 1985). For example, in Strosnider's study involving mildly handicapped students who took Maryland's tests, ethnicity alone did not significantly influence students' results on MCTs. Santilli and Fisher also found no significant difference in handicapped students' results based on race. Although Serow, Davies, and Parramore (1982) found race to be a factor affecting student improvement on MCT retests in North Carolina, others concluded that race may only be a factor when analyzed in combination with other pupil and program characteristics (Strosnider, 1986).

Data on indicators of general ability, severity of the handicapping condition, student level of services or assistance, and grades were not available because of confidentiality restrictions. An ability measure, commonly used in prediction studies, was not available without a written parent release because of legal restraints and

confidentiality laws governing exceptional children records (Division for Exceptional Children, 1988). In other studies this variable was found to be highly correlated with student success on MCTs (Strosnider, 1986). In addition to the ability measure and race, Strosnider found handicapping condition, sex, mathematics grades, and CAT scores became a part of the discriminant function in predicting success or failure on Maryland's MCT for Baltimore students.

Unfortunately, no data on student setting, grades, or severity of the handicapping condition linked to student name or codes were reported at the State Department level in North Carolina. Also, Florida's large-scale studies involving handicapped students and MCTs have not been designed to gather data on ability and other distinguishing factors (Algozzine, O'Shea, Crews, & Stoddard, 1987). An analysis based on these variables would involve observational or ethnographic research and parent releases for a much smaller sample than was used in this study or in the Florida investigation.

Grades for handicapped students do not necessarily have a strong predictive relationship with achievement because assessments and instruction are more directly related to the Individualized Education Program (IEP). For example, when looking at results in Strosnider's study (1986), mathematics grades were not found to be a significant variable in predicting success on MCTs.

An indicator of the severity of the handicapping condition was not available because this information is part of a student's confidential records. However, the student level of services as indicated by placement setting (i.e., regular class, resource, separate class) has been used in other studies to approximate the severity of handicapping condition. In North Carolina, no data on student setting is reported at the state level that would link MSDT student codes with this information.

Although selected quantitative variables cited in effective schools literature were used in this study, several investigated characteristics involving engaged time or time on

task, instructional techniques, class management strategies, school climate, and instructional leadership were not included because this information was either not available or not quantifiable for the sample size. All of these variables, but specifically, more refined measures of learning time, might be considered for future studies.

As researchers have pointed out, most major studies of school learning have not included measures of student learning time as a variable (Bloom, 1976; Rosenshine, 1989). Although allocated time is a powerful tool that teachers and administrators can manipulate to increase pupil achievement, by using more sophisticated variables such as engagement rate and success in addition to allocated time, one should be able to account for a substantial amount of pupil achievement (Borg, 1989).

The concept of Academic Learning Time (ALT), an important contribution of the Beginning Teacher Evaluation Study (BTES), included an estimate of quality of instruction. This variable was measured through interviews with teachers, aides, and other personnel involved directly with students (Fisher, et al., 1978). Since huge variations in allocated time are a fairly permanent fact of life in public schools, this variability may have influenced achievement differences, if assessed by direct observation and if measured over a longer time period.

An additional factor that may account for the lack of significant findings in this study is that some of the characteristics associated with student success have been researched using non-handicapped populations. Although effective teaching and schools research has identified teacher and school characteristics associated with pupil learning, these studies generally used regular classroom settings when conducting the research. If information had been available on the severity of the handicapping condition, then this factor might have related more positively to student performance than the variables based on effective schools and teaching research.

For the data sets that were available and collected, discrepancies were noted in the information provided on demographics from the CAT Student Information Questionnaire and the MSDT. Sex, ethnicity, and handicapping condition were recorded on the MSDT; therefore, this information was available for most students. Discrepancies were noted in parent education information when reported on Phase 2 and Phase 3 tests. The information was either missing or varied significantly from the first data entry to the second entry several months later on the MSDT which could have impacted on the data analysis. For example, parent education level was coded as "8th grade or less" on MSDT Phase 2 and as "some post high school" on MSDT Phase 3 several months later.

