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ABSTRACT

This benefit-cost evaluation project provides a comprehensive analysis of a school district special education program. The project addressed the need for information on ways to evaluate special education programs and to make programmatic decisions based on evaluation information. Project activities focused on the following four interrelated areas: (1) collection of follow-up information on students after exiting from school (either through graduating, aging out, or dropping out of school); (2) collection of information on the costs of services received by students during their school years; (3) development of a benefit-cost analysis framework; and (4) analysis of the relationships between benefits and costs. School record information was collected on 466 special education students, 519 vocational education students, and 519 college students. Students in special education for whom school record information was collected included 327 with learning disabilities, 75 with mild mental retardation, 35 with speech impairments, 25 with emotional disabilities, and 4 with visual impairments. Outcome information was obtained from 313 students in special education programs (66%), 330 students in vocational education programs (64%), and 368 college students (71%). Students in special education in the respondent group included 220 with learning disabilities, 53 with mild mental retardation, 22 with speech impairments, 14 with emotional disabilities, and 4 with visual impairments. Twelve bar graphs and 112 data tables are included. School records data forms and a high school follow-up questionnaire are provided. (TJH)

Minnesota • University Affiliated Program on Developmental Disabilities

Assessing Outcomes, Costs and Benefits of Special Education Programs

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ASSESSING OUTCOMES, COSTS, AND BENEFITS OF SPECIAL EDUCATION PROGRAMS

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Preface

Research activities within special education during the past decade have begun to address critical policy issues, often using new techniques. Increasingly, researchers and policy makers alike have recognized the need to be able to evaluate the outcomes of special education programs and to assess their efficiency in meeting accepted goals. One approach to accountability has been to look at both costs and outcomes of the programs.

This benefit-cost evaluation project, funded by the Office of Special Education and Rehabilitative Services, reflects the trend toward a comprehensive analysis of a special education program. The project addressed the need for information on ways to evaluate special education programs and to make programmatic decisions based on evaluation information. Project activities focused on four interrelated areas: (a) collection of follow-up information on students after exiting from school (either through graduation, aging out, or after dropping out of school), (b) collection of information on the costs of services received by students during their school years, (c) development of a benefit-cost analysis framework, and (d) analysis of the relationships between benefits and costs.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Assessing Outcomes, Costs, and Benefits

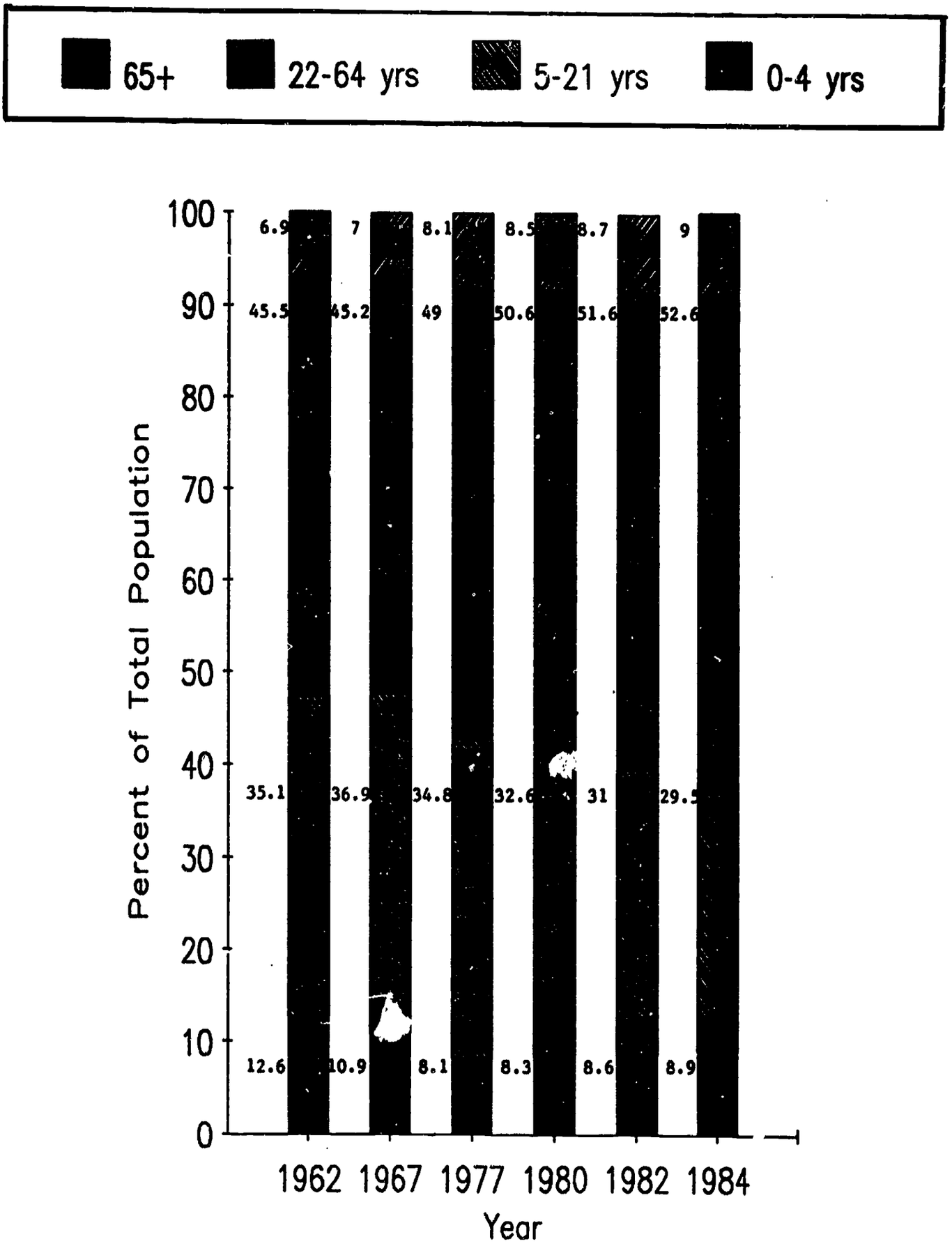
Within special education, there exists a real need for current information about public school programs for students with handicaps. We need information on the outcomes of programs for students with special education needs, about the costs of serving such students, and about the relationships between benefits and costs. The field has recognized the importance of this information need. A strong focus now exists on transition issues for students in special education programs.

The process by which individuals with handicaps move from schooling toward integration and employment in society has become a key concern of educators and policy makers in the past few years. Critical issues relate to the outcomes of schooling, the existence and quality of transition services, and the relationship between benefits and costs. The need for attention to the transition process and to more accessible adult services is emphasized by the demographic changes in the U.S. population during the past 10 years. These dramatic changes are reflected in a higher average number of adult U.S. citizens over preceding decades. Today, approximately 62% of the population is older than 22 years. Statistical data for individuals with disabilities demonstrate parallel trends, as is evident in Figure 1-1 (Census information on the numbers and proportions of people with severe disabilities by year and age group). Data presented in the 1985 Report to Congress on the Implementation of The Education of the Handicapped Act (U.S. Department of Education, 1985) also indicate the trend toward increased average ages of persons with handicaps. The Report notes that the number of secondary students with handicaps served over the previous two years increased at a more rapid rate than the number of students served in younger age groups. Every indication from Census statistics and other research reports is that these trends will continue, thus highlighting the need to address the critical transition from secondary special education to adult services and the expanded need for employment and adult services programs.

Historically, our information about the transition of individuals with handicaps has been minimal. Although many studies have been conducted on the occupational status and community adjustment of adults with mental retardation, they provide mixed results on dimensions of employment and community integration (cf. Baller, Charles, & Miller, 1967; Bruininks, Meyers, Sigford, & Lakin, 1981; Cobb, 1972; Edgerton, 1967, 1969; Goldstein, 1964; Kennedy, 1966). When the economy is robust, adults with retardation seem to enjoy reasonably high rates of employment, generally in unskilled and service occupations. In periods of recession and high unemployment, labor force participation and community adjustment is lower, often in comparison to peers without handicaps in the same community. Unfortunately, most studies of post-school adjustment, particularly during the early transition years, were conducted prior to 1970, and mostly with people with mild retardation. Few sound studies have been conducted during the past 15 years, a period that exhibited substantial changes in the development of special education services and changes in the economy and employment structure. Those that have been conducted are relatively recent studies. Despite our limited knowledge base, the demands of consumers for improved adult services and the reality of demographic changes in the population of individuals with handicaps has produced considerable pressures to address the needs of young adults and their families.

Only recently have efforts to evaluate the benefits derived from special education services gone beyond the scope of focusing mainly on increases in achievement levels of

Figure 1-1. Estimated Percentage of People with Severe Disabilities by Age Category.



students in specific programs. For example, Hasazi and her associates have looked at the employment status of 301 youth with handicaps in Vermont who exited from high school between 1979 and 1983 (Hasazi, Gordon, & Roe, 1985). They interviewed the student, parent, or another individual to get information, then looked at the association of various factors with employment status. A statewide follow-up survey of students in special education also has been conducted in Colorado (Mithaug, Horiuchi, & Fanning, 1985). In this study, 234 graduates who completed special education programs in 1978 and 1979 were interviewed, and analyses were conducted to identify predictors of vocational and social success.

Wehman and his associates have conducted a follow-up study of 117 young adults with moderate, severe, or profound mental retardation in Virginia (Wehman, Kregel, & Seyfarth, 1985). They interviewed parents about their child's level of employment, type of employment, transportation to job site, length of employment and wages earned, fringe benefits received, assistance in obtaining a job, reasons for lack of employment and job terminations, and level of service received from vocational rehabilitation and local mental retardation services. A follow-up study in four rural districts looked at the post-secondary adjustment of 113 students with mild handicaps (Fardig, Algozzine, Schwartz, Hensel, & Westling, 1985). They interviewed the former students (median age = 19 years) or members of their immediate family to obtain information on current employment status, position, length of time on job, wages, and previous employment status. They also had some information on the academic histories of the students (special education classification, years in school, courses, exit information, reading and math scores, and number of months out of school). Analyses focused on the relationship between employment status and education and training.

In California, Semmel and her associates looked at employment outcomes for students in special education in a cooperative work placement program (Semmel, Cosden, & Konopak, 1985). They conducted phone interviews of students one year after they left school, and interviewed a teacher or counselor who knew the student. In Washington, Edgar is conducting three follow-up studies, one three years after students in special education left school, one five years after they left school, and a follow-along study of students starting when they were in seventh grade (Levine, personal communication, 1984).

Most of these follow-up studies have focused on outcomes and their relationship to specific school experiences (e.g., summer job, coursework, job placement during school, etc.). They have not, however, examined the relationship between costs and outcomes of special education. Generally, they have included only students with mild to moderate handicaps. Most often, they have focused on employment-related outcomes, with little information on other outcomes such as living arrangements, satisfaction, leisure activities, money handling skills, citizenship and other issues. Further, little demographic information is available in each of these studies, so that it is not possible to identify relationships of outcomes to community contextual characteristics such as socioeconomic status variables, district financial characteristics, and labor and other economic statistics.

While there have been detailed cost studies of special education programs (cf. Kakalik, Furry, Thomas, & Carney, 1981), until recently follow-up studies have been few and far between. There is growing concern in education in general, and special education in particular, with the need to be able to document the relationships between costs and long-term benefits that accrue within a broader social context. Such long-term benefits include those received by the student (e.g., economic self sufficiency, personal

adjustment, community involvement, self esteem) and those derived by society in general (e.g., increased tax collections, decreased use of public assistance programs, reduced incidence of institutionalization). To date, a lack of outcome data combined with inadequate methodologies have prevented useful evaluations of the relationships between benefits and costs of special education programs.

Benefit-cost analysis is an economic accounting procedure that involves weighing and quantifying both the costs and the benefits of a particular program, and deriving an estimate of the program's efficiency. In some cases, when it is impossible to assign quantitative values to all benefits and costs, the more limited tool of cost-effectiveness analysis must be used. In this case, the costs of achieving key outcomes are identified and compared across programs to assess relative efficiency. The primary issue addressed by benefit-cost and cost-effectiveness analyses is whether the various outcomes of a program justify their costs in terms of economic efficiency and quality of life factors. This is a crucial question for special education programs.

In 1979, Brewer and Kakalik concluded that "reliable analyses of the cost and effectiveness of special educational services require information that is not presently available" (p. 396). However, they attempted to show what a possible analysis might look like by examining the costs of special education, estimating how much the individual would have to earn after leaving school to equal the extra expenditures for special education, and then discussing whether this seemed reasonable. Their hypothetical analysis, however, did not consider other important benefits that might be derived from special education services such as increased personal adjustment and decreased use of public assistance. The analysis is solely economic.

Advances now have been made in benefit-cost methodology that allow for the evaluation of important quality-of-life dimensions in statistical analyses, and that make the methodology feasible within the constraints that exist in school systems (Kerachsky, Thornton, Bloomenthal, Maynard, & Stephens, 1985; Thornton, 1985). A model of this approach to benefit-cost analysis was provided by the STETS (Structured Training and Employment Transitional Services) evaluation, which was designed to provide a test of the effectiveness of transitional-employment programs in integrating 18- to 24-year-old young adults with mental retardation into the economic and social mainstream. It was funded by the Employment and Training Administration of the U.S. Department of Labor and directed by the Manpower Demonstration Research Corporation. To evaluate the impact of STETS, data were obtained on 226 experimental group members (randomly assigned and enrolled in STETS) and 211 control group members (sent back to referral agency). Point-in-time data were collected through in-person interviews with either the sample members or their proxies. Interview data were supplemented with information on program-service receipt and program cost data. Data also were obtained from other sources, including community service agencies, program intake records, and special work-site case studies.

The impact of STETS was estimated by comparing the outcome measures for experimentals with those of controls. Analyses of impact focused on labor-market behavior, training and schooling, public transfer use, and economic status, independence, and life-style. A benefit-cost methodology also was undertaken to assess the economic efficiency of STETS. The overall findings from the evaluation of STETS are described in general by Bangser (1985) and in detail by Kerachsky et al. (1985).

Wehman and his associates collected information over a six-year period on individuals with mental retardation who went through a special job placement program in Virginia (Hill, Hill, Wehman, Banks, Pendleton, & Britt, 1985). They conducted a benefit-cost analysis of the program (Hill, Hill, Wehman, & Banks, 1985) and found very positive outcomes from the implementation of the supported work model for 155 persons with severe, moderate, and mild retardation.

Both the STETS evaluation and the Wehman studies have focused their benefit-cost analyses on special training programs. Benefit-cost analyses have not been reported for our public education system for students in special education. Of the recent studies that have followed these students after they have left school, none has looked at the relationship between costs and benefits.

The purpose of this report is to summarize the activities and results of a benefit-cost evaluation of a special education program. Each of the next four chapters addresses one of the components of the study.

In Chapter 2, Bruininks, Thurlow, Lewis, and Larson describe the procedures and results of a comprehensive follow-up study that was conducted as one component of the larger study on the benefits and costs of special education. In this component, both school record information and outcome information were collected for students who graduated or would have graduated from a special education program in a large suburban school district between the years 1977 and 1984. Students in this respondent group included 220 with learning disabilities, 53 with mild mental retardation, 22 with speech impairments, 14 with emotional disabilities, and 4 with visual impairments. In addition, data also were collected for two non-special education comparison groups. Respondents in these groups included 330 students in a vocational course program and 368 students in a college-bound program. Subjects are described in terms of information in their school records, and in terms of the obtained outcome information. Chapter 2 concludes with a discussion of the implications of the findings for services and for future research.

Chapter 3 is a summary of the application of cost-analysis procedures in the same school district. In this chapter, Lewis, Bruininks, and Thurlow develop a generic school-based model wherein costs can be described more fully and accurately for local district planning, budgeting, and allocating of resources to instructional programs and service areas, and then adapt this model to the specific programmatic needs of special education. They present a case study from a large suburban school district to show both the feasibility and utility of the model within special education, and report empirical data within special education whereby these data can be used both for this district and others as a basis for future comparative purposes in special education. The chapter concludes by addressing whether some current policy assumptions, practices, and resource allocations in special education are realistic or economically rational, and by providing recommendations to local districts concerning planning, budgeting, and administrating of special education programs.

Chapter 4 describes the framework for conducting a benefit-cost analysis of special education service programs. In this chapter, Thornton and Will present a benefit-cost approach that has been used successfully to evaluate a number of social programs. The approach emphasizes several features of benefit-cost analysis that make it appropriate for assessing alternative program options for special education. For example, it uses a comprehensive accounting framework that includes all major benefits and costs, regardless of whether they can be explicitly measured or valued. It also places emphasis on

benefit-cost analysis as a process rather than a bottom line -- the knowledge gained by systematically assessing the available information about a program is generally more important than any single estimate of benefits and costs. The use of sensitivity tests to assess the relative importance and implications of the various assumptions and estimates also are used in the analysis. Another feature is that multiple analytical perspectives are used to indicate how different groups in society will perceive a specific program and how the program will affect the distribution of social outcomes. Finally, a general approach to valuing program effects and incorporating unmeasured effects is adopted so that all essential effects can be taken into account when making decisions.