Other indicators of socio-economic status (SES) are regarded as more reliable, i.e., parent income level and occupation. The best indicator is a combination of the three data sources. Frequently, predictor or parent variables are extracted from interviews with parents. Data are then converted into a socio-economic index score based on educational status, income level, and prestige ranking (Blishen & McRoberts, 1976). However, no other information was available on SES because of confidentiality restraints relating to exceptional children records.

Another artifact of the parent education level data was the lack of discrimination in the two categories of "more than 8th grade, but did not finish high school" and "finished high school" in the case of a parent who had a 12th grade education as reported on the Student Information Questionnaire (California Achievement Tests, 1991). A more accurate indicator would have been the number of years of schooling completed.

Critics of assessment procedures for handicapped students contend that technically inadequate tests are frequently used (Ysseldyke & Algozzine, 1982). Based on characteristics of reliability and validity, the MSDT pretest and posttest formats raised some issues in this area. The test reliability would have been greater if school districts had elected to use the long form for MSDT Phase 3 testing (posttest). The long form

consisting of 300 items was an alternate form of the pretest administered at Phase 2. In the short form test consisting of 100 items, the reliability of the measure is also lower than it would be if the longer version had been used. The caution that the longer version provided individual diagnostic information whereas the shorter version was primarily intended for use in evaluating the summer school program was included in the state report (Division of Testing, 1988). However, only 23% of all school districts elected to use the Phase 3 MSDT long form test. Furthermore, out of the 38 school districts surveyed, all but one chose to administer the MSDT Phase 3 short form. Discrepancies in comparing scores from pretest to posttest may have occurred because of decisions based on economics and time factors.

The dependent t tests analysis did indicate a significant difference between the means from pretest to posttest scores in each area. Both statistical and practical significance were noted in reading and mathematics gains. Based on this information it appears that language skills are more difficult to remediate during a short term intervention process such as summer school.

Implications of the Study

From this study, several implications can be drawn that may have value to teachers, school systems, administrators, the Department of Public Instruction, and policy makers involved in planning, organizing, and implementing summer school programs, services for exceptional children, and educational assessments.

At a time when the funding of the Basic Education Program is being debated and budgetary cuts are imminent (Simmons, 1991; North Carolina School Boards Association, 1991), this study should provide data on the program and school characteristics.

Since these factors were reported to have an impact on test scores and to improve the basic skill levels of low-achieving students, it was reasoned that analyses such as these would provide a valuable benchmark in evaluating selected variables for sixth grade LD and BEH students.

Although a long-term follow-up of third- and sixth-grade graduates of the 1986 Summer School had investigated whether the effects were sustained into the next year, these students were compared to similar students who did not experience the remediation program (Ward, 1989). Inconsistent differences at the sixth grade level on grades and absenteeism and the subgroups (i.e., LD and BEH students) sampled rendered value to a study of this nature.

Although students made gains in summer school, this study did not provide an answer to the "why" question. Since the beginning of the reform movement, there have been discussions about lengthening the school year. When school is in session, advantaged and disadvantaged children learn at about the same rate. However, since basic skills deficits are exacerbated during the summer months for disadvantaged youths (Berlin & Sum, 1988; Heyns, 1987), year-round schooling would give all students an equal opportunity to learn and not have the negative connotation that is frequently associated with MCT and remediation programs.

Several aspects of the technical characteristics of the Minimum Skills Diagnostic Tests are in need of examination. The three achievement tests were not highly correlated according to the data analysis in this study. If any evidence is substantiated that technically-inadequate data procedures might lead to decisions having significant effects on students' lives, then educators need to examine carefully decision-making processes based on these assessments.

Technical issues with standardized testing have also created many complex problems for policy makers (Algozzine, O'Shea, Crews, & Stoddard, 1987). Debates

have been held over the nature of tests used for competency programs, test validity and reliability, and the manner in which test performance is related to state standards. With more and more emphasis being placed on assessment, and particularly assessment of minimum competencies, policies regarding handicapped students and MCT raise a number of queries. Will districts attempt to exempt handicapped students so their scores will not lower district-wide testing results? Should handicapped students not be held accountable to develop competencies and their teachers not be expected to demonstrate that students have acquired basic skills?