Chapter 5 is a report on using benefit-cost analysis procedures in a school district to examine the relationships between benefits and costs for the special education program. In this chapter, Lewis, Bruininks, Thurlow, and McGrew link the costs and benefits of special education in a specific program area, present empirical data from the school district relative to services provided to students with mild retardation, and then examine a number of alternative benefit-cost assumptions for estimating probable results of special education services.

Chapter 6 addresses the issue of the feasibility of local school programs adopting procedures similar to the benefit-cost evaluation project. It provides a brief review of the findings and conclusions of each aspect of the Benefit-Cost Project, then discusses several methodological considerations related to the feasibility of local school programs adapting procedures similar to those used in the cost analysis, the follow-up study, and the integration of cost and outcome data in benefit-cost analysis framework. The chapter concludes with an overview of several policy issues and their relationship to the future for benefit-cost analysis procedures in special education programs.

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CHAPTER 2

Post-School Outcomes for Students in Special Education and Other Students One to Eight Years after High School

Robert H. Bruininks, Martha L. Thurlow, Darrell R. Lewis, and Nancy W. Larson

The extent to which individuals with handicaps move from schooling toward employment and community integration has become a key concern of educators and policy makers in the past few years. This concern has been highlighted since the 1984 Amendments of the Education of the Handicapped Act (Public Law 98-199), which emphasized transitional services for youth with handicaps. Much of the focus has been on individuals with more severe handicaps because recent studies have indicated that their rates of unemployment and substantial underemployment may range from 50% to 75% (see U.S. Department of Labor, 1979; Greenleigh Associates, 1975; Halpern, Close, & Nelson, 1986; Hasazi, Preskill, Gordon, & Collins, 1982; Mithaug & Horiuchi, 1983; Wehman, Kregel, & Barcus, 1985). However, interest in the transitional process clearly extends to individuals with milder handicaps.

At the present time, many people who have received the benefits of special education services have recently left, or are about to leave, the security of their educational programs to confront the expectations and demands of adult life. Demographic changes in the population of individuals with handicaps have produced considerable pressures to address the needs of young adults and their families. The numbers of individuals with mild handicaps who have received special education services have increased substantially during the past decade, and increasing numbers are now in the adult world where services, if needed, are much less prevalent. There is strong interest among educators and policy makers in documenting the quality of life and the extent to which youth with mild handicaps achieve the desired goals of employment, community living, and social and leisure opportunities.

Within the past few years, several studies have been undertaken to assess the post-school outcomes of individuals who have received special education services while in school. Before these studies, information had been minimal about many aspects of the transition of individuals with handicaps. In 1984, the Office of Special Education and Rehabilitative Services of the U.S. Department of Education stressed the need for research on the transition of youth with disabilities:

> First, too little is known about current transition experiences: We can only estimate the number of individuals who make their way into the workforce . . . and the number who remain jobless despite current service efforts. Careful descriptions of the school population and follow-up studies of special education graduates could assist both schools and post-school services plan for transition, establish policies and programs, and evaluate results. (Will, 1984, p. 9)

Previous studies on the occupational status and community adjustment of adults with mental retardation have provided mixed results on dimensions of employment and community integration (cf. Baller, Charles, & Miller, 1967; Bruininks, Meyers, Sigford, & Lakin, 1981; Cobb, 1972; Edgerton, 1967, 1969; Goldstein, 1964; Kennedy, 1966). When the economy is robust, adults with retardation seem to enjoy reasonably high rates of employment, generally in unskilled and service occupations. In periods of recession and

high unemployment, labor force participation and community adjustment is lower, often in comparison to peers without handicaps in the same community. Unfortunately, most studies of post-school adjustment were conducted prior to 1970, and mostly with people with mild retardation.

Within the past 15 years (except for very recently), few sound follow-up studies were conducted. The paucity of information during this period is critical because substantial changes have occurred in the development of special education services, as well as in the economy and employment structure. Basically, studies conducted prior to the 1970s are not generalizable because of changes in the economic and employment environment, and because significant legislative actions have, in many ways, changed the nature and the extent of services provided to youth and adults with handicaps.

Eight follow-up studies in recent years have included individuals with mild handicaps in their follow-up samples. These studies are summarized in Table 2-1 according to the major areas in which information was collected.

One follow-up study, conducted in four rural Florida school districts, looked at the post-secondary adjustment of 113 students with mild handicaps (Fardig, Algozzine, Schwartz, Hensel, & Westling, 1985). Former students (median age = 19 years) or members of their immediate family were interviewed to obtain information on their current employment status, position, length of time on job, wages, and previous employment status. Fardig et al. also had obtained some information on the academic histories of the students (special education classification, years in school, courses, exit information, reading and math scores, and number of months out of school). Analyses were focused on the relationship between employment status and training.

Fardig et al. (1985) found that 51.3% of their sample were employed, another 13.3% were full-time students, 11.5% homemakers, and 3.4% in military service; only 17.7% were unemployed. They found that "highest grade completed" was the best predictor of employment adjustment (30.1% of sample had dropped out before completing high school), and that vocational coursework was a poor predictor. Students with learning disabilities demonstrated better employment adjustment than students with emotional disabilities or mild mental retardation.

Hasazi and her associates identified 462 youth with handicaps in Vermont who exited from high school between 1979 and 1983 (Hasazi, Gordon, & Roe, 1985). The researchers interviewed the student, parent, or another individual to obtain follow-up information on the former student's current employment status, employment and training history, and use of social services for 301 of these students. The researchers also obtained information from student school records on educational history, age, and community demographics. They then looked at the association of various factors with employment status.

Hasazi et al. (1985) found that over half the sample (about 55%) was employed, and that most individuals in the sample had found their jobs through a "self-family-friend" network. Just over 20% of this sample had been unable to find jobs. Hasazi et al. also found that certain employment variables (e.g., current wages, percentage of time employed since high school) could be predicted by part-time or summer work during high school. The authors, however, cautioned that their research needs to be replicated in other states, especially in more metropolitan areas. Vermont is considered to be a rural state, thus possibly limiting the generalizability of some of the findings.

Table 2-1

Summary of Areas in Which Information Was Reported for Eight Follow-up Studies[a]

Area/Subtopic	Study[b] ED	FA	HA	MI	SC	SE	WE	ZI
Employment								
Current Job status	*	*	*	*	*	*	*	*
Current earnings	*	*	*	*	*	--	*	--
Satisfaction	--	--	--	*	--	--	*	--
How found job	*	--	*	*	--	*	*	--
Previous job	--	*	*	*	*	*	*	--
Job search	--	--	*	--	--	*	--	--
Education								
Current status	*	*	*	*	*	--	--	--
Job training	*	--	*	--	--	--	--	--
Financial Integration								
Support income	--	--	--	*	*	--	--	--
Pay taxes	--	--	--	--	--	--	--	--
Banking	--	--	--	*	--	--	--	--
Shopping	--	--	--	*	--	--	--	--
Social Integration								
Leisure activities	--	--	--	--	--	--	--	--
Marital status	--	--	*	*	--	--	--	--
Friendships	*	--	--	--	--	--	--	--
Living arrangements	*	--	*	*	*	--	--	--
Votes	--	--	--	--	--	--	--	--
Legal Problems	*	*	--	--	--	--	--	--
Driver's License	--	--	--	*	--	*	--	--

[a]A "*" indicates that some kind of information (no matter how minimal) was collected and reported in the citation. It should be noted that some investigation reports focused only on one aspect of the information collected (e.g., Zigmond focused on dropouts compared to graduates) and thus the citation included here may not have reported all types of information that was collected.

[b]Studies are identified as follows: ED = Edgar et al. (1985), FA = Fardig et al. (1985), HA = Hasazi et al. (1985), MI = Mithaug et al. (1985), SC = Schalock et al. (1986), SE = Semmel et al. (1985), WE = Wehman et al. (1985), ZI = Zigmond & Thornton (1985).

A statewide follow-up survey of special education students also was conducted in Colorado (Mithaug, Horiuchi, & Fanning, 1985). In this study, 234 graduates who completed special education programs in 1978 and 1979 were interviewed, and analyses were conducted to identify predictors of vocational and social success. Over half of the students (57%) in this sample were from administrative units considered to be urban. Their average age was 22.5 years.

Mithaug et al. (1985) found that 69% of the former students were employed. Positive post-school adjustment was greatest for students with learning disabilities, followed by those with emotional disabilities, then those with mental retardation, and finally students with physical handicaps. Over half of the former students lived with their parents.

A study of students who had graduated between 1979 and 1983 was conducted by Schalock, Wolzen, and Ross (1986). The study included 66 students with learning disabilities and 31 with mild mental retardation who had been in rural schools that used a community-based job exploration and training vocational model. Employment rates were 72% of those with learning disabilities and 58% of those with mild mental retardation. Independent living rates for the two groups were similar (25% for those with learning disabilities and 23% for those with mild mental retardation). They also found that students with learning disabilities were more likely than students with mild mental retardation to be employed, live independently, and be self sufficient.

In California, Semmel and her associates looked at employment outcomes for students in special education in a cooperative work placement program (Semmel, Cosden, & Konopak, 1985). They conducted phone interviews of students about one year after they left school, and interviewed a teacher or counselor who knew the student. Some of the students ($n = 49$) had been in a special Work Ability (WA) program, while others had not (non-WA; $n = 60$), but all were considered to be students in special education.

Semmel et al. (1985) found that WA and non-WA students had similar rates of employment after high school, even though they had different rates during high school. These researchers also concluded that students from special class programs gained more from high school work experience than did students from resource room programs.

In Washington, Edgar and his associates are conducting three follow-up studies, one three years after students in special education left school, one five years after they left school, and a follow-along study of students starting when they were in seventh grade (Levine, personal communication, 1984). Using a telephone interview procedure, they talked to parents of the former students. They have summarized data from these interviews for nearly 1400 students (1,292 in special education, 107 nonhandicapped peers) who exited school from 1978 to 1984.

Among their findings (Edgar & Levine, 1986) are that 58% of the population with handicaps were employed, 29% were living independently, and 18% were attending some kind of postsecondary school. In general, outcomes were best for students with learning disabilities and students with behavior disabilities (these two categories were not separated). The rates of "unengagement" (defined as not in school and not employed) ranged from a low of 24-25% (for students with sensory impairments and students with learning/behavior disabilities) to highs of 49% and 52% for former students with mild mental retardation or severe handicaps.

Wehman and his associates (see Wehman, Kregel, & Seyfarth, 1985) followed persons with mental retardation in Virginia, many of whom were considered to have mild mental retardation. The students ranged from 17 to 24 years, and had been in urban (30%), suburban (31%), and rural (high poverty) districts (38%). Parents were interviewed about their children's current status. Wehman et al. (1985) found a 42% total employment rate, with most of those employed being primarily at entry-level service jobs. When students with moderate to severe handicaps were removed, 60.3% of the remaining 184 individuals were employed.

Several studies have focused only on students with learning disabilities during their school years. For purposes of simplification, only the Zigmond and Thornton (1985) study, which has been reported in journals, will be discussed here. Zigmond and Thornton (1985) identified samples of 105 students with learning disabilities and 118 peers without handicaps, selected from 1978-79 ninth grade enrollment lists (class of 1982). Interviews were conducted with 60 former students with learning disabilities and 61 of their peers. While much of the study's focus was on drop out rates and basic skills competency levels (both of which were lower for youth with learning disabilities compared to youth without learning disabilities), Zigmond and Thornton also looked at employment status, and factors related to it. In describing their study, they noted that previous studies have produced widely varying rates of employment. They suggested that part of the variance might be explained by the economic conditions of the locales and the times, but that none of the previous studies (see Blalock, 1981; Cordero, 1975; Lechtinen & Tuomisto, 1978; Levin, Zigmond, & Birch, 1985; White, Schumaker, Warner, Alley, & Deshler, 1980) included a control group of youth without handicaps to provide the needed perspective for the data. Zigmond and Thornton found that youth with learning disabilities did have significantly higher rates of dropping out of school (54% vs 33%), and significantly lower levels of basic skills competency than their peers. However, Zigmond and Thornton also found that dropouts with and without learning disabilities were employed at significantly lower rates (44% and 50%) than their graduating peers (74% and 83%). The samples in Zigmond and Thornton's study were from a large, northeastern, urban school district, considerably different from the samples in the Fardig et al., Hasazi et al., and Wehman et al. studies.

Purpose

The present study was a follow-up study that was conducted as one component of a larger study, for which the goal was to analyze the benefits and costs of special education services. The focus of the component reported here was to collect school record information and outcome information about students who graduated or would have graduated from a special education program between the years 1977 and 1984. For this component, the primary research questions of interest were:

1. What are the characteristics of school programs (e.g., type, duration, and intensity of special education services received) and school outcomes (e.g., grade point average, graduation status) for students who were provided special education services for at least one year during high school (grade 10, 11, or 12)?

2. What are the long-term (1 to 8 years) occupational outcomes (e.g., employment status, income, job satisfaction) for students who were provided special education services for at least one year during high school (grade 10, 11, or 12)?

3. What are the long-term (1 to 8 years) educational outcomes (e.g., educational status, training experiences) for students who were provided special education services for at least one year during high school (grade 10, 11, or 12)?

4. What are the long-term (1 to 8 years) financial integration outcomes (e.g., checking account, credit account, other incomes sources) for students who were provided special education services for at least one year during high school (grade 10, 11, or 12)?

5. What are the long-term (1 to 8 years) social integration outcomes (e.g., leisure activities, friendships) for students who were provided special education services for at least one year during high school (grade 10, 11, or 12)?

6. To what extent do school, employment, educational, financial integration, and social integration outcomes differ for students in special education as a function of handicapping category assigned to them during their last special education service year?

The special education sample in the present research project included students who had been served under different labels during their special education histories. Using the primary category assigned to each student during his or her last year of special education services, the following question was examined:

* To what extent do school, employment, educational, financial integration, and social integration outcomes differ for students with (a) mild mental retardation, (b) learning disabilities, (c) emotional disabilities, and (d) speech impairments?

In addition to the information collected on students in special education, comparable data were collected for other students from the same schools. The "other students" included two groups: (a) college students - students who were identified as taking classwork that provided preparation for college enrollment, and (b) vocational students - students who were identified as not taking classwork that provided preparation for college enrollment. These students had either received no special education at all, or less than one year of special education services during their high school years (grades 10, 11, 12). The first five questions noted above were asked for students in these two groups. Although it was anticipated that differences would appear in school and post-school outcomes for these samples, it was believed that comparisons on variables addressed in this study would yield greater understanding of the comparative adjustment of students in special education who had recently left public school secondary programs. In addition to the questions noted above, the following research question was investigated:

* To what extent do school, employment, educational, financial integration, and social integration outcomes differ for students in special education, vocational, and college groups.

The purpose of this chapter is to report the methodology and findings from the school record and outcome component of the larger research project. The Method section provides a description of the specific procedures for obtaining both school record and outcome information. The Results section is divided into three parts. The first part addresses some findings on school variables for respondents and nonrespondents. The

second part addresses findings related to school record and outcome information for the students in each of the four categories of special education programs, specifically students with mild mental retardation, learning disabilities, emotional disabilities, and speech impairments. The last part of the Results section compares findings for the students in special education with those for other students from the same high schools (identified as either "college" or "vocational" students).

METHOD

Subjects

Subjects were students in a midwestern suburban school district who graduated or would have graduated in the years 1977 through 1984. The main group of interest was students in special education in the district's two high schools. Students in special education were included for all years from 1977 through 1984. All students who received at least one year of special education or its equivalent (e.g., 720 minutes/day for 2 months, 360 minutes/day for 4 months) during their high school years (grades 10-12 in this district) were included in the study. This included students who had dropped out anytime during grades 10-12. School assignment was based on the school from which the student exited. The total number of special education students was 466.

Students in the special education group had six handicapping conditions: learning disabilities, mild mental retardation, emotional disabilities, speech impairments, visual impairments, and hearing impairments. Students with more severe handicapping conditions (moderate mental retardation, multiple handicaps, etc.), who were served outside of the district, or in a separate special education high school for students with severe emotional handicaps, were excluded from this study. Designation of handicapping condition by school personnel was used to establish categorical placements of students in the study.