This study does not necessarily answer any of these questions, but it does suggest that policy makers and educators should address some of these issues since handicapped students attend summer school in large numbers. The reported gains were substantiated for this sample, but the study variables selected from the characteristics associated with successful programs in the instructional planning for summer school were not highly correlated with student performance.

By using a special sample, a model is not going to get the variability one would expect to find in a population with a normal distribution. Since the variables used in the model were generally researched using a population with a normal distribution, the research reported acceptable ranges of variability. This study does not serve to correct the false conclusion that many have drawn from Coleman's Equality of Educational Opportunity report (1966)--that schooling has no effect on student learning. It also does not confirm the significant effect quantity of schooling is reported to have on achievement (Borg, 1980; Carroll, 1963; Fisher, et al., 1978). It does, nonetheless, indicate the need to establish the relative contribution of the teacher on learning, particularly with respect to policy makers and the public, since most school monies are earmarked for instructional costs. If the research on this relationship continues to be vague, then a

strong case will surely be made for limiting the funding of special programs such as summer school.

However, few studies were found indicating correlations between effective schools and teaching variables and the achievement of special populations. Different variables might produce significant results for a larger, randomly selected sample of LD and BEH students. A more appropriate model may need to include the severity of the handicapping condition, general ability, student setting (consultation, resource, or self-contained), and the length of time that special education services have been delivered.

North Carolina has not had mandated preschool programs for handicapped students. This factor may have limited the opportunities for learning for certain subgroups. In discussing mastery learning studies, Bloom (1976) maintained that where help and time are provided to slower students, and these students are motivated, 90 percent or more finally reach the learning criteria level.

If the North Carolina State Board of Education, the Department of Public Instruction, and the legislature are seeking hard data sources that will measure student outcomes, it may be necessary to examine the data quality and ensure careful collection techniques before making funding and policy decisions on the Basic Education Program and Senate Bill 2 (The School Improvement and Accountability Act, 1989). The technical flaws noted in the data format and inconsistencies in reporting could have a significant impact on many levels.

Recommendations for Future Research

The findings of this study served as the basis for the following recommendations for future research for educators, State Departments of Education, and policy makers.

1. Additional studies of the performance of mildly handicapped students on MCTs should be conducted to examine the effect of variables such as the severity of the handicapping condition, general ability, time on task, student motivation, instructional techniques, and the duration/setting of special education services.

2. Longitudinal studies should be conducted to examine trends in the performance of these populations after early intervention programs such as preschool handicapped programs have had an opportunity to make an impact.

3. Since few studies have used the selected effective schools and teaching characteristics to explain variance in a different type of population, research should be conducted to investigate the effect of effective schools and teaching variables on the performance of handicapped populations.

4. Because of inadequacies found in the data sets, research on information collection related to school system performance should be undertaken to ensure that system comparisons on characteristics as documented in North Carolina's Report Card (North Carolina State Board of Education, 1990) are based on valid and reliable sources of data.

Summary

This chapter has provided an opportunity for explanation and interpretation of the results of the study. It is apparent that student learning took place, but "why" remains unanswered. Several implications have been drawn and recommendations pertaining to educators, administrators, State Departments of Education, and policy makers have been made. Recommendations for future research concluded this chapter.

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Appendix A. 1988 BEP Summer School Demographics

BEP Summer School
Average Statewide Student Demographics*
Grades 3, 6, and 8

	1988	
	Number	Percent
<u>Sex</u>		
Male	14318	64.0
Female	8052	36.0
<u>Ethnicity</u>		
American Indian	785	3.5
Black	11203	50.1
White	10188	45.6
Other	190	0.8
<u>Exceptional Children Classification</u>		
Not Classified as Exceptional	13278	79.0
Other Health Impaired	0	0.0
Multihandicapped	59	0.3
Hearing Impaired	43	0.3
Speech/Language Impaired	263	1.6
Visually Impaired	7	0.1
Emotionally Impaired	348	2.1
Orthopedically Impaired	16	0.1
Learning Disabled	2657	15.8
Mentally Handicapped	132	0.8
<u>ECIA Chapter 1 Participation</u>		
None	10338	61.4
Reading	3785	22.5
Mathematics	507	3.0
Reading and Language	940	5.6
Reading and Mathematics	1206	7.2
Other	65	0.4
<u>Parent Education Level</u>		
8th or less	1080	6.7
9th to 12th	4716	29.0
High School Graduate	7892	48.6
Some Post-High School	2547	15.7
<u>Days Absent**</u>		
0-7	11177	66.3
8-14	3563	21.1
15-221	1355	8.0
Over 21	768	4.6

(continued)

	1988	
	Number	Percent
<u>Migrant Education Program</u>		
Yes	125	0.7
No	16728	99.3
<u>Prior Grade Retentions</u>		
Never Retained	14933	61.8
Retained in current grade span	1734	7.2
Retained at least once	7498	31.0

*Figures based on BEP Summer School students for whom demographic information from the North Carolina Annual or Minimum Skills Diagnostic Testing Program Student Information Questionnaire was available.

**As of the time of Annual Testing

NA = Not Available

Note. From Report of Student Performance (p. 8) by Division of Testing, 1988, Raleigh, NC: North Carolina Department of Public Instruction.

Appendix B. Survey Letters

Elizabeth City-Pasquotank
Board of Education

P.O. Box 2247 • 1200 Halstead Boulevard
Elizabeth City, North Carolina 27909
Telephone (919) 335-2981

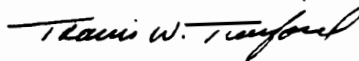
July 21, 1989

To Whom It May Concern:

Mrs. Judy G. Thorne, an exceptional children's teacher in the Elizabeth City-Pasquotank County School System, is currently working toward an Ed.D. Degree from Virginia Polytechnic Institute. As a part of her dissertation study, she is conducting a survey of summer school programs for certain categories of exceptional children. A copy of the survey is attached for your information. I would personally request that you encourage your appropriate staff person to complete and return the survey to Mrs. Thorne, so that her data will be complete and accurate.

I fully acknowledge that this is a busy time of the year for you and your staff; however, I hope that you will assist Mrs. Thorne in this undertaking. I wish to thank you in advance for your cooperation and assistance.

Sincerely,



Travis W. Twiford, Ed.D.
Superintendent

TWT/djm
ATTACHMENT

Elizabeth City-Pasquotank
Board of Education

P.O. Box 2247 • 1200 Halstead Boulevard
Elizabeth City, North Carolina 27909
Telephone (919) 335-2981

July 24, 1989

Dear Summer School Coordinator:

As you may have observed, a significant number of mildly handicapped students attend the Basic Education Program Summer School. As a concerned special educator and graduate student in education administration, I am gathering information about factors related to the participation of learning disabled (LD) and behaviorally-emotionally handicapped (BEH) students in the 1988 BEP Summer School.

As a coordinator, your input will contribute significantly toward an examination of some of the issues we face in this important area of education. By taking a few minutes to complete this survey, you will be assisting in needed research on exceptional children in the summer school program and ways to improve education for these students. This information will lead to specific recommendations and the results will be shared with the N.C. Department of Public Instruction.

Because the survey is based on a cross-section sampling of summer school students, it will be appreciated if you will complete the enclosed form prior to August 16 and return it in the stamped enclosed envelope. All replies will be held in strict confidence.

I realize that you are busy and thank you for your participation in this project. I will be pleased to send you a summary of the survey results if you desire and your school system can receive credit in this study at your request.