Table 2-2 is a summary of the numbers of students in each category of handicapping condition for each year. Students were counted in the last category of special education service they received in high school. If a student received services for more than one handicapping condition (e.g., learning disability and speech impairment), the student was counted within the primary service category (i.e., the one with the largest number of minutes of service per day).

The breakdown of subjects in each category according to gender is presented in Table 2-3. Overall, 73% of the subjects were male, and 27% were female. Within categories, however, the proportions of males to females varied considerably. Among students with learning disabilities and speech impairments, there were approximately 3 males to each female. Among students with emotional disabilities, there were 2 males for each female. Among students with mild mental retardation and visual impairments, the proportions were approximately equal. A chi-square test for the four groups of students with different handicapping conditions confirmed that statistically significant differences in gender distribution existed, $\chi^2(3) = 19.75$, $p < .001$.

Scores from individually-administered aptitude and achievement tests are presented in Tables 2-4 (aptitude) and 2-5 (achievement). The scores in these tables were derived from many different tests (no more than 44% of any one category had been tested with the same test). Ranges of scores were considerable, within groups as well as across groups. Because of the amount of missing data in these measures of aptitude and achievement, statistical comparisons were not made.

Table 2-2

Numbers of Subjects with Various Handicapping Conditions for Each Year

Year	Handicapping Condition					Total
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Visual Impairment	
1977	7	15	2	0	0	24
1978	7	30	3	1	0	41
1979	13	42	3	3	0	61
1980	10	29	5	6	1	51
1981	6	42	2	8	0	58
1982	7	55	4	6	0	72
1983	14	49	4	6	2	75
1984	11	65	2	5	1	84
TOTAL	75	327	25	35	4	466

Table 2-3

Numbers of Males and Females with Various Handicapping Conditions

Sex	Handicapping Condition					Total
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Visual Impairment	
Male	38	249	18	23	2	330
Female	37	78	7	12	2	136
TOTAL	75	327	25	35	4	466

Table 2-4
Percentile Rank Aptitude Scores on Individually Administered Tests for Students with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Verbal					
	Mean	20.85	44.41	7	--
	SD	27.58	27.26	--	
	Range	1-84	9-91	--	
	N	n=13	n=12	n=1	
Performance					
	Mean	25.69	58.92	55.00	--
	SD	28.88	22.94	--	
	Range	2-85	26-96	--	
	N	n=13	n=12	n=1	
Total					
	Mean	20.47	38.37	33.25	--
	SD	26.25	21.38	11.26	
	Range	2-81	5-94	14.40	
	N	n=17	n=71	n=4	

Table 2-5
Percentile Rank Achievement Scores on Individually Administered Tests for Students with Various Handicapping Conditions

		Handicapping Condit'			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Reading Recognition					
	Mean	1	35	--	--
	SD	--	--	--	--
	Range	--	--	--	--
	N	n=1	n=1		
Reading Comprehension					
	Mean	17.60	30.76	42	66
	SD	19.83	18.65	18.38	--
	Range	2-50	6-81	29-55	--
	N	n=5	n=45	n=2	n=1
Math					
	Mean	14.67	28.5	45.00	4.00
	SD	11.55	24.77	39.32	--
	Range	2-27	1-98	17-73	--
	N	n=6	n=46	n=2	n=1
Written Language					
	Mean	25.80	18.63	15.00	23.00
	SD	37.72	15.85	9.90	--
	Range	1-91	2-86	--	8-22
	N	n=5	n=46	n=2	n=1

Other students from the same high schools were used to form contrast groups. The first contrast group was made up of 519 students in regular education who were following a vocational preparation coursework plan. The second contrast group was made up of 519 students in regular education following a college preparation coursework plan.

Table 2-6 is a summary of the number of students in each contrast group for each class year, as well as the number of students in special education by year. As is evident in the table, students in regular education (vocational and college) were selected from every other school year (78, 80, 82, and 84). Within these years, random samples of 65 students were selected from each group in each high school. This was accomplished by identifying the group placements of 25% of the students on the total class list (which usually totaled about 600 students who were potential graduates) and then eliminating the number of students above the desired number of 65 for each group (vocational and college) through use of a random numbers table.

The distribution of subjects in each group according to gender is presented in Table 2-7. It is obvious that there are significant differences in the distributions. While males and females were approximately equal in number for the vocational and college groups, males were much more prevalent than females in the special education group. This difference in distributions was statistically significant, $x^2(2) = 81.51$, $p < .001$.

Criteria for placement of students in the two regular education groups were based upon high school coursework. The specific criteria were developed for this study by a group of administrators and teachers. It was believed that criteria based on coursework would be easiest to judge and yet would be accurate in differentiating between students who would likely attend college and students who would not. Under the defined criteria, students who had taken two or more vocational education, business education, home economics, industrial arts, and/or fine arts classes were classified as belonging to the vocational group. Students who did not meet these guidelines were classified as belonging to the college group. Information for decision making was taken from each student's school transcript. Students did not have to graduate to be included within the sample; however, they did have to be considered potential graduates.

Instruments

Two basic types of instruments were used in this study: (a) forms for collecting information from school records, and (b) high school follow-up survey forms.

School record forms. Three formats were used to collect information from students' school records: (a) school record form, (b) special education data form, and (c) special education program form. The school record form (see Appendix A, p. 233) was used to collect data on both the student's program and the results of group-administered standardized tests. The following types of program information were collected from the school records:

(a) Whether graduated and if so, year of graduation
(b) Entry date into high school, and whether student was a transfer student
(c) Attendance, for each high school grade (grades 10-12)
(d) Total credits
(e) Overall grade point average
(f) Class rank

Table 2-6

Number of Students in Each Group for Each Year

Year	Group		
	Vocational Program[a]	College Program[a]	Special Education
1977	0	0	24
1978	130	130	41
1979	0	0	61
1980	131	129	51
1981	0	0	58
1982	128	130	72
1983	0	0	75
1984	130	130	84
TOTAL	519	519	466

[a]Original sampling resulted in 130 students (65 from each high school) per group each year (even-numbered years), but some students were lost, or gained after sampling because they belonged in one of the other two groups.

Table 2-7

Numbers of Males and Females in Each Group

Gender[a]	Group			Total
	Vocational Program	College Program	Special Education	
Male	218	285	330	833
Female	299	232	136	667
TOTAL	517	517	466	1500

[a]Gender information was not available for 2 students in the vocational program and 2 students in the college program.

(g) Class percentile
(h) Any non-special education alternative programs the student received from preschool through high school.

Standardized test data from the most recently administered aptitude test, the most recent achievement test, the achievement test administered in Grade 9, and the most recent Gates MacGinitie reading test were also coded, along with the names of the tests. The specific tests that were administered sometimes varied, although the majority of students had been given the same tests (see Table 2-8).

The second format used to collect information from students' school records was a special education data and service form (see Appendix B, p. 234). Information was collected from the students' special education records (or from referral records if the student did not receive special education services). Test data were recorded from the most recent individual intelligence test, the most recent individual general achievement test, any additional reading test (most recent), any additional language test (most recent), and any additional achievement test. The specific tests that were administered frequently varied from one student to the next. The name of the specific test that had been used was coded along with the test scores. For analysis purposes, only the tests that had been administered to the greatest numbers of students were included. These were the Woodcock-Johnson Tests of Cognitive Ability (W-J), the Wechsler Intelligence Scale for Children (Revised) or Wechsler Adult Intelligence Scale (Revised) (WISC-R/WAIS-R), the Woodcock-Johnson Tests of Achievement (W-J), the Wide Range Achievement Test (WRAT), the Peabody Individual Achievement Test (PIAT), the Stanford Diagnostic Reading Test, and the Gates-MacGinitie Reading Tests. In addition, only achievement tests given after grade 9 and aptitude tests given after grade 6 were included. (See Table 2-9 for the distribution of students with information from specific tests.)

General information on special education services also was recorded on this form. This included the role of the person who had originally referred the student (counselor, teacher, student, parent, or other), the reason for referral (math, reading comprehension, reading rate, attention, written language, other), and what kind of former service was received elsewhere. Finally, the average number of minutes of service per day, to the nearest 15 minutes, received during each grade of school (from preschool to grade 12, including repeated grades) was recorded.

The third format used to collect information from school records was a special education program form (see Appendix C, p. 235). Students' special education files were searched for the following types of information for each year service was received: (a) service site, (b) whether an outside evaluation was conducted, and if so, what kind (private, public) and type (psychological, neurological, physical), (c) the primary category of service and the number of months service was received, (d) the levels of service (from six possible levels) and months in each, (e) the disability area, (f) the number of academic and behavioral IEP objectives listed and met, and the special education teacher's evaluation of the student's overall success (-, 0, +), and (g) any related services that the student received, the level of service and the number of hours per day. Specific level 6 (residential) placements that occurred also were recorded. A student could have as many as 17 years of special education service recorded, since service could have been provided from preschool through age 21.

Table 2-8

Group Aptitude and Achievement Tests Administered to Students in Each Group

		Group		
		Vocational Program	College Program	Special Education
Aptitude[a]				
SCAT	N	335	353	296
	%	75	75	75
Lorge-Thorndike	N	8	3	28
	%	2	1	7
TCS/CSI	N	101	114	64
	%	23	24	19
Other	N	--	--	5
	%			1
Achievement[b]				
SRA	N	355	361	321
	%	78	76	83
CTBS	N	100	112	65
	%	22	24	17
Other	N	3	--	--
	%	1		

[a]Names of aptitude tests are: SCAT = Scholastic and College Aptitude Test; Lorge-Thorndike = Lorge-Throndike Intelligence Scale; TCS-CSI = California Test of Cognitive Skills, Cognitive Scale Index.

[b]Names of achievement tests are: SRA = Science Research Associates, Achievement Series; CTBS = California Test of Basic Skills.

Table 2-9

Individual Aptitude and Achievement Tests Administered to Students in Each Group

		Group		
		Vocational Program	College Program	Special Education
Aptitude[a]				
W-J	N	--	--	95
	%			35
WISC/WISC-R	N	2	--	81
	%	25		27
WAIS/WAIS-R	N	--	--	45
	%			15
Other	N	2	--	25
	%	25		8
Unusable	N	4	5	46
	%	50	100	15
Achievement[b]				
W-J	N	--	1	80
	%		13	23
PIAT	N	1	--	34
	%	6		10
WRAT	N	1	--	113
	%	6		32
Other	N	--	--	1
	%			0
Unusable	N	16	5	124
	%	89	88	35

[a]Names of aptitude tests are: W-J = Woodcock-Johnson Tests of Cognitive Ability, WISC/WISC-R = Weschler Intelligence Scale for Children (and Revised version), WAID/WAID-R = Weschler Adult Intelligence Scale (and Revised version). "Unusable" refers to measures administered before grade 7.

[b]Names of achievement tests are W-J = Woodcock-Johnson Tests of Achievement, PIAT = Peabody Individual Achievement Test, WRAT = Wide Range Achievement Test. "Unusable" refers to measures administered before grade 9.

Project follow-up form. For the project follow-up questionnaire, items were developed to obtain information in eight general areas: (a) leisure activities, (b) limitations on activities, (c) education, (d) employment, (e) financial independence, (f) school experiences, (g) special training, and (h) friendships. (See Appendix D, p. 236 for copy of questionnaire.)

For leisure activities, the respondent was asked to mark each of 19 activities that he or she had done in the past 7 days. Within the area of limitations on activities, respondents were asked about the extent to which daily activities were limited by physical health and the ways in which activities were limited. In education, respondents were asked which of six education activities they had done in May, how many hours classes were attended, and job plans.

Within the area of employment, respondents were asked to indicate their job activities, how the job was found, what the job's title was, how many months on the job, hours worked per week, money earned per hour, total earnings before taxes, and satisfaction with various aspects of the job. For information on financial independence, respondents were asked to indicate whether they had a driver's license, checking account, credit card/charge account, whether they took a vacation in 1984, and sources of income other than jobs.

Information about high school experiences was obtained from items on jobs held during high school, and opinions about job preparation during high school. Special training items focused on whether special training had been received since high school and who had provided it. One item also asked about the number of different employers since high school. In the last area, friendships, respondents were asked to indicate the number of close friends they had during high school and since high school.

The project follow-up questionnaire was not sent to individuals in the 1984 class because the school district sent a follow-up questionnaire in the spring to every student in the previous year's graduating class as part of regular school district procedures. For these students, data from selected items on the high school follow-up questionnaire were gathered. The items of interest included: (a) current education activity (vocational school, community college, college or university, apprenticeship, other, or none), (b) current employment activity (unemployed, homemaker, military, paid employment), or other activity, (c) if employed, hours per week, nature of job, relatedness of job to high school vocational training, location of employer, kind of business, and hourly income, (d) if receiving education, hours per week, school name, and major area or program, and (e) ratings of two statements ("Overall I feel I received a good education" and "I was prepared with enough occupational skills in high school to do what I am presently doing").

For the school district's 1984 questionnaire, three project items were added. The additional items were:

Current job was obtained through

1. Parents/relatives
2. Friends
3. School
4. Newspaper ads/walk in
5. Employment service or training program

6. Other
   Specify _____

Currently living with:

1. No one (alone)
2. Parents/guardians
3. Spouse
4. Friends/roommates
5. Other
   Specify _____

   Hours per week you work _____

These items were attached, on a separate page, to the school district's regular follow-up questionnaire.

Procedures

Specific procedures that were followed for the school record search and the follow-up of students are described here.

School record search. Data were obtained from school records in three phases. First, school transcripts were scanned for information that was to be inserted on the first school record form. This information was collected by four research assistants who had been trained by a district special education teacher. After training, the teacher checked each research assistant's accuracy, and then continued to monitor accuracy throughout this phase of data collection. Approximately two months were required to complete almost all of this phase.

The second phase of the school record search involved the special education records in each school. These were read and information was recorded by the special education teacher. Data collection from the special education files occurred over a period of 12 months.

A third phase of data collection involved the search of speech services files, which were maintained in a separate location from all other files. To complete this search, the names of all students in the study sample had to be checked against the names in the speech files. Students who received only speech services would otherwise not have been identified as students in special education programs. Examination of the speech files occurred over a two-month period. This activity was completed by the special education teacher and one research assistant.

Mail follow-up. The school district questionnaire was sent by the district in April 1985 to all students in the two high schools' 1984 classes. For those students who were identified as subjects for this study, the school district also sent a separate page with the three additional items (how current job was obtained, current living arrangements, and hours working per week). These questionnaires were sent following the district's typical procedures, which involved (a) mailing of an initial questionnaire and letter from the school principal, (b) sending a reminder letter and second questionnaire two weeks later, and (c) telephoning contacts after another two weeks to obtain responses over the phone. In addition, questionnaires that were returned incomplete were followed up by

telephoning those respondents to obtain the missing information. Envelopes that were returned unopened to the school district by the post office were sent again to a new address if one could be found. Sources used to find new addresses were relatives, students now in school, telephone directories, and long-time residents of the community.

The mail follow-up questionnaire for this study was sent to all other students (classes 1977-1983) by the research project team. The basic school district procedure was followed, with some alterations. Most of the alterations had to be implemented because of very low response rates across all groups. The questionnaires with cover letters from school principals were first sent in May. After approximately three weeks, a reminder post card was sent to all nonrespondents. A second copy of the questionnaire and another letter were sent at the beginning of July. In August, a new letter from one of each of the schools' special education teachers was sent, along with another copy of the questionnaire. At this point, telephone contacts were made to random samples of students in the college and vocational groups and to most of the students in the special education program. The college and vocational groups were contacted by research assistants. The students in the special education group were contacted by research assistants, special education teachers, and through student networks (e.g., student still in school would contact student from an earlier class). A specific telephone script was used when students were asked to respond to the survey over the phone.

Response Rates

Considerable effort was expended to obtain good rates of responses to the project follow-up. A summary of the general follow-up procedures used for the special education students is provided in Table 2-10. Not reflected in this table is the fact that a given student may have received more than two copies of a survey and may have been called many times also. Both telephone and mail procedures were used with all students, even those who had moved out of the state or country. The number of different methods used includes phone calls as one method and survey mailings as another method. The final reasons for nonresponses in the special education group were: (a) refusals (n = 16, 11.7%), (b) never located (n = 115, 83.9%), and (c) other (n = 6, 4.4%). The "other" category included such things as a student indicating he or she would return the form, but it was never received, or the student indicating he or she would answer questions over the phone, but never had the time to do so.

The final overall return rate was 66.0% for students in special education. This compared to 63.5% for students in vocational programs (52.7% for '78, 63.6% for '80, 59.8% for '82, and 77.7% for '84) and 71.0% for students in college programs (56.2% for '78, 66.4% for '80, 79.2% for '82, and 82.3% for '84). As might be expected, return rates generally were better for the more recent years. The return rates for individuals in each handicapping condition are shown in Table 2-11. Former students with emotional disabilities had the lowest overall response rates (55.6%).