Sincerely,



Judy G. Thorne, Teacher of
Exceptional Children

encl: Survey Questionnaire
Postage-paid Return Envelope

Elizabeth City-Pasquotank
Board of Education

P.O. Box 2247 • 1200 Halstead Boulevard
Elizabeth City, North Carolina 27909
Telephone (919) 335-2981

July 24, 1989

Dear Exceptional Children Program Administrator:

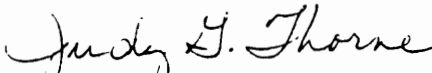
As you may have observed, a significant number of mildly handicapped students attend the Basic Education Program Summer School. As a concerned special educator and graduate student in education administration, I am gathering information about factors related to the participation of learning disabled (LD) and behaviorally-emotionally handicapped (BEH) students in the 1988 BEP Summer School - information that only you who are working with exceptional children can supply.

As a director, your input about your programs will contribute significantly toward a study of some of the issues we face in this important area of education. By taking a few minutes to complete this survey, you will be assisting in needed research on exceptional children in the summer school program and ways to improve education for these students. This information will lead to specific recommendations and the results will be shared with the N.C. Department of Public Instruction.

Because the survey is based on a cross-section sampling of summer school students, it is essential that each of you who receives the questionnaire complete it prior to August 16 and return it in the stamped enclosed envelope. All replies will be held in strict confidence.

I realize that you are busy and thank you for your participation in this project. I will be pleased to send you a summary of the survey results if you desire and your school system can receive credit in this study at your request.

Sincerely,


Judy G. Thorne, Teacher of
Exceptional Children

encl: Survey Questionnaire
Postage-paid Return Envelope

Appendix C. Data Form

LEA - School Code _____
Student(s) _____

SUMMER SCHOOL SURVEY

DIRECTIONS: PLEASE RESPOND TO EACH OF THE ITEMS BELOW BY FILLING IN THE APPROPRIATE SPACE. Remember that this information is for the 1988 BEP Summer School.

1. What was the number of students (student:teacher ratio) in the sixth grade summer school class in which this student(s) was enrolled?

_____ students

2. The sixth grade teacher for the student(s) was certified in:

Learning Disabilities (LD) _____
Severely Emotionally Handicapped (BEH) _____
Another area of exceptionality _____
No area of exceptionality _____

3. The sixth grade teacher attended:

State funded inservice workshop for summer school personnel (regional center) _____
Local workshop for summer school training _____
No summer school training _____

4. The sixth grade teacher's years of teaching experience:

0 years _____
1 or more years _____

5. Hours per day in 1988 that sixth grade students spent in mastering basic skills; do not include time for snacks, breaks, lunch, etc.

_____ hours

6. Instructional days in session for 1988 BEP Summer School for sixth graders; include only those days on which the students received instruction; do not include any teacher workdays. If you had more than one summer session, report only the BEP.

_____ days

Return to: Judy G. Thorne
402 Pineview Drive
Elizabeth City, NC 27909

Appendix D. Student Information Questionnaire

1990-1991

grade 6

NORTH CAROLINA ANNUAL TESTING PROGRAM BASIC SKILLS

CAT California Achievement Tests Level 16 Form E

3 6 8

1. Print the requested information in the boxes for each item.

2. Print the requested information in the boxes for each item.

3. Check to see that the circles are filled in accurately.

4. Erase when necessary.

5. Erase when necessary.

School: BLADE HILL

Teacher: B. AUCKER

Student's Last Name: ZARESKI

Student's First Name: SARKIS

Student's Middle Initial: MI

Student's Social Security Number: 5050 1000

Student's Date of Birth: 11/27/83

Student's Sex: Male Female

Student's Ethnic Group: American Indian White Black Other

Student's Participation in ECIA Chapter I program: No Yes, Reading Yes, Mathematics Yes, Reading and Language Yes, Reading and Mathematics Yes, other

Student's Highest Educational Level: Eighth grade or less More than eighth grade, but did not finish high school Finished high school Some education after high school

Student's Absence: 0-7 days 8-14 days 15-21 days More than 21 days

Student's Participation in Migrant Education Project: Yes No

STUDENT INFORMATION QUESTIONNAIRE (To be completed by teacher or counselor) DIRECTIONS: Please answer the following items about this student. If you have any questions about any item or items, refer to the Test Administrator's Manual: Part I or bring them to the attention of your Testing Coordinator before turning in your materials.

- What is this student's sex?
 Male Female
- What is this student's ethnic group?
 American Indian White
 Black Other
- Is this student participating in an ECIA Chapter I program this year? (If "Yes," please mark the one choice that most accurately describes the program.)
 No
 Yes, Reading
 Yes, Mathematics
 Yes, Reading and Language
 Yes, Reading and Mathematics
 Yes, other
- Using the following educational levels determine, if possible, the highest level attained by either of this student's parents.
 Eighth grade or less
 More than eighth grade, but did not finish high school
 Finished high school
 Some education after high school
- To date, how many days has this student been absent from school this year?
 0-7 days 15-21 days
 8-14 days More than 21 days
- Is this student participating in the instructional phase of a migrant education project?
 Yes No

89390

Figure 2. Student Information Questionnaire

STUDENT INFORMATION QUESTIONNAIRE (To be completed by teacher or counselor) **DIRECTIONS** Please answer the following items about this student. If you have any questions about any item or items, refer to the Test Administrator's Manual: Part I or bring them to the attention of your Testing Coordinator before turning in your materials.

1. What is this student's sex?
 Male Female

2. What is this student's ethnic group?
 American Indian White
 Black Other

3. Is this student participating in an ECIA Chapter I program this year? (If "Yes," please mark the one choice that most accurately describes the program.)

- No
 Yes, Reading
 Yes, Mathematics
 Yes, Reading and Language
 Yes, Reading and Mathematics
 Yes, other

4. Using the following educational levels determine, if possible, the highest level attained by either of this student's parents.

- Eighth grade or less
 More than eighth grade, but did not finish high school
 Finished high school
 Some education after high school

5. To date, how many days has this student been absent from school this year?

- 0-7 days 15-21 days
 8-14 days More than 21 days

6. Is this student participating in the instructional phase of a migrant education project?

- Yes No

7. Listed below are the categories which the Division for Exceptional Children uses in identifying children with special needs. Using this list, indicate which ONE of the following categories best describes this student's official classification as an exceptional student by specially trained personnel (e.g., doctor, psychologist). (For assistance, refer to "Brief Definitions of Student Exceptionalities," which is located in the Appendix of the Test Administrator's Manual: Part 1.)

- Not classified as an exceptional student
 Academically Gifted
 Multihandicapped - student has more than one handicap
 Hearing impaired
 Speech and/or language impaired
 Visually impaired
 Behaviorally/Emotionally handicapped
 Orthopedically impaired
 Specific learning disability
 Mentally handicapped
 Other health impairment

8. Mark the grade or grades this student has repeated.

- None
 K
 1
 2
 3



Published
1987

Minimum Skills Diagnostic Tests

grade 5

Machine-readable bubbles for recording student information.

MI [Row of bubbles]

School

First Name [Rows of bubbles]

Student's Last Name [Rows of bubbles]

Teacher

Student's Last Name [Rows of bubbles]

DIRECTIONS: This form is processed by machine. The following steps are necessary to process and report information accurately.

- 1 Use No. 2 pencil only.
- 2 Print the requested information in the boxes for each item.
- 3 Fill in the circle that goes with the letter you printed in each box.
- 4 Check to see that the circles are filled in accurately.
- 5 Erase errors completely.

Additional machine-readable bubbles for recording test results.

STUDENT INFORMATION QUESTIONNAIRE (To be completed by teacher or counselor)

DIRECTIONS: Please answer the following items about this student. If you have any questions about any item or items, refer to the *Test Administrator's Manual* or bring them to the attention of your Testing Coordinator before turning in your materials.

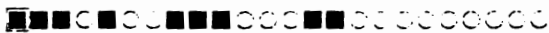
1. What is this student's sex?
 Male Female

2. What is this student's ethnic group?
 American Indian White
 Black Other

3. Listed below are the categories which the Division for Exceptional Children uses in identifying children with special needs. Using this list, indicate which **ONE** of the following categories best describes this student's **OFFICIAL** classification as an exceptional student by specially trained personnel (e.g., doctor, psychologist). For students not classified as exceptional, be sure to fill in "Not classified as an exceptional student."