Analyses

For this initial report on post-school outcomes for students in special education, data were summarized and simple comparative statistical tests (chi square, analysis of variance [ANOVA]) were run when appropriate. Two basic kinds of comparisons were made. First, comparisons were made within the special education group, among the four major conditions (mild mental retardation, learning disabilities, emotional disabilities, and

Table 2-10
Summary of Follow-up Procedures Used For Nonrespondents in Special Education Group[a]

	Number	Percentage
Different Methods Used[b]		
Two	7	5.3
Three	28	21.0
Four	16	12.0
Five	76	57.1
Six	6	4.5
Frequency of Telephone Calls[c]		
One	24	28.6
Two-Five	46	54.8
Six-Ten	8	9.5
Eleven-Fifteen	3	3.6
More than Fifteen	3	3.6
Repeated Mailings[d]		
Two	27	34.6
Three	50	64.1
Four	1	1.3

[a]Information is for all classes except the 1984 class; for those students, follow-up procedures were conducted by the school district.

[b]For four students, no information existed about address or phone number on school records.

[c]Information on frequency of phone calls is summarized for 84 students on whom records were maintained.

[d]Information on repeated mailings is summarized for 78 students.

Table 2-11
Return Rates (Percentages) for Students with Various Handicapping Conditions for Each Year

	Handicapping Condition					
Year	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Visual Impairment	Total
1977	50.0	50.0	50.0	--	--	50.0
1978	75.0	67.8	50.0	0.0	--	65.8
1979	57.1	58.5	33.3	50.0	--	56.7
1980	80.0	64.3	40.0	57.1	100.0	64.7
1981	66.7	65.0	75.0	62.5	--	63.8
1982	57.1	67.3	75.0	66.7	--	66.7
1983	71.4	74.5	33.3	50.0	100.0	69.4
1984	81.8	73.8	100.0	100.0	100.0	76.2
Total	68.4	67.2	55.6	62.8	100.0	66.0

speech impairments). Then the three groups of students (special education, vocational, college) were compared. A .010 probability level was required for statistical significance due to the large number of tests that were run.

Because respondents sometimes answered one item but not another, the number of respondents varied with the item. This variability in numbers also existed in school record data because of missing data in some student files.

RESULTS

I. Respondents versus Nonrespondents

In order to determine whether systematic differences existed between former students who responded to the follow-up survey and former students who did not respond, selected information from school records was examined.

Graduation Rates

Graduation rates for respondents and nonrespondents in the vocational, college and special education groups are presented in Table 2-12. As is evident in the table, all the groups with lower graduation rates had a higher nonrespondent rate; chi-square analyses confirmed that the percentages were significantly different than expected: vocational - $x^2(1) = 7.97$, $p < .005$; college - $x^2(1) = 9.33$, $p < .003$; special education - $x^2(1) = 31.29$, $p < .001$. The differences in percentages for respondents and nonrespondents were relatively minimal (from 4% to 6%) for the vocational and college groups. For the special education group, the difference in percentages was 23%.

Absenteeism Rates

Absenteeism rates for respondents and nonrespondents are presented in Table 2-13. In every group and in every grade, the nonrespondents had an equal or greater average proportion of days absent than did the respondents. The smallest difference in proportions was for the college group in grade 10, where the proportions were the same (.035, or approximately 6 days during a 170-day school year). The largest difference was for the special education group in grade 11 (a difference of .026, or approximately 4 1/2 days difference between the respondents' 14 days absent during a 170-day school year and the nonrespondents' 18 1/2 days absent). Several of the differences were statistically significant: special education, grade 11 - $F(1,393) = 8.05$, $p < .005$; vocational, grade 11 - $F(1,473) = 8.60$, $p < .004$; vocational, grade 12 - $F(1, 489) = 7.22$, $p < .008$; college, grade 12 - $F(1,511) = 9.58$, $p < .003$.

Class Standing

Grade point averages and class percentiles of respondents and nonrespondents in the vocational, college, and special education groups are summarized in Table 2-14. On both variables, respondents had higher averages than did nonrespondents in all groups. Statistically significant differences in the distribution, from that expected by chance, were found for the vocational group, for both grade point average - $F(1,492) = 15.94$, $p < .001$, and class percentile - $F(1,487) = 19.45$, $p < .001$. The difference in grade point averages approached significance for the special education group, $F(1,418)$, $p < .027$, and the college group, $F(1, 511) = 4.63$, $p < .032$, as did the class percentile for the college group, $F(1,512) = 5.21$, $p < .023$.

Table 2-12

Graduation Status of Respondents (Res) and Nonrespondents (Non)

		Group					
		Vocational Program		College Program		Special Education	
		Res	Non	Res	Non	Res	Non
Graduated	N	224	267	260	248	207	128
	%	98	92	100	96	83	60
Not Graduated	N	4	22	--	11	42	86
	%	2	8		4	17	40

Table 2-13

Percentage of Days Absent for Respondents (Res) and Nonrespondents (Non) in Grades 10, 11, and 12

		Group					
		Vocational Program		College Program		Special Education	
		Res	Non	Res	Non	Res	Non
Grade 10	Mean	6.0	6.2	3.5	3.5	7.7	8.9
	SD	5.3	5.0	4.1	3.6	8.1	8.0
	Range	0-32.6	0-28.7	0-43.1	0-21.5	0-48.2	0-61.3
	N	215	246	251	228	234	178
Grade 11	Mean	6.9	8.9	3.9	4.5	8.2	10.8
	SD	6.8	7.8	3.7	4.0	7.5	10.5
	Range	0-42.9	0-69.6	0-24.1	0-20.5	0-42.2	0-63.3
	N	219	256	256	235	230	165
Grade 12	Mean	7.8	9.6	4.7	6.2	9.9	11.2
	SD	6.6	8.0	4.1	6.1	9.8	8.5
	Range	0-44.2	0-42.8	0-25.0	0-43.4	0-100.0	0-46.9
	N	221	270	260	253	216	136

Table 2-14

Grade Point Averages and Class Percentiles of Respondents (Res) and Nonrespondents (Non)

	Group					
	Vocational Program		College Program		Special Education	
	Res	Non	Res	Non	Res	Non
Grade Point Average[a]						
Mean	7.36	6.80	9.20	8.88	6.14	5.80
SD	1.59	1.53	1.61	1.76	1.55	1.54
Range	3.56	3.14-10.53	3.90-11.85	3.89-11.98	1.97-9.98	1.67-10.06
N	222	272	260	253	237	183
Class Percentile						
Mean	40.39	31.31	66.72	61.54	23.79	20.18
SD	23.14	22.28	24.38	27.12	20.11	17.82
Range	1-98	0-90	1-99	3-99	0-88	0-84
N	221	268	260	254	236	181

[a]Grade point average could range from 0 to 12.00.

Special Evaluation and Treatments

The extent to which students in each group received special evaluations and/or treatments during their school years is presented in Table 2-15. All groups showed minimal use of these evaluations and treatments; approximately 2% of the special education sample used them. Only for psychiatric treatment and incarceration was the percentage slightly greater for the nonrespondents than for the respondents.

Related Services

Related services were non-special education services provided by the school district, such as work placement programs and vocational training, as well as the specialized non-special education treatments and evaluations that the school district contracted to have provided by outside agencies. Table 2-16 is a summary of four types of related services that students might receive during their high school years. In general, respondents tended more often to have received services related to vocational training than did nonrespondents. However, only the vocational program participation by students in special education (85.6% for respondents and 75.5% for nonrespondents) reached statistical significance, $x^2(1) = 7.06$, $p < .008$. When there were not differences favoring the respondent group, the two groups tended to be equal in their use of related services. Participation in chemical treatment programs tended to be equal for respondents and nonrespondents.

Special Education Services

The average numbers of minutes of special education received during pre-elementary years (including preschool, transition class, and kindergarten), elementary school, junior high school, and senior high school years are presented in Table 2-17. When the numbers of students receiving services are considered, there are few differences between the extent of services received by the respondent and nonrespondent groups. A possible exception is during the high school years for students in special education, where the respondent group tended to receive an average number of minutes of special education that was less than that received by the nonrespondent group. None of these comparisons reached statistical significance.

Summary

Table 2-18 provides a summary of the significant differences that were found between respondents and nonrespondents in the three groups. Some of the comparisons are shown graphically in Figure 2-1. When statistically significant differences were found, they favored the respondent group. In other words, respondents tended more often to have graduated, to have had a lower absenteeism rate, to have ended their school career with a higher grade point average and class percentile score, and to have participated in a vocational program during high school.

It must be noted, however, that only the difference in graduation rates for respondents and nonrespondents was consistently significant across the three groups. For students in special education, the significant differences emerged for graduation rate, absenteeism rate in grade 11, and rate of participation in a vocational program.

The results suggest that there is a possibility that the outcome data obtained in this study are somewhat skewed (with more favorable outcomes for those who responded

Table 2-15

Special Evaluations and Treatments Received by Respondents (Res) and Nonrespondents (Non)

		Group					
		Vocational Program		College Program		Special Education	
		Res	Non	Res	Non	Res	Non
Chemical Dependency Evaluation	N	1	1	--	--	2	3
	%	0	0			1	1
Chemical Dependency Treatment	N	1	3	--	6	6	5
	%	0	1		0	2	2
Psychological Evaluation	N	--	--	--	--	4	5
	%					2	2
Psychiatric Treatment	N	--	1	--	--	2	6
	%		0			1	3
Neurological Evaluation	N	--	--	--	--	--	1
	%						0
Incarceration	N	--	--	--	--	3	9
	%					1	4

Table 2-16

Summary of Related Services Used by Respondents (Res) and Nonrespondents (Non)

		Group					
		Vocational Program		College Program		Special Education	
		Res	Non	Res	Non	Res	Non
Work	N	118	126	4	5	146	124
	%	52	43	2	2	58	57
Vocational	N	224	276	159	135	214	163
	%	98	95	61	52	86	75
Chemical Program	N	2	3	--	1	8	6
	%	1	1	0		3	3
Psychological Program	N	--	1	--	--	5	9
	%		0			2	4

Table 2-17

Summary of Minutes of Special Education Received by Respondents (Res) and Nonrespondents (Non)

	Group					
	Vocational Program		College Program		Special Education	
	Res	Non	Res	Non	Res	Non
Preschool						
Mean	15.00	15.00	--	37.50	49.17	15.00
SD	--	--		31.82	80.66	--
Range	--	--	15-60	15-360	--	
N	1	1	2	18	1	
Elementary						
Mean	20.00	29.54	21.43	23.18	64.33	57.45
SD	12.60	18.62	16.14	18.20	53.04	38.08
Range	15.60	15-60	15-60	15-60	15-360	15-250
N	18	19	21	11	119	96
Junior High						
Mean	71.25	37.50	45.00	60.00	77.31	70.92
SD	74.88	31.82	25.98	--	59.75	52.29
Range	15-180	15-60	15-60	--	15-435	15-335
N	4	2	3	1	169	139
Senior High						
Mean	--	--	--	--	78.63	94.92
SD					62.70	89.40
Range					15-405	15-595
N					211	180

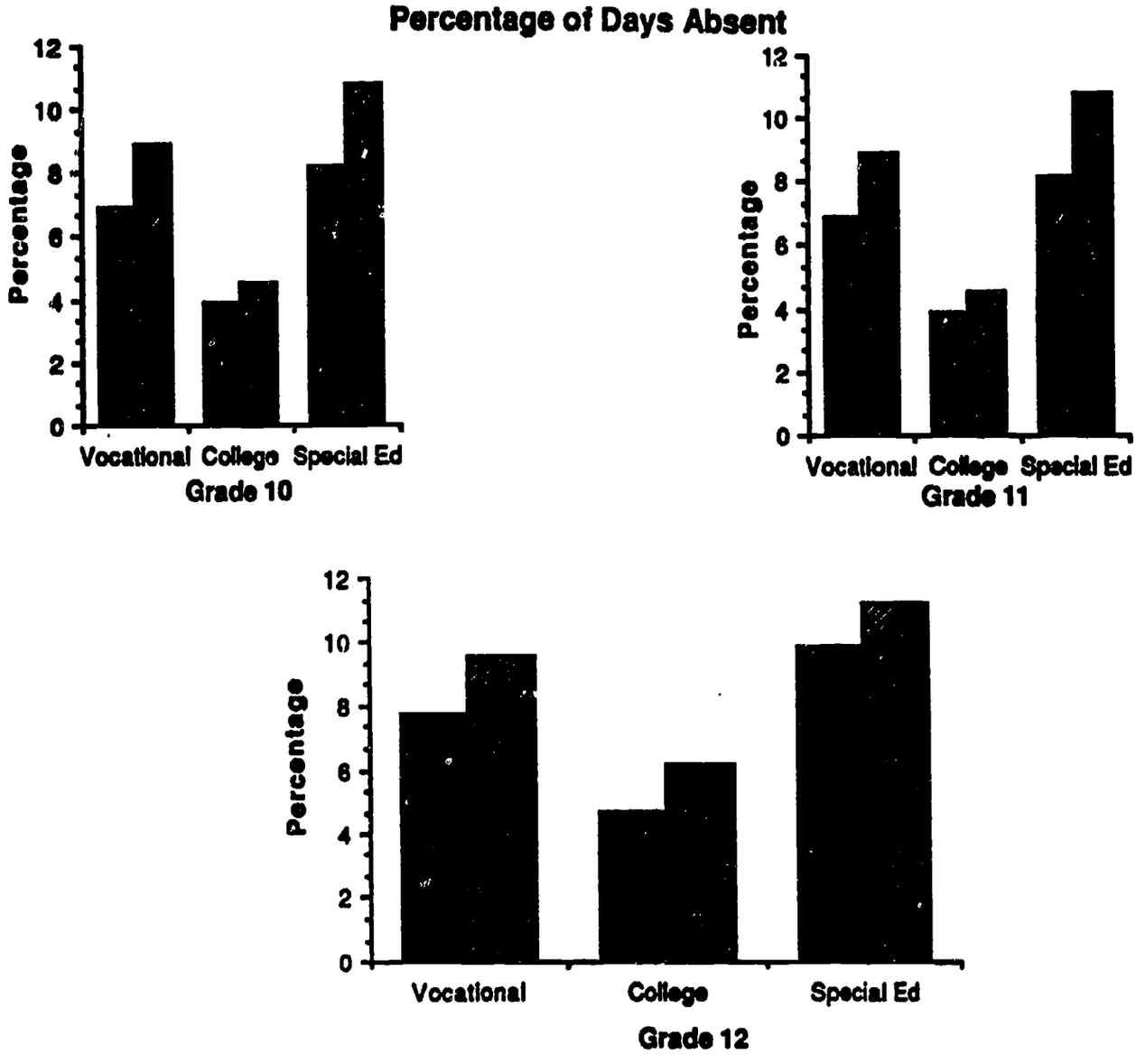
Table 2-18

Summary of Statistically Significant Differences Between Respondents and Nonrespondents in Three Groups[a]

Variable	Group		
	Vocational Program	College Program	Special Education
Graduation rate	*R	*R	*R
Absenteeism - grade 10	--	--	--
Absenteeism - grade 11	*N	--	*N
Absenteeism - grade 12	*	*N	--
GPA	*R	--	--
Class percentile	*R	--	--
Chemical Dependency evaluation	--	--	--
Chemical Dependency treatment	--	--	--
Psychological evaluation	--	--	--
Psychological treatment	--	--	--
Neurological evaluation	--	--	--
Incarceration	--	--	--
Work program	--	--	--
Vocational program	--	--	*R
Chemical program	--	--	--
Psychological program	--	--	--
Preschool special education	--	--	--
Elementary special education	--	--	--
Junior High special education	--	--	--
Senior High special education	--	--	--

[a]Statistically significant differences are indicated by an asterisk (*). The letter following the asterisk indicates the group that was higher on the variable (R = respondent, N = nonrespondent.)

Figure 2-1. School Record Information for Respondents and Nonrespondents in Three Groups.



than would have been found if information had been obtained from nonrespondents). However, the extent to which there are differences between respondents and nonrespondents is not as great as might have been expected.

II. Descriptions and Comparisons for Handicapping Conditions

Students with four handicapping conditions are the focus of this section -- those with mild mental retardation, learning disabilities, emotional disabilities, and speech impairments.

School Record Information

Information collected from students' cumulative files and special education files is included in this section. The information is based on all potential subjects. Differences between numbers of subjects in the sample and numbers for whom data are reported are due to missing data.