- | | |
|--|--|
| <input type="radio"/> Multihandicapped-student
has more than one handicap | <input type="radio"/> Not classified as an exceptional student |
| <input type="radio"/> Hearing impaired | <input type="radio"/> Deaf-Blind |
| <input type="radio"/> Speech and/or language impaired | <input type="radio"/> Behaviorally/Emotionally handicapped |
| <input type="radio"/> Visually impaired | <input type="radio"/> Orthopedically impaired |
| | <input type="radio"/> Specific learning disability |
| | <input type="radio"/> Other health impairment |

DO NOT
MARK
IN THIS AREA



25495

Appendix E. MSDT Objectives

January 6, 1986

OBJECTIVES FOR THE NORTH CAROLINA
MINIMUM SKILLS DIAGNOSTIC TESTS

GRADE 6

READING/LANGUAGE ARTS	MATHEMATICS
<ol style="list-style-type: none"> 1. Read a passage with a reading level of 5.0 and identify the main idea 2. Read a passage with a reading level of 5.0 and identify a detail stated in the passage 3. Read a passage with a reading level of 5.0 and select the correct sequence of events * 4. Read a passage with a reading level of 5.0 and identify the setting 5. Read a passage with a reading level of 5.0 and identify the cause and effect of a relationship 6. Read a passage with a reading level of 5.0 and select the best conclusion 7. Read a passage with a reading level of 5.0 and identify the character's traits, attitudes, and actions * 8. Read independently a variety of materials 9. Identify synonyms, antonyms, and multiple meanings of words 10. Identify root words and affixes 11. Recognize word categories 12. Capitalize first word in sentences, names of persons and places, days of the week, months of the year, and the pronoun "I" when writing 13. Identify correct spelling of words 14. Choose the correct punctuation for a short paragraph 15. Identify correct plurals of nouns and verbs 16. Select forms of verbs to agree with subjects 17. Choose the correct pronoun to represent a given noun * 18. Write descriptive and clarification paragraphs consisting of complete sentences related to the topic, and using conventional grammar, punctuation, capitalization, and legible handwriting 19. Identify correct abbreviations 20. Locate information in directories and reference materials * 21. Participate appropriately in a group discussion as both a speaker and a listener * 22. Follow three-step oral and written directions in sequence 	<ol style="list-style-type: none"> 1. Write the standard form of a number up to millions 2. Compare numbers to millions 3. Add two 4- or 5-digit numbers (with regrouping) 4. Subtract two 4- or 5-digit numbers (with regrouping) 5. Multiply a 2-digit number or a 3-digit number by a 1-digit number (with regrouping) 6. Multiply a 3-digit number or a 2-digit number by a 2-digit number 7. Divide a 3- or 4-digit number by a 1-digit number with a zero in the quotient 8. Divide a 3- or 4-digit number by a 2-digit number 9. Use an estimate to check the reasonableness of a given sum, difference, product, or quotient 10. Write decimals to thousandths 11. Add decimals to thousandths 12. Subtract decimals to thousandths 13. Write decimals greater than 1 using tenths and hundredths 14. Write the least common multiple of two numbers 15. Find the greatest common factor of two numbers 16. Write the simplest form for a fraction 17. Write a fraction or mixed number with denominator 10, or 100 as a decimal and a decimal as a fraction 18. Multiply two unit fractions or a fraction by a whole number 19. Multiply a mixed number by a fraction, or a whole number 20. Multiply a decimal and a whole number or 2 decimals in tenths 21. Add fractions 22. Read and interpret bar, line, circle, and picture graphs 23. Add, subtract, multiply, and divide to solve word problems appropriate to computational level 24. Determine appropriate metric unit for length, using centimeter, meter or kilometer * 25. Determine appropriate U.S. customary unit for length using inch, foot, yard or mile 26. Solve word problems involving money 27. Solve problems involving perimeter and area when a formula is given 28. Compare decimals 29. Find the average of a group of numbers 30. Identify angle, parallel lines, and perpendicular lines
<p>Note: Taken from the <i>Basic Education Plan</i>, January 1986</p>	

*Objective not tested by the NCMSDT

NCMSDTP 3 - 2

Vita

BIOLOGICAL INFORMATION

Judy Guillet Thorne
Birthdate: March 28, 1946
Married to: Robert E. Thorne
Children: Ashlee (20), Anna Barrett (16)

402 Pineview Drive
Elizabeth City, NC 27909

EDUCATION.