Graduation rates. Graduation rates for the four student groups are summarized in Table 2-19. As is evident in Table 2-19, the graduation rates for students with mild mental retardation (81%), learning disabilities (72%), or speech impairments (88%) were fairly similar, while the rates for students with emotional disabilities (26%) were much lower. Statistically significant differences were indicated by a chi-square test, $x^2(3) = 31.59$, $p < .001$.

Absenteeism rates. The average rates of absenteeism (percentage of days absent out of total days possible) for each of the high school years for students with the four handicapping conditions, as well as the actual number of days, are shown in Table 2-20. For the students with mild mental retardation, learning disabilities, or speech impairments, the proportions of days absent tended to increase with grade level. For students with emotional disabilities, a different pattern emerged: absenteeism rates tended to increase from grade 10 to grade 11, and then to drop again at grade 12 (probably related to the large decrease in the number of students in each grade for this group - a drop of 50%). In general, absenteeism for most of the students in special education accounted for about 10 to 15 days (6% - 9%) of the typical 170-day school year; for students with emotional disabilities, typical absenteeism rates tended to be almost twice as much, or about 25 to 30 days during the school year.

Statistical tests for differences among conditions at each grade level indicated that significant differences existed at grades 10 and 11: grade 10 - $F(3, 402) = 7.41$, $p < .001$; grade 11 - $F(3, 387) = 15.86$, $p < .001$. At grade 12, the difference only approached statistical significance: $F(3, 344) = 2.73$, $p < .040$. For grade 10, follow-up tests (Student-Newman-Keuls) indicated that students with emotional disabilities had a significantly greater proportion of days absent than did students with mild mental retardation, speech impairments, or learning disabilities. At grade 11, follow-up tests also indicated that students with emotional disabilities were absent a significantly greater proportion of days than students with mild mental retardation, speech impairments, or learning disabilities.

Class standing. Table 2-21 provides a summary of grade point averages, which were computed on a 12-point scale, with the value 12 assigned to the grade of A+, and class percentiles for students with the four handicapping conditions. For both of these

Table 2-19
Graduation Status of Students with Various Handicapping Conditions[a]

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Graduated	N	61	233	6	30
	%	81	72	26	88
Not Graduated	N	14	97	17	4
	%	18	29	74	12

[a]For this table, number of students with various handicapping conditions are: Mild Mental Retardation = 75, Learning Disability = 325, Emotional Disability = 23, Speech Impairment = 34.

Table 2-20
Absenteeism in Grades 10, 11, and 12 for Students with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Percentage of Days Absent					
Grade 10	Mean	7.2	8.2	16.0	6.1
	SD	6.6	8.1	12.9	6.8
	Range	0-33.2	0-61.8	3.3-48.2	0-27.6
	N	67	291	16	32
Grade 11	Mean	7.3	9.2	24.8	8.0
	SD	8.4	7.8	19.8	7.5
	Range	0-45.1	0-[illegible]	1.5-63.3	0-26.8
	N	65	280	13	33
Grade 12	Mean	7.8	11.1	14.6	9.4
	SD	5.9	10.1	6.5	8.9
	Range	0-24.9	0-100.0	6.0-25.7	0-35.4
	N	62	248	8	32
Number of Days Absent					
Grade 10	Mean	12.00	14.24	26.69	10.41
	SD	13.19	14.01	21.44	9.07
	Range	0-69	0-106	3-85	0-49
	N	67	291	16	32
Grade 11	Mean	12.60	[illegible]	31.15	14.00
	SD	14.52	13.71	17.18	13.19
	Range	0-70	0-[illegible]	4-[illegible]	1-67
	N	65	284	13	33
Grade 12	Mean	13.18	18.[illegible]	23.75	16.28
	SD	9.08	17.01	11.82	15.53
	Range	0-43	0-174	8-42	0-62
	N	62	246	8	32

Table 2-21

Grade Point Averages and Class Percentiles of Students with Various Handicapping Conditions

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Grade Point Average[a]				
Mean	6.55	5.78	4.68	7.07
SD	1.34	1.48	1.40	1.77
Range	2.86-9.06	1.67-9.85	2.22-7.50	4.09-10.06
N	71	296	15	33
Class Percentile				
Mean	28.50	19.31	13.71	37.24
SD	18.37	17.16	16.32	25.78
Range	1-72	0-88	1-45	1-84
N	70	296	14	33

[a]Grade point average could range from 0 to 12.00.

variables, ANOVAs indicated the existence of statistically significant differences: grade point average - $F(3, 411) = 15.18$, $p < .001$; percentile - $F(3, 409) = 13.87$, $p < .001$.

Follow-up tests for grade point average indicated that both the students with emotional disabilities and learning disabilities had significantly lower grade point averages than the students with speech impairments or mild mental retardation. In addition, students with emotional disabilities had a significantly lower grade point average than students with learning disabilities. Follow-up tests for the class percentile variable indicated that students with emotional or learning disabilities had statistically significant lower class percentile ranks than students with speech impairments or mild mental retardation. Also, students with speech impairments had a significantly higher class percentile rank than students with mild mental retardation.

Special evaluations and treatments. A summary of the extent to which students with each condition received special external evaluations and/or treatments during their school years is presented in Table 2-22. The numbers reported in this table suggest that there are differences in the use of these special external evaluations and treatments. Students with speech impairments did not receive any of these special treatments. Minimal use is indicated for students with mild mental retardation or learning disabilities (from 0% to 4%). Considerably greater use is indicated for students with emotional disabilities (usually between 8% and 20%). Statistical tests (chi square) indicated that significant differences from expected distributions existed for psychiatric treatment, $x^2(3) = 37.31$, $p < .001$, for chemical dependency evaluation, $x^2(3) = 12.39$, $p < .007$, and for incarceration, $x^2(3) = 33.69$, $p < .001$. In each case, the statistical significance could be explained by the larger numbers and percentages for students with emotional disabilities.

Related services. Related services were non-special education services provided by the school district, such as work placement programs and vocational training, as well as specialized non-special education treatments and evaluations that the school district contracted to have provided by outside agencies. Table 2-23 is a summary of the types of school-based related services received by students with the four handicapping conditions. In general, the lowest participation rates for work programs were found for students with emotional disabilities or speech impairments. This distribution differed significantly from the expected distribution, $x^2(3) = 19.01$, $p < .001$. The lowest participation rates for vocational programs were found for the students with emotional disabilities. This distribution also was significantly different from expectation, $x^2 = 38.77$, $p < .001$. Chemical program and psychological program participation rates were found to be highest for students with emotional disabilities (24%); use of these programs was minimal by students with mild mental retardation (1-3%) or learning disabilities (2-3%), and nonexistent for students with speech impairments. For both variables, these differences among conditions reached statistical significance: chemical - $x^2(3) = 16.12$, $p < .002$; psychological - $x^2(3) = 43.79$, $p < .001$.

Group test scores. Aptitude and achievement test scores (percentile ranks) that were available for students with four handicapping conditions are provided in Table 2-24. These test scores generally were derived from group administrations during grade 10. For most students, the aptitude data presented in the table are from the SCAT (58% for students with emotional disabilities to 82% for students with speech impairments) or Lorge Thorndike (3% for students with speech impairments to 26% for students with emotional disabilities). Similarly, the achievement data usually are from the SRA (81% for students with learning disabilities to 92% for students with mild mental retardation). The tests used with students in the 1984 class were the Cognitive Scale Index of the

Table 2-22

Special Evaluations and Treatments Received by Students with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Chemical Dependency Evaluation	N	0	3	2	0
	%	0	1	8	0
Chemical Dependency Treatment	N	1	8	2	0
	%	1	2	8	0
Psychological Evaluation	N	2	4	2	0
	%	3	1	8	0
Psychiatric Treatment	N	1	2	4	0
	%	1	1	16	0
Neurological Evaluation	N	0	1	0	0
	%	0	0	0	0
Incarceration	N	3	4	5	0
	%	4	1	20	0

[a]For this table, number of students with various handicapping conditions are: Mental Retardation = 75, Learning Disability = 326, Emotional Disability = 24, Speech Impairment = 34.

Table 2-23

Summary of Related Services Received by Students with Various Handicapping Conditions[a]

		Handicapping Condition				
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Significance Level
Work[b]	N	54	183	6	11	.001
	%	72	56	24	32	
Vocational[c]	N	68	272	10	22	.001
	%	91	83	40	65	
Chemical Program[d]	N	1	9	4	--	.002
	%	1	3	16	--	
Psychological Program	N	2	5	6	--	.001
	%	3	2	24	--	

[a]For this table, number of students with various handicapping conditions are: Mild Mental Retardation = 75, Learning Disability = 326, Emotional Disability = 25, Speech Impairment = 34.

[b]Work = Work program or WECEP or Summer School work program.

[c]Vocational = Vocational or Vo-Tech.

[d]Chemical Program = Chemical treatment or evaluation.

[e]Psychological Program = Psychiatric treatment or psychological evaluation.

Table 2-24

Aptitude and Achievement Percentile Ranks on Group-Administered Tests for Students with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Aptitude					
Verbal					
	Mean	12.13	20.70	17.22	40.85
	SD	13.49	17.54	16.57	30.29
	Range	1-67	1-88	1-68	1-97
	N	53	281	18	33
Math					
	Mean	9.66	22.43	19.22	51.00
	SD	12.80	20.40	18.35	32.77
	Range	1-66	1-94	1-65	1-99
	N	53	281	18	33
Total					
	Mean	8.54	18.61	14.06	46.21
	SD	12.71	17.95	13.32	31.88
	Range	1-69	1-85	1-46	2-98
	N	50	280	17	33
Achievement					
Reading					
	Mean	9.17	21.69	20.23	46.87
	SD	8.38	17.27	15.60	22.38
	Range	1-37	1-82	3-48	6-93
	N	47	284	13	30
Language Arts					
	Mean	8.96	15.47	11.39	40.80
	SD	9.26	14.66	12.01	24.71
	Range	1-45	1-84	1-38	8-98
	N	48	284	13	30
Math					
	Mean	17.28	28.85	25.23	52.28
	SD	15.06	21.95	19.72	28.85
	Range	1-66	1-95	1-62	1-99
	N	47	283	13	29
Composite					
	Mean	8.02	18.89	15.46	46.52
	SD	7.34	15.90	13.82	25.47
	Range	1-34	1-90	2-45	9-99
	N	46	275	13	29

California Test of Cognitive Skills, and the California Test of Basic Skills. The ranges of scores were great for all the handicapping conditions.

On aptitude measures, significant differences were found among the categories for each of the scores (verbal, performance, and total) at the .001 level: verbal - $F(3, 381) = 17.10$; performance - $F(3, 381) = 27.42$; total - $F(3, 376) = 28.50$. In each case, follow-up tests indicated that students with learning disabilities had significantly higher scores than students with mild mental retardation, and that students with speech impairments had significantly higher scores than students with mild mental retardation, emotional disabilities, or learning disabilities.

Achievement test scores for the areas of reading, math, and language also were significantly different for the four conditions of students in special education: reading - $F(3, 370) = 30.92$, $p < .001$; math - $F(3, 368) = 15.74$, $p < .001$; language - $F(3, 371) = 30.94$, $p < .001$. In reading, follow-up tests revealed the following as significant differences: students with speech impairments had higher scores than students with learning disabilities, emotional disabilities, or mild retardation; students with learning disabilities or emotional disabilities had higher scores than students with mild mental retardation. In both language and math, the following differences were found to be significant: students with speech impairments had higher scores than students with learning disabilities, emotional disabilities, or mild mental retardation; students with learning disabilities had higher scores than students with mild mental retardation.

Reasons for referral. The extent to which students in each of the four conditions had been referred for problems in the areas of math, reading comprehension, reading rate, attention, written language, oral language, behavior, low achievement, low ability, or another area are presented in Table 2-25. A different primary reason was evident for each condition. For example, for students with mild mental retardation, the primary reason for referral was "low ability" (24%). Most of the remaining reasons (about 30% or more) were related to academic achievement concerns. For students with learning disabilities, the primary reasons for referral were "reading comprehension" (45%), "math" (22%), "written language" (18%), and "low achievement" (13%). "Oral language" clearly was the primary reason for referral for students with speech impairments (88%). For students with emotional disabilities, the primary reason for referral was spread among "reading comprehension" (36%), math (32%), and "behavior" (32%). The remaining reasons also tended to be achievement related. The "other" condition produced relatively high rates for three of the groups (students with mild mental retardation, students with learning disabilities, and student with emotional disabilities). The reasons in this condition are quite diverse and include self-concept, memory, distractibility, and a variety of other achievement and classroom behavior concerns.

Special education services. The average numbers of daily minutes of special education received during pre-elementary years, elementary school, junior high school, and senior high school are presented in Table 2-26. For all conditions except possibly mild mental retardation, there was an increase across grade levels in the amount of time that special education services were received. Of interest is the relatively gradual increases across time, except for students with emotional disabilities; no services were provided before elementary school, then the average number of minutes increased to a very high average number of minutes. Thus, a "typical" student with mild mental retardation received about 1 hour and 10 minutes of special education service per day in preschool and from 1 hour and 45 minutes to 2 hours at each of the other levels. In contrast, a "typical" student with emotional disabilities received no services in preschool,

Table 2-25

Primary Reasons for Referral of Students with Various Handicapping Conditions[a]

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Math				
N	4	72	8	--
%	5	22	32	
Reading Comprehension				
N	10	145	9	--
%	13	45	36	
Reading Rate				
N	1	18	4	--
%	1	6	16	
Attention				
N	4	28	2	--
%	5	9	8	
Written Language				
N	1	59	4	--
%	1	18	16	
Oral Language				
N	3	22	4	30
%	4	7	16	88
Behavior				
N	6	28	8	4
%	8	9	32	12
Low Achievement				
N	4	44	--	--
%	1	13		
Low Ability				
N	19	1	1	1
%	24	0	4	
Other				
N	17	46	7	2
%	21	14	28	6

[a]Percentages are based on the number of students referred for a given reason divided by the number of students with the handicapping condition: Mild Mental Retardation = 75, Learning Disability = 327, Emotional Disability = 25, Speech Impairment = 35). Percentages total more than 100% because more than one reason was listed for some students.

Table 2-26
Summary of Daily Minutes of Direct Special Education Services for Those Receiving Services

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Preschool (Pre, K T)				
Mean	78.13	27.50	--	15.00
SD	117.68	22.91		--
Range	15-360	15-75		--
N	8	12		4
Elementary (1-6)				
Mean	104.03	53.91	45.13	21.61
SD	82.09	22.90	20.31	20.79
Range	15-360	15-200	15-65	15-93
N	40	148	12	14
Junior High (7-9)				
Mean	107.55	62.35	151.03	53.77
SD	59.01	36.90	123.23	53.26
Range	15-260	15-330	30-435	15-190
N	55	221	17	13
Senior High (10-12)				
Mean	118.49	67.14	227.71	29.72
SD	56.52	50.27	130.22	57.66
Range	15-290	15-500	45-595	15-300
N	75	261	24	27

about 45 minutes in elementary school, about 2 1/2 hours in junior high, and about 3 hours and 45 minutes per day in senior high. Students with learning disabilities received about 1/2 hour per day in preschool and about one hour at all other levels. Students with speech impairments received services for considerably less time, and did not show the continuous increase over years.

Analyses of the special education direct service data revealed that there were no statistically significant differences among conditions during preschool, $F(2, 21) = 2.00$, $p < .165$, elementary school, $F(3, 210) = 1.80$, $p < .150$, and junior high, $F(3, 302) = 2.31$, $p < .080$. Significant differences in high school, $F(3, 383) = 4.86$, $p < .003$, were attributed to the greater time received by students with emotional disabilities compared to students with mild mental retardation, learning disabilities, or speech impairments.

The numbers in Table 2-26 reflect special education services for students receiving direct services. The frequency with which students in each group received indirect services (such as monitoring) is summarized in Table 2-27.

Summary. Table 2-28 is a summary of the findings for those variables derived from students' cumulative files and from special education files. Several differences appeared among students with different handicapping conditions. For example, cumulative file information generally indicated that students with emotional disabilities (and sometimes students with learning disabilities) fell below students with speech impairments or mild mental retardation in progress measures (graduation rates, grade point average, class percentile) and above them in absenteeism rates. (It should be noted that the higher performance on progress measures of students with mild mental retardation is probably related to the fact that many of their grades came from courses designed for them.) Test data usually separated students with speech impairments (higher) from students with mild mental retardation (lower) in terms of aptitude and achievement. Minutes of service was another variable for which significant differences were found, with students with mild mental retardation receiving more minutes of service than students with learning disabilities or speech impairments in all grade levels, and students with emotional disabilities receiving more than all others at the junior and senior high school levels. Several of these comparisons are shown graphically in Figure 2-2.

Outcome Information

Information collected from the project follow-up form is included in this section. The focus of attention here again is on students with four handicapping conditions: mental retardation, learning disabilities, speech impairments, and emotional disabilities. The numbers of students for whom data are presented, however, are only those who responded to the follow-up forms. Thus, the possible numbers of respondents for each condition are: mild mental retardation = 53, learning disabilities = 220, emotional disabilities = 14, speech impairments = 22. Not all respondents answered all items. The appropriate numbers are noted when this occurred. The outcome results are organized within four broad categories: (a) occupational, (b) educational, (c) financial, and (d) social.

Occupational Outcomes

Information on four types of variables related to occupational outcomes is included here: current activities, employment characteristics, job satisfaction, and how the job was found.

Table 2-27

Summary of Numbers and Percentages of Students Receiving Indirect Special Education Services in Each Grade[a]

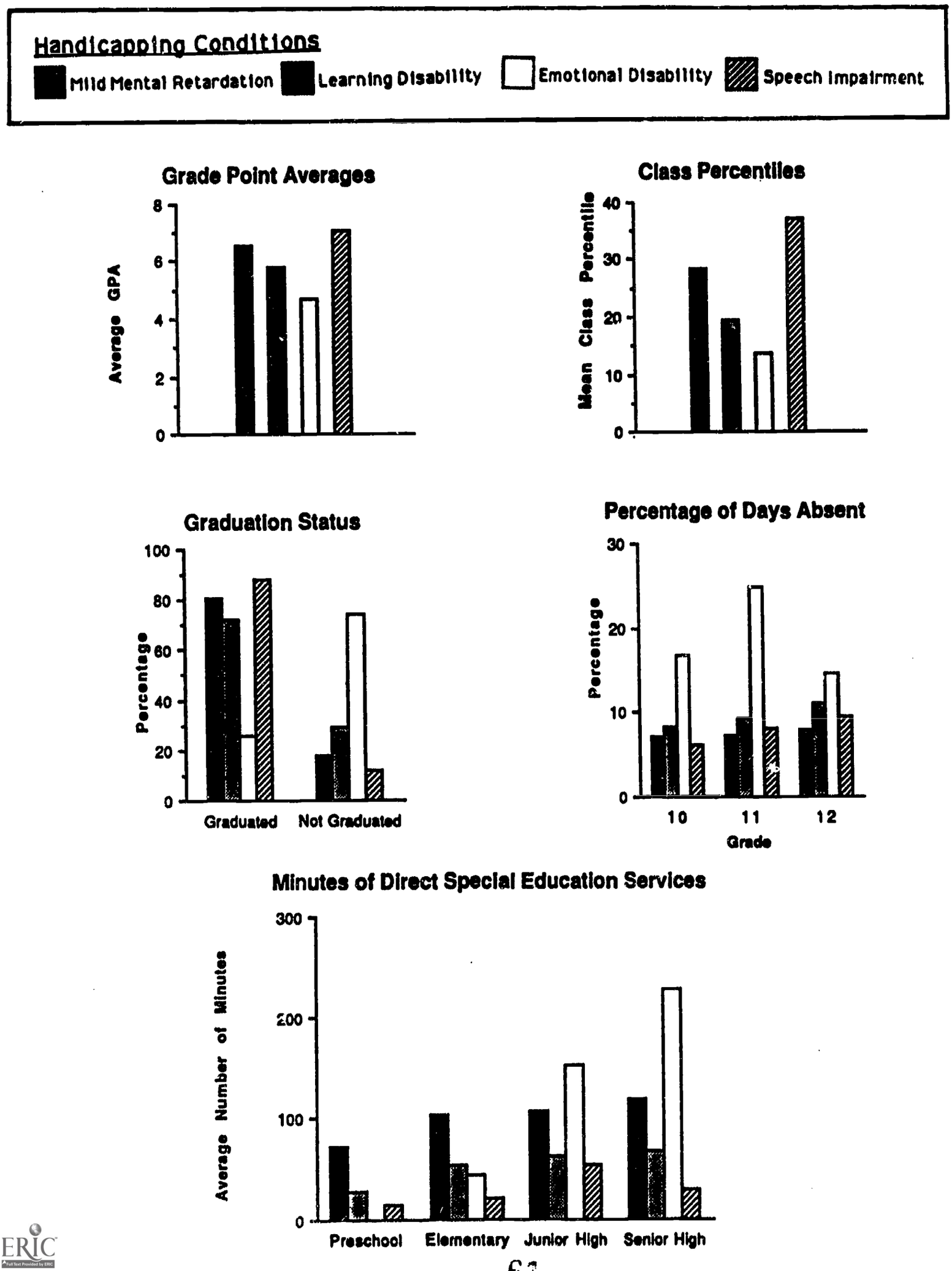
Grade	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Preschool	--	--	--	--
Kindergarten	1 (1%)	--	--	--
Transition	1 (1%)	--	--	--
Grade 1	--	1 (0%)	--	1 (3%)
Grade 2	--	--	--	--
Grade 3	1 (1%)	--	--	--
Grade 4	--	2 (1%)	--	--
Grade 5	1 (1%)	3 (1%)	--	3 (9%)
Grade 6	1 (1%)	13 (4%)	--	2 (6%)
Grade 7	--	17 (5%)	--	1 (3%)
Grade 8	1 (1%)	25 (8%)	1 (4%)	4 (12%)
Grade 9	5 (7%)	63 (19%)	4 (16%)	4 (12%)
Grade 10	3 (4%)	89 (27%)	2 (8%)	11 (32%)
Grade 11	5 (7%)	81 (25%)	1 (4%)	14 (41%)
Grade 12	5 (7%)	68 (21%)	1 (4%)	10 (29%)

[a]Percentages are based on all students with various handicapping conditions for whom information was available: Mild Mental Retardation = 75; Learning Disability = 326; Emotional Disability = 25; Speech Impairment = 34.

Table 2-28
Summary of Statistical Comparisons of Students with Various Handicapping Conditions on School File Variables

Variable	Significance Level	Nature of Differences among Handicapping Conditions
Graduation rate	.001	Mild Mental Retardation, Learning Disability, Speech Impairment > Emotional Disability
Absenteeism - grade 10	.001	Emotional Disability > Mild Mental Retardation, Speech Impairment, Learning Disability
Absenteeism - grade 11	.001	Emotional Disability > Mild Mental Retardation, Speech Impairment, Learning Disability; Learning Disability > Mild Mental Retardation
Absenteeism - grade 12	ns	----------
Grade point average	.001	Speech Impairment, Mild Mental Retardation > Emotional Disability, Learning Disability
Class percentile	.001	Speech Impairment, Mild Mental Retardation > Learning Disability
Work program	.001	Learning Disability, Mild Mental Retardation > Emotional Disability, Speech Impairment
Vocational program	.001	Learning Disability, Mild Mental Retardation, Speech Impairment > Emotional Disability
Chemical program	.002	Emotional Disability > Speech Impairment, Mild Mental Retardation, Learning Disability
Psychological program	.001	Emotional Disability > Speech Impairment, Mild Mental Retardation, Learning Disability
Verbal aptitude	.001	Learning Disability > Mild Mental Retardation; Speech Impairment > Mild Mental Retardation, Emotional Disability, Learning Disability
Performance aptitude	.001	Learning Disability > Mild Mental Retardation; Speech Impairment > Mild Mental Retardation, Emotional Disability, Learning Disability
Total aptitude	.001	Learning Disability > Mild Mental Retardation; Speech Impairment > Mild Mental Retardation, Emotional Disability, Learning Disability
Reading achievement	.001	Speech Impairment > Learning Disability, Emotional Disability, Mild Mental Retardation; Learning Disability > Mild Mental Retardation
Math achievement	.001	Speech Impairment > Learning Disability, Emotional Disability, Mild Mental Retardation
Language achievement	.001	Speech Impairment > Learning Disability, Emotional Disability, Mild Mental Retardation
Preschool minutes service	ns	----------
Elementary minutes service	.001	Mild Mental Retardation > Learning Disability, Speech Impairment, Emotional Disability
Jr. High minutes service	.001	Emotional Disability > Mild Mental Retardation, Learning Disability, Speech Impairment; Mild Mental Retardation > Learning Disability, Speech Impairment
Sr. High minutes service	.001	Emotional Disability > Mild Mental Retardation, Learning Disability, Speech Impairment; Mild Mental Retardation > Learning Disability, Speech Impairment

Figure 2-2. School Record Information for Students with Various Handicapping Conditions.



Current activities. A summary of the numbers and percentages of students with each handicapping condition involved in six kinds of occupation-related activities is presented in Table 2-29. (Percentages in the tables do not add to 100% because a respondent could be involved in more than one activity.) Table 2-29 also indicates the results of chi-square tests to compare students with the four handicapping conditions on each variable. The percentages who were in paid employment varied from 35% (for students with speech impairments) to 80% (for students with mild mental retardation or learning disabilities). Yet, a significant difference among the four groups of students was not found on this variable. In fact, the only difference that approached significance was for the "unemployed-not looking for work" variable, $x^2(3) = 7.69$, $p < .060$. Lower labor force participation for the students with speech impairments was expected since members of this group were enrolled at higher rates than the other groups in post high school educational programs (see Educational Outcomes section).

Employment characteristics. Table 2-30 presents a summary of several characteristics related to employment (hours working, earnings, number different employers). Earnings were of primary interest in this study. Both hourly earnings and total earnings during 1984 are presented in Table 2-30. Also indicated in the table are the results of statistical procedures (either analyses of variance or chi-squares) to test the significance of differences among the four groups of students. The differences in the number of hours worked per week (ranging from 35 to 40 hours) did not reach the level of statistical significance, $F(3, 221) = 3.10$, $p < .030$.

Both of the earnings variables, however, did show statistically significant differences. Average hourly earnings, $F(3, 170) = 5.88$, $p < .001$, ranged from $4.98 (for individuals with mild mental retardation) to $7.67 (for individuals with learning disabilities). Actual ranges for individual students went from .64 (for a student with mental retardation) to $25.00 (for a student with learning disabilities). Follow-up tests (Student-Newman-Keuls) indicated that the respondents with learning disabilities had hourly earnings that were significantly higher than those of respondents with learning disabilities. Gross earnings (before taxes) for the year 1984, $F(3, 167) = 4.28$, $p < .007$, ranged from just over $8000 (for respondents with mild mental retardation) to about $14,300 (for respondents with learning disabilities). Actual gross earnings for individual respondents, however, ranged from nothing (respondents with mild mental retardation or learning disabilities) to $81,250 (a respondent with learning disabilities). Follow-up tests again indicated that respondents with learning disabilities had significantly higher incomes than did respondents with mild mental retardation.

Number of different employers was also relatively similar for the four groups of respondents (see Table 2-30), with most subjects averaging about 3 to 4 employers. Statistical tests indicated that there was not a significant difference among the groups.

Job satisfaction. Information related to job satisfaction is presented in Table 2-31. The tables show the number of respondents indicating either "not satisfied," "satisfied," or "very satisfied" to three items related to the use of abilities in the job, the pay and amount of work, and the chance to get ahead. On each of the items, most students expressed their satisfaction (responded either "satisfied" or "very satisfied"). The lowest satisfaction rates were found for the group with speech impairments (67%) on the "use of abilities" item, for the group with emotional disabilities (51%) on the "pay and amount of work" item, and for students with speech impairments (59%), mild mental retardation (60%), or learning disabilities (66%) on the "chance to get ahead" items. None of the chi square tests on these variables was statistically significant.

Table 2-29

Current Activities of Subjects with Various Handicapping Conditions

	Handicapping Condition				
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Significance Level
Homemaker					
N	7	44	4	3	ns
%	16	25	36	17	
Military					
N	0	6	1	1	ns
%	0	3	9	3	
Unemployed -- looking					
N	6	25	0	2	ns
%	13	14	0	6	
Unemployed -- not looking					
N	4	7	2	3	ns
%	9	4	18	9	
Paid employment					
N	36	137	8	12	ns
%	80	80	73	35	
Other					
N	0	6	1	2	ns
%	0	3	9	6	

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 45; Learning Disability = 173; Emotional Disability = 11; Speech Impairment = 18. Percentages may not total 100% because respondents could select multiple activities.

Table 2-30

Employment Characteristics of Subjects with Various Handicapping Conditions

	Handicapping Condition				
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Significance Level
Hours per Week					
Mean	35.03	40.35	35.78	37.44	ns
SD	14.08	9.41	8.32	12.24	
Range	4-80	10-72	15-40	20-70	
N	38	162	9	16	
Money Earned Per Hour					
Mean	4.98	7.67	5.85	6.43	.001
SD	2.22	3.66	1.90	3.13	
Range	.64-13.00	2.85-25.00	3.35-8.00	1.00-11.35	
N	32	124	7	11	
Total 1984 Earning before Taxes					
Mean	8,036.42	14,309.52	9,499.57	13,754.55	.007
SD	5,549	9,921	4,838	9,294	
Range	0-24,000	0-81,250	2,513-15,000	2,000-31,500	
N	31	122	7	11	
Number of Different Employers					
Mean	3.59	3.96	5.40	3.67	ns
SD	3.85	4.22	6.54	2.35	
Range	1-24	1-30	1-20	1-10	
N	32	170	10	18	

Table 2-31

Job Satisfaction of Subjects with Various Handicapping Conditions

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Use of Abilities				
Not Satisfied	7 (21%)	25 (17%)	1 (13%)	4 (33%)
Satisfied	21 (62%)	76 (53%)	7 (88%)	6 (50%)
Very Satisfied	6 (18%)	43 (30%)	0 (0%)	2 (17%)
Pay and Amount of Work				
Not Satisfied	10 (29%)	31 (22%)	4 (50%)	2 (17%)
Satisfied	18 (53%)	84 (58%)	3 (38%)	6 (50%)
Very Satisfied	6 (18%)	29 (20%)	1 (13%)	4 (33%)
Chance to Get Ahead				
Not Satisfied	13 (39%)	50 (35%)	1 (13%)	5 (42%)
Satisfied	15 (45%)	57 (40%)	6 (75%)	2 (17%)
Very Satisfied	5 (15%)	37 (26%)	1 (13%)	5 (42%)

[a]For this table, number of students with various handicapping conditions are: Mild Mental Retardation = 34; Learning Disability = 144; Emotional Disability = 8; Speech Impairment = 12.

How job was found. Information about how the respondents found their jobs is presented in Table 2-32. For this table, certain responses were combined to more closely reflect those generally presented in the research literature. As is evident in Table 2-32, most jobs were found through the parent-relative-friend network, for all groups except the group with mild mental retardation. For these students, most jobs were found by themselves. However, chi-square tests indicated that these differences were not significant (although they approached significance, $x^2(9) = 16.47$, $p < .060$).

Summary. Figure 2-3 is a summary of several of the comparisons of occupational outcomes for subjects with different handicapping conditions. Table 2-33 is a review of the findings for each of the occupational outcome variables that could be tested statistically. Significant differences were identified for only two of the variables. Both were related to earnings. Respondents with learning disabilities earned more per hour, and per year (based on 1984 information) than respondents with mild mental retardation.

Educational Outcomes

Information on two variables related to educational outcomes is presented here: current activities and special training since high school. Again, the possible numbers of subjects for these variables is limited to those who responded to the follow-up forms (individuals with mild mental retardation = 53, learning disabilities = 220, emotional disabilities = 14, speech impairments = 22)

Current activities. Table 2-34 is a summary of the current educational activities of the respondents. (Percentages may total more than 100% because respondents could be involved in more than one type of educational activity.) Chi-square analyses indicated that none of the differences among subjects with different handicapping conditions was statistically significant. All groups of students, except those with speech impairments, showed relatively low levels of participation in each type of educational activity. This was reflected in the only chi square that approached significance, that for "college or university," $x^2(3) = 9.48$, $p < .030$.

Special training. Participation in special training activities since high school and the number of weeks in the first training experience are summarized in Table 2-35. The participation rates for respondents with the four handicapping conditions ranged from 27% for those with emotional disabilities to 61% for those with speech impairments. Statistical tests on participation were not significant. The total number of weeks in the first training experience ranged from 1 to 312. Significant differences were not found for the number of weeks in the first training experience.

Summary. Educational outcome data for respondents with mild mental retardation, learning disabilities, speech impairments, or emotional disabilities showed few statistically significant differences. There was a tendency for the group with speech impairments to be currently involved in educational activities after leaving high school, while the groups with mild mental retardation, learning disabilities, or emotional disabilities showed much lower levels of involvement. A spread was evident in the percentages of respondents who had some type of special training since leaving school, ranging from 27% of respondents with emotional disabilities and 36% of those with mild mental retardation to 57% of respondents with learning disabilities and 61% of those with speech impairments. Figure 2-4 shows some of the educational outcomes graphically.