- A.B. University of North Carolina, Chapel Hill, NC, 1968
Major: Education-Secondary Social Studies
- M.Ed. University of North Carolina, Chapel Hill, NC, 1971
Major: Education-Rehabilitation Counseling
- Ed.D. Virginia Polytechnic Institute and State University, Blacksburg, VA, 1985-1991
Major: Education Administration and Supervision

PROFESSIONAL EXPERIENCE

- Present: Program Administrator, Exceptional Children's Program and Pupil Support Services (1989-Present). Elizabeth City-Pasquotank Public Schools, Elizabeth City, NC.
- Past: Exceptional Children's Program Teacher, School Base Chairperson, Mentor Teacher, Elizabeth City-Pasquotank Public School, Elizabeth City, NC (1975-1989).
- Special Education Teacher, Camden County Public Schools (1973-1975).
- Instructor (part-time), College of the Albemarle, Elizabeth City, NC (1972-1975).
- Social Adjustment Teacher and Counselor, Durham Sheltered Workshop, Durham, NC (1969-1968).
- Social Worker I, Durham County Department of Social Services, Durham, NC (1968-69).
- Administrative Assistant, Rehabilitation Program, University of North Carolina, Chapel Hill, NC (1971).

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS.

Phi Kappa Phi Honor Society
Delta Kappa Gamma Honor Society for Women Educators
Phi Delta Kappa

National Education Association
North Carolina Association of Educators

Council of Exceptional Children
Council for Administrators of Special Education
Council for Children with Behavioral Disorders

International Reading Association
Parents for Academically Gifted Education
Parents for Academic Excellence

HONORS

National Rehabilitation Scholarship Recipient

Outstanding Educator Finalist, public Schools Student Teacher of the Year, University of North Carolina

Volunteer Honoree

Junior Women's Club Educator of the Month

Appointment by County Commissioners to Board of Directors, Children's Hospital, Greenville, NC

RESEARCH INVOLVEMENT AND GRANT PROPOSALS

The Effects of Selected Variables on Test Performance for Mildly Handicapped Students

Effects of School Factors on BEH Students' Success on the NC Minimum Skills Diagnostic Test

Integrated Multi-Sensory Approach for School Success

OTHER PROFESSIONAL ACTIVITIES

Grant proposals submitted for Peer Tutoring, Alternative Education, Transition Graduate Program, Parenting Institute, Teacher Training in Mathematics for the Academically Gifted, and numerous State and Federal Exceptional Children projects

Member of Elizabeth City-Pasquotank Public Schools Effective Schools Leadership Team

Conducted workshops for the following: Elizabeth City State University, Elizabeth City, NC; International Reading Association, Raleigh, NC; Public Health Department, Columbia, NC; NCCBD Annual Conference, Wrightsville Beach, NC; Elizabeth City-Pasquotank Public Schools, Elizabeth City, NC.

Supervision of Student Interns, University of North Carolina and Elizabeth City State University

Certificated in the following areas: Physically Handicapped, Mental Retardation, Social Studies, Specific Learning Disabilities, Curriculum Instructional Specialist, Principal, Program Administrator (Exceptional Children), Mentor, Severely Emotionally Handicapped

Pasquotank Interagency Council Representative

Parenting Institute Board of Directors
Cities in Schools Planning Board
Facilitator, Summit on the Student

Curriculum development in the following areas: Guidance, Cooperative Learning, Trainable Mentally Handicapped, Reading Instruction, Academically Gifted, Dropout Prevention


Judy Guillet Thorne