Table 2-32

How Job Was Found by Subjects with Various Handicapping Conditions[a]

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Parents, Relatives, Friends	N	14	87	10	10
	%	34	52	91	56
School	N	6	8	--	2
	%	15	5	--	11
Self	N	15	52	--	4
	%	37	31	--	22
Employment Agency or Other	N	6	21	1	2
	%	15	13	9	11

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 41; Learning Disability = 168; Emotional Disability = 11; Speech Impairment = 18.

Table 2-33

Summary of Statistical Comparisons of Subjects with Various Handicapping Conditions on Occupational Outcome Variables

Variable	Significance Level	Nature of Difference among Handicapping Conditions
Homemaker	ns	Emotional Disability > Mild Mental Retardation, Speech Impairment
Military	ns	--
Unemployed--looking	ns	--
Unemployed--not looking	ns	--
Paid employment	ns	--
Other	ns	--
Hours per week	ns	--
Hourly earnings	.001	Learning Disability > Mild Mental Retardation
1984 earnings	.007	Learning Disability > Mild Mental Retardation
Number of different employers	ns	--
How job was found	ns	--

Figure 2-3. Occupational Outcomes for Students with Various Handicapping Conditions.

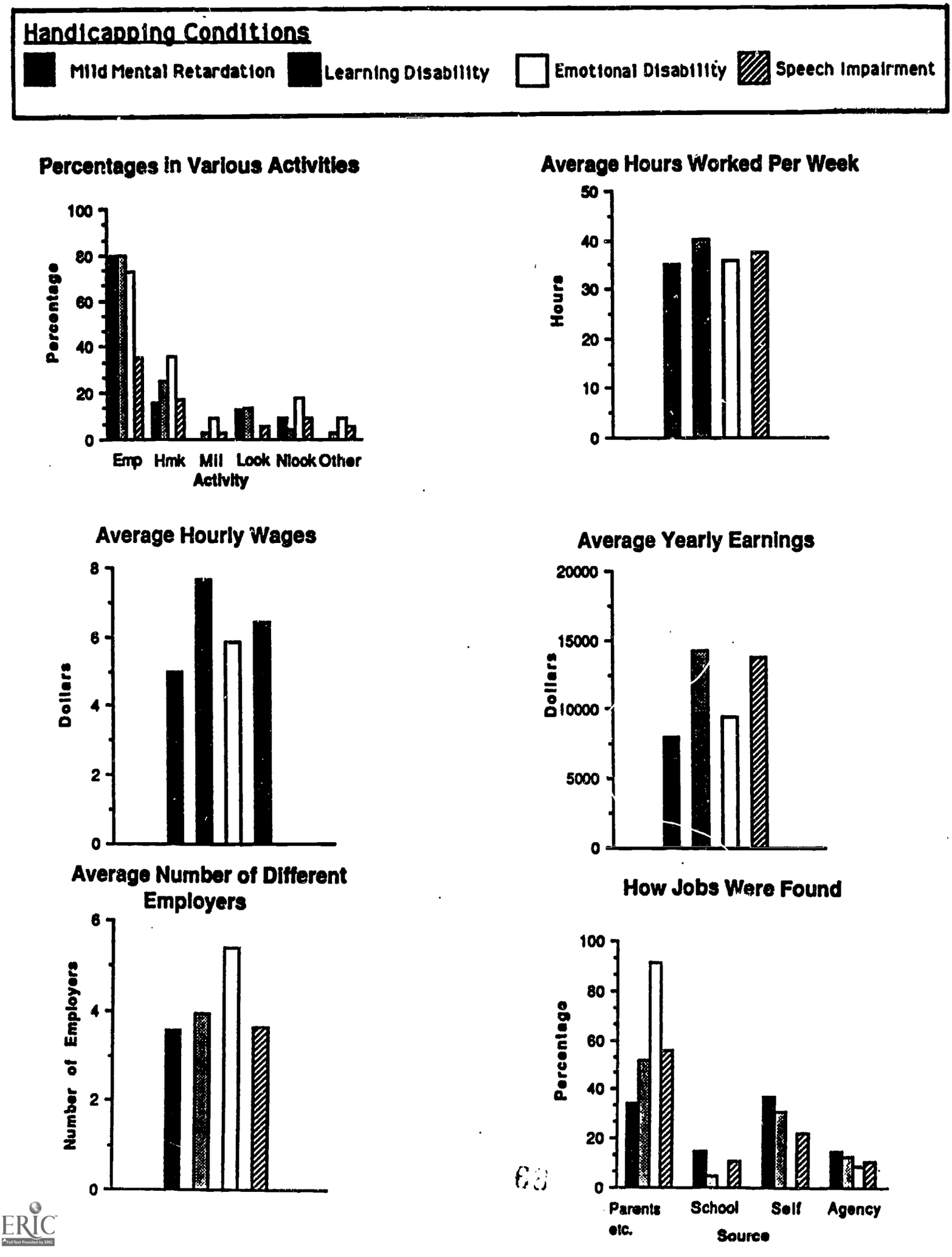


Table 2-34

Current Education Activities of Subjects with Various Handicapping Conditions[a]

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Vocational School	N	3	7	--	31
	%	7	4		91
Community College	N	--	3	--	1
	%		2		3
College or University	N	1	11	--	4
	%	2	6		12
Apprenticeship	N	1	9	--	--
	%	2	5		
Other Education	N	3	7	2	1
	%	7	4	18	3
None	N	40	136	9	10
	%	89	79	82	29

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 45; Learning Disability = 173; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included). Percentages may not total to 100% because respondents could select multiple activities.

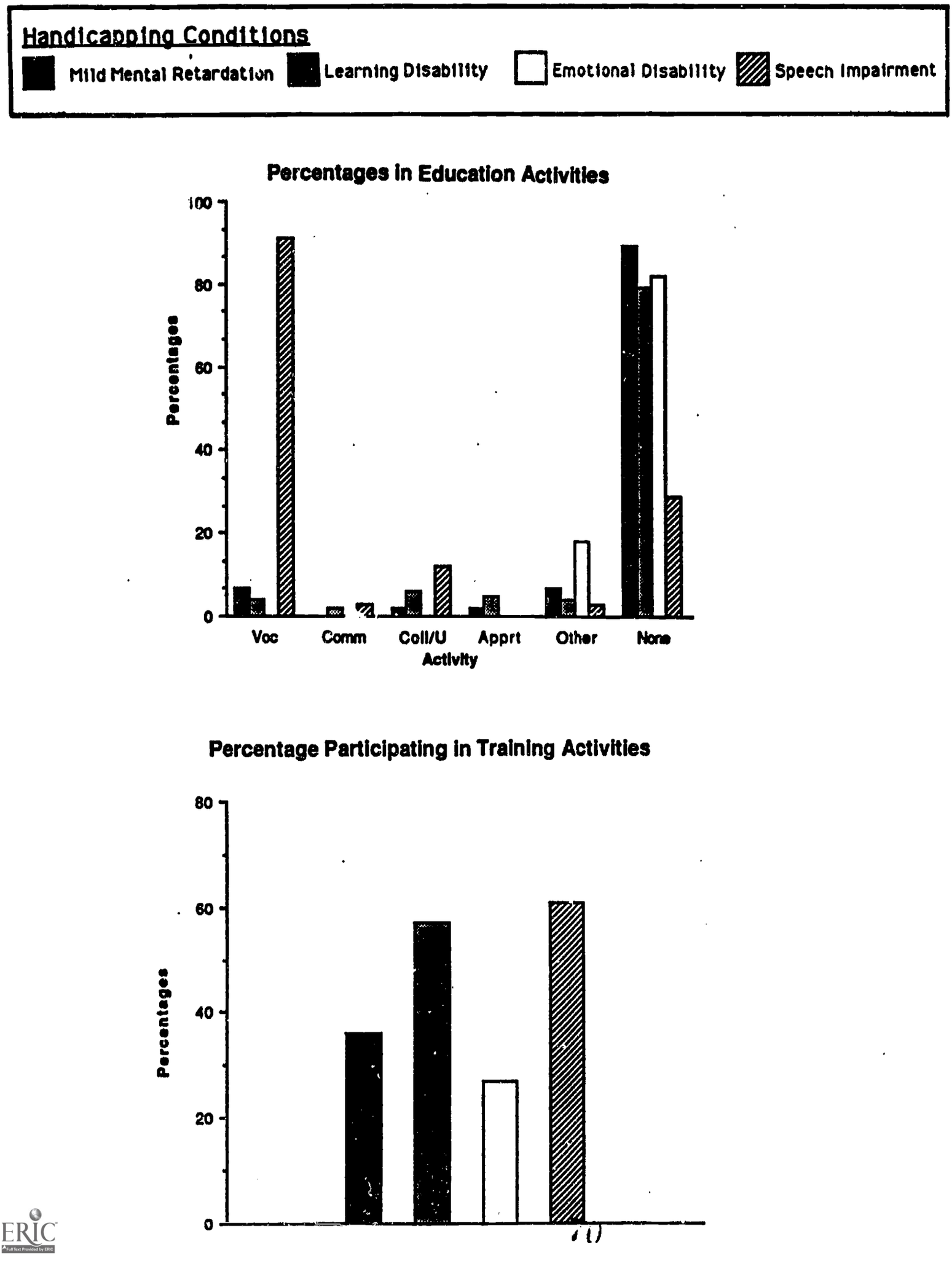
Table 2-35

Special Training Activities of Subjects with Various Handicapping Conditions

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Special Training Since High School[a]				
N	16	98	3	11
%	36	57	27	61
Weeks in First Training				
Mean	39.21	62.34	24.00	82.82
SD	41.05	64.30	24.33	61.07
Range	2-156	1-312	8-52	2-182
N	19	91	3	11

[a]For this table, number of students with various handicapping conditions are: Mild Mental Retardation = 44; Learning Disability = 173; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included).

Figure 2-4. Educational Outcomes for Students with Various Handicapping Conditions.



Financial Integration Outcomes

Four general variables related to the financial integration of respondents are included here: checking account possession, credit card possession, vacations in 1984, and other income sources and amounts. The maximum number of respondents in each category group is 45 individuals with mild mental retardation, 173 with learning disabilities, 11 with emotional disabilities, and 18 with speech impairments. For many of the items related to financial integration, however, respondents chose not to provide information. In addition, subjects in the 1984 groups were not asked to provide information related to these items.

Checking account. Information about the number and percentage of respondents who indicated that they had a checking account is shown in Table 2-36. The percentages ranged from a low 9% for subjects with emotional disabilities to 60% for subjects with learning disabilities and 67% for subjects with speech impairments. Subjects with mild mental retardation were in the middle, with 44% indicating they had checking accounts. The percentages remained relatively constant across class years for subjects with mild mental retardation, but increased substantially for those with learning disabilities. A chi-square test of the numbers, not broken down by years, indicated that the distribution was significantly different from what would be expected by chance, $x^2(3) = 14.05$, $p = .004$. This appeared to be due to the very low numbers of students with emotional disabilities with checking accounts.

Credit card/charge account. Table 2-36 also shows the number and percentage of respondents in each group who indicated that they had a credit card or a charge account. These percentages ranged from 27% to 54%, with fewer respondents with emotional disabilities (27%) and more respondents with learning disabilities (54%) and speech impairments (50%) having them. A chi-square test was nonsignificant.

Vacations. An indication of the numbers and percentages of respondents taking a vacation in 1984 also is shown in Table 2-36. These percentages ranged from 52% for individuals with mild mental retardation to 72% for those with speech impairments. Both individuals with learning disabilities (65%) and emotional disabilities (64%) were close in percentage. The chi-square test was nonsignificant.

Other income. The sources from which respondents received income, other than from a job, are summarized in Table 2-37. The largest percentage in each group received no other income. These percentages ranged from none of those with mild mental retardation to 69% of those with learning disabilities. Other than income from family or relatives, the percentages of respondents receiving income from the other sources listed in Table 2-37 were quite low, always 8% or less. Chi-square tests indicated that none of the distributions was significantly different from expectation.

A summary of the amounts of other income from these sources is shown in Table 2-38. The numbers of respondents on which these data are based often are considerably lower than the number possible due to the respondents' failure to provide dollar information. Statistically significant differences among the four groups were not found. Data on other income may be questionable in many instances since it was not possible to verify results through other sources.

Summary. A summary of the results of statistical tests on variables related to financial integration is provided in Table 2-39. Few differences emerged in these

Table 2-36

Current Financial Characteristics of Subjects with Various Handicapping Conditions

	Handicapping Condition				
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Significance Level
Checking Account					
N	20	104	1	12	.004
%	44	60	9	67	
Credit Card/Charge Account					
N	18	92	3	9	ns
%	40	54	27	50	
Vacation in 1984					
N	23	112	7	13	[illegible]
%	52	65	64	72	

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 45; Learning Disability = 172; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included).

Table 2-37

Other Income Sources for Subjects with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Family/Relative	N	8	11	3	3
	%	19	7	27	19
Friend	N	1	4	1	1
	%	2	2	9	6
County	N	--	3	--	--
	%		2		
State	N	1	8	1	2
	%	2	5	9	12
Federal	N	2	7	--	--
	%	5	4		
Other	N	3	16	2	1
	%	7	10	18	6
None	N	--	118	6	10
	%		69	55	56

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 42; Learning Disability = 162; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included).

Table 2-38

Amount of Other Income Received Each Month by Subjects with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Family/Relative					
	Mean	57.20	190.71	400.00	50.00
	SD	70.12	185.35	--	--
	Range	1-160	10-500	--	--
	N	5	7	1	2
Friends					
	Mean	2.00	375.00	--	--
	SD	--	419.32		
	Range	--	100-1000		
	N	1	4		
County					
	Mean	--	297.67	--	--
	SD		119.82		
	Range		199.431		
	N		3		
State					
	Mean	325.00	389.89	528.00	105.00
	SD	--	300.40	--	--
	Range	--	42-852	--	--
	N	1	6	1	1
Federal					
	Mean	119.30	222.00	--	--
	SD	136.75	171.17		
	Range	23-216	50-434		
	N	2	5		
Other					
	Mean	147.50	212.79	--	--
	SD	38.89	275.25		
	Range	120-175	100-1500		
	N	2	12		

Table 2-39

Summary of Statistical Comparisons of Subjects with Various Handicapping Conditions on Financial Integration Outcomes

Variable	Significance Level	Nature of Difference among Handicapping Conditions
Checking Account	.005	Learning Disability , Speech Impairment > Emotional Disability
Credit Card/ Charge Account	ns	--
Vacation in 1984	ns	--
Income Source:		
Family/Relative	ns	--
Friend	ns	--
County	ns	--
State	ns	--
Federal	ns	--
None	ns	--
Amount of Income from:		
Family/Relative	ns	--
Friend	ns	--
County	ns	--
State	ns	--
Federal	ns	--
Other	ns	--

outcome variables. The primary difference was that fewer individuals with emotional disabilities had checking accounts than those with learning disabilities or speech impairments. Several comparisons of the conditions on financial integration variables are presented in Figure 2-5.

Social Integration Outcomes

Four general variables related to social integration of respondents are included here: driver's license possession, number of close friends, leisure activities, and activities limitations. These data were not collected from subjects in the 1984 groups. Therefore, potential numbers of respondents were 45 with mild mental retardation, 173 with learning disabilities, 11 with emotional disabilities, and 18 with speech impairments.

Driver's license. The number and percentage of respondents with each handicapping condition who indicated that they had a driver's license is shown in Table 2-40. All percentages are quite high. The lowest percentage was found for those with mild mental retardation (58%), and then those with emotional disabilities (73%). The other students with handicapping conditions had percentages at or above 90%. A chi-square test indicated the distribution was significantly different from that expected by chance, $x^2(3) = 34.37$, $p < .001$, apparently reflecting the difference between the subjects with mild mental retardation and the subjects with either learning disabilities or speech impairments.

Number of close friends. The number of close friends reported by respondents also is shown in Table 2-40. The differences in numbers among groups of students with the four handicapping conditions were not significant, $F(3, 230) = 1.16$, $p < .330$.

Leisure activities. Table 2-41 is a summary of the number and percentage of respondents with each condition indicating that they participated in each of the listed leisure activities during the seven days preceding the day on which they completed the survey form. The level of significance indicated by a chi-square test for each activity also is reported in the table. As indicated in the table, significant differences were found among groups of students with the four handicapping conditions in their rates of participation for only 1 of the 19 listed activities, "volunteer work," $x^2(3) = 13.00$, $p < .005$. For several variables, the chi square approached significance: shopping - $x^2(3) = 6.76$, $p < .090$, hobbies - $x^2(3) = 8.21$, $p < .050$, date - $x^2(3) = 11.16$, $p < .020$, cards - $x^2(3) = 6.93$, $p < .080$, and sat - $x^2(3) = 9.11$, $p < .030$. Participation rates did vary considerably as a function of the activity. Clearly, the greatest percentage of respondents had spent time watching TV, listening to a radio or records (from 96% to 100%); these percentages are similar to those found for people without handicaps. Across categories, participation rates were fairly low for working as a volunteer (0% - 33%), going to a sports event (13% - 22%), and attending a religious service (9% - 28%).

The 18 specific leisure activities were organized into those considered to be more interactive in nature (e.g., went on date), and those considered to be more noninteractive in nature (e.g., watched TV). The average numbers in each of these types of activities are summarized in Table 2-42. Analyses indicated that significant differences existed for interactive activities, $F(4, 266) = 4.20$, $p < .003$. Follow-up tests indicated that respondents with learning disabilities engaged in significantly more interactive activities than did respondents with mild mental retardation. The statistical test for non-interactive activities only approached significance, $F(4, 266) = 2.54$, $p < .05$.

Figure 2-5. **Financial Outcomes for Students with Various Handicapping Conditions.**

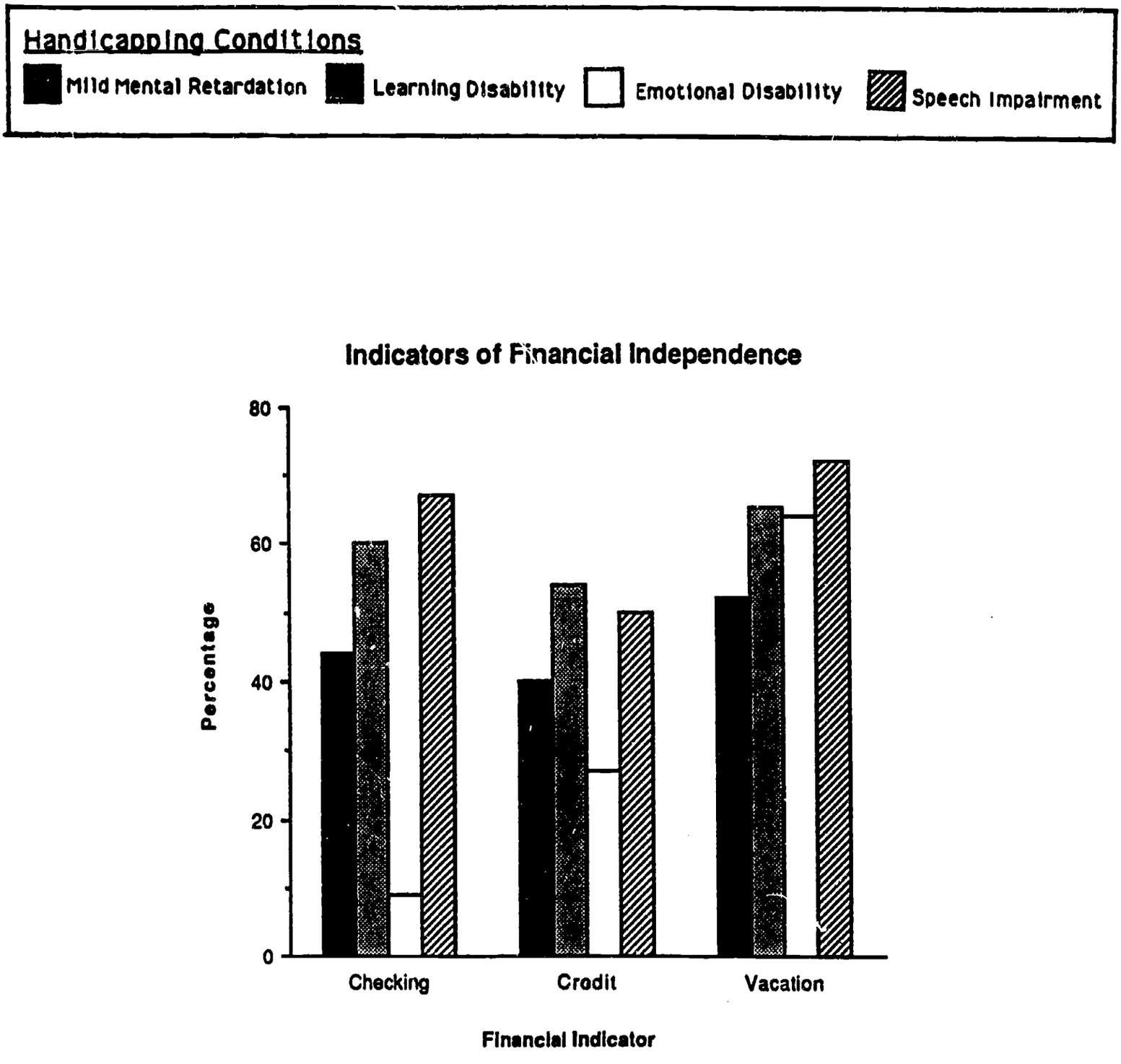


Table 2-40

Social Integration Characteristics of Subjects with Various Handicapping Conditions

		Handicapping Condition			
		Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Driver's License[a]					
	N	26	156	8	18
	%	58	90	73	100
Number of Close Friends					
	Mean	6.29	8.43	8.50	7.70
	SD	5.80	6.99	5.74	5.51
	Range	1-25	1-46	2-20	3-25
	N	41	166	10	17

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 45; Learning Disability = 173; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included).

Table 2-41

Current Leisure Activities of Subjects with Various Handicapping Conditions[a]

	Handicapping Condition				
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment	Significance Level
Went out to eat	32 (71%)	141 (82%)	8 (73%)	14 (78%)	ns
Went on trip	6 (13%)	34 (20%)	4 (36%)	5 (28%)	ns
Worked as volunteer	2 (4%)	18 (10%)	0 (0%)	6 (33%)	.005
Went shopping	36 (80%)	133 (77%)	5 (45%)	12 (67%)	ns
Worked on hobbies	16 (36%)	94 (54%)	3 (27%)	11 (61%)	ns
Went to sports event	6 (13%)	37 (21%)	2 (18%)	4 (22%)	ns
Went to movie	17 (38%)	64 (37%)	3 (27%)	9 (50%)	ns
Participated in sports	9 (20%)	62 (36%)	3 (27%)	9 (50%)	ns
Attended party/dance	17 (38%)	83 (48%)	4 (36%)	8 (44%)	ns
Went on date	9 (20%)	69 (40%)	1 (9%)	9 (50%)	ns
Visited friend	28 (62%)	137 (59%)	9 (82%)	15 (83%)	ns
Went to meeting	7 (16%)	33 (19%)	1 (9%)	7 (39%)	ns
Watched/listened to TV	43 (96%)	168 (97%)	11 (100%)	18 (100%)	ns
Spent time with relative	27 (60%)	120 (69%)	8 (73%)	12 (67%)	ns
Attended religious service	9 (20%)	35 (20%)	1 (9%)	5 (28%)	ns
Went to park or on walk	19 (42%)	94 (54%)	5 (45%)	6 (33%)	ns
Played cards/games/toys	13 (29%)	87 (50%)	5 (45%)	7 (39%)	ns
Sat around	23 (51%)	125 (72%)	9 (82%)	14 (78%)	ns
Other	5 (11%)	16 (9%)	0 (0%)	3 (17%)	ns

[a]For this table, number of subjects with various handicapping conditions are: Mild Mental Retardation = 45; Learning Disability = 173; Emotional Disability = 11; Speech Impairment = 18 (1984 students were not included).

Table 2-42

Average Numbers of Interactive and Noninteractive Leisure Activities for Subjects with Various Handicapping Conditions

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Interactive[a]				
Mean	4.13	5.30	4.36	5.78
SD	1.64	2.03	1.96	2.16
Range	0-7	0-11	1-7	1-9
N	45	173	11	18
Noninteractive[b]				
Mean	2.96	3.57	3.09	3.72
SD	1.43	1.30	0.83	1.23
Range	1-7	1-7	2-4	2-7
N	45	173	11	18

[a]Interactive leisure activities included: went out to eat, went on trip, worked as volunteer, went to sports event, participated in sports, attended party/dance, went on date, visited friend, went to meeting, spent time with relative, and attended religious service.

[b]Noninteractive leisure activities included: went shopping, worked on hobbies, went to movie, watched/listened to TV, went to park or on walk, played cards, games, toys, and sat around.

Activities limitations. Information about the extent to which activities are limited and the nature of the primary limitation are presented in Table 2-43. Most respondents indicated that activities were "not at all" limited (73% for respondents with mild mental retardation or emotional disabilities, 82% for those with learning disabilities, 89% for those with speech impairments.) The primary limitation noted was "health" for those with emotional disabilities, mild mental retardation, or learning disabilities and "time" for those with speech impairments. Statistical tests were not significant.

Summary. Relatively few differences among respondents with different handicapping conditions emerged in the social integration outcome data (see Figure 2-6). Table 2-44 is a summary of the findings for those variables that could be tested statistically for differences among groups. The major differences that were found were in driver's license possession (where percentages of individuals with learning disabilities or speech impairments exceeded percentages of individuals with mild mental retardation) and percentages indicating participating in volunteer work. In general, more respondents with learning disabilities participated in interactive leisure activities than did respondents with mild mental retardation.

III. Major Group Descriptions and Comparisons

Three major groups of students are the focus here -- those in special education, those in a vocational course work program, and those in a college-bound program.

School Record Information

Information collected from students' cumulative files and special education files is included in this section. The information is based on all potential subjects (vocational = 519, college = 519, special education = 466). Differences between the numbers included in tables and data analyses are due to missing data.

Graduation rates. Graduation rates for the three groups of students are summarized in Table 2-45. The percentage graduating ranged from 72% for students in special education to 98% for students in the college group. (Remember, however, that only students considered to be potential graduates were included in the lists from which vocational and college students were selected.) Chi-square analysis indicated that this distribution was significantly different from that expected by chance, $x^2(2) = 174.95$, $p < .001$.

Absenteeism rates. The average rates of absenteeism for each of the high school years for the three groups of students are shown in Table 2-46. The absenteeism data are presented as percentages of days absent (out of total days possible), as well as actual number of days. The percentages generally increase with grade level (i.e., in grade 11 students were absent a greater percentage of the time than in grade 10, and in grade 12 they are absent a greater percentage of the time than in grade 11). The average percentage of the school year during which students were absent in grade 10 ranged from 3.5 (for students in the college group) to 8.2 (for students in the special education group). (Again, sampling procedures for students in the vocational and college groups may have influenced this finding.) These percentages represent approximately 6 days and 14 days, respectively, for students in the college and special education groups during a typical 170-day school year. The percentage of absenteeism increased to 10.4 (almost 18 days) for students in special education by grade 12. All one-way analyses of variance conducted on the absenteeism rates for each grade were statistically significant at the

Table 2-43

Activity Limitations for Subjects with Various Handicapping Conditions[a]

	Handicapping Condition			
	Mild Mental Retardation	Learning Disability	Emotional Disability	Speech Impairment
Extent to Which Activities are Limited[b]				
Not at all	33 (73%)	138 (82%)	8 (73%)	16 (89%)
A little	10 (22%)	11 (7%)	1 (9%)	2 (11%)
Some	1 (2%)	15 (9%)	--	--
A great deal	1 (2%)	4 (2%)	2 (18%)	--
Nature of First Listed Limitation				
Health	10 (63%)	19 (50%)	3 (50%)	1 (25%)
Time	5 (31%)	9 (24%)	2 (33%)	2 (50%)
Money	--	5 (13%)	1 (17%)	--
Transportation	--	2 (5%)	--	--
Other	1 (6%)	2 (5%)	--	1 (25%)

[a]Entries are numbers of subjects, with percentages in parentheses.

[b]Percentages are based on numbers of subjects with various handicapping conditions who respond to this item: Mild Mental Retardation = 45; Learning Disability = 168, Emotional Disability = 11; Speech Impairment = 18 (1984 student were not included).

Figure 2-6. Social Integration Outcomes for Students with Various Handicapping Conditions.

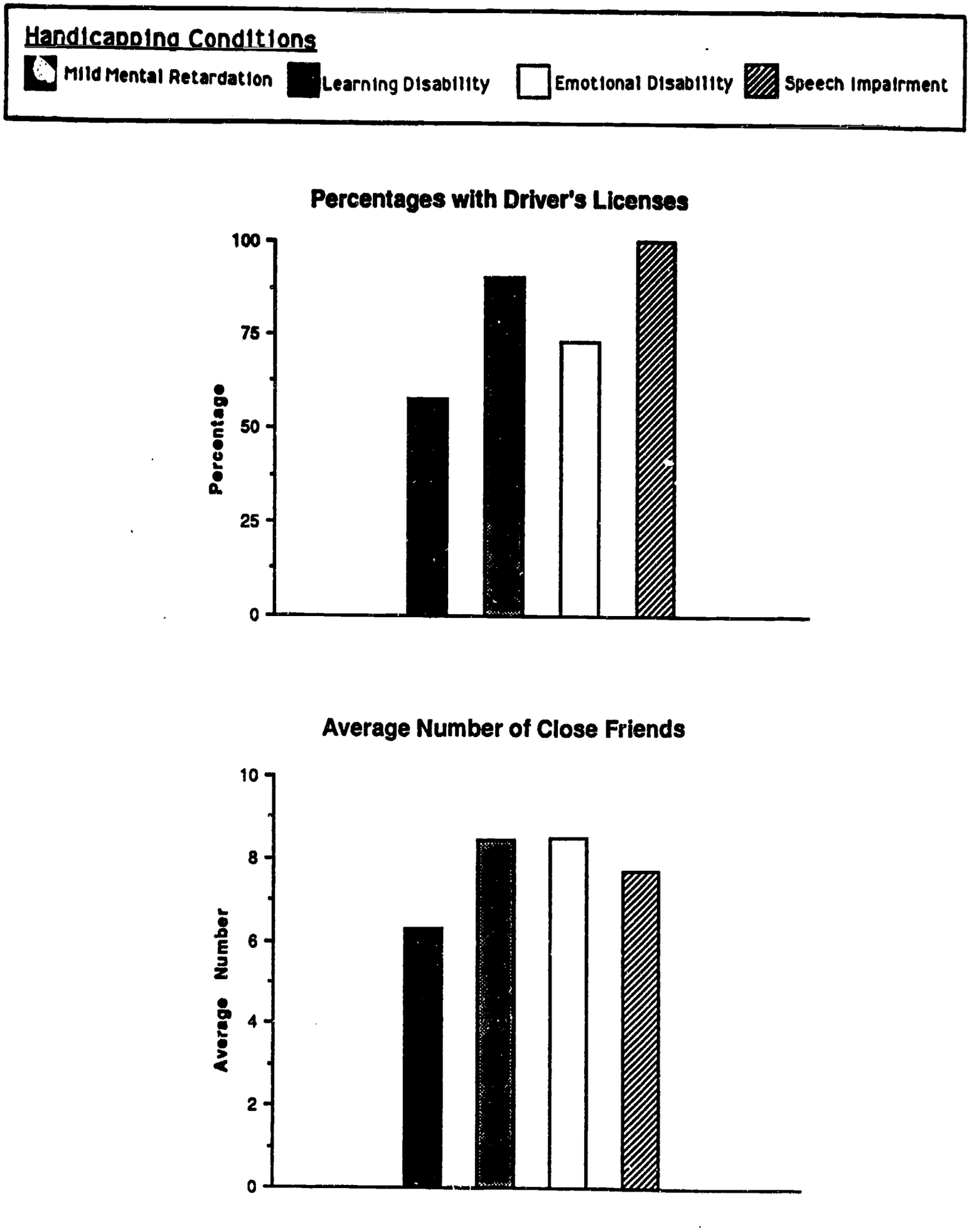


Table 2-44

Summary of Statistical Comparisons of Subjects with Various Handicapping Conditions on Social Integration Outcomes

Variable	Significance Level	Nature of Difference among Handicapping Conditions
Driver's License	.001	Learning Disability, Speech Impairment > Emotional Disability, Mild Mental Retardation
Number of Close Friends	ns	--
Interactive Leisure	.003	Learning Disability > Mild Mental Retardation
Noninteractive Leisure	ns	--
Activities Limited	ns	--

Table 2-45

Graduation Status of Students in Three Groups[a]

	Group		
	Vocational Program	College Program	Special Education
Graduated			
N	491	508	335
%	95	98	72
Not Graduated			
N	26	11	119
%	5	3	26

[a]For this table, numbers of subjects in programs are: Vocational Program = 517; College Program = 519; Special Education = 454.

Table 2-46

Absenteeism in Grades 10, 11, and 12 for Students in Three Groups

		Group		
		Vocational Program	College Program	Special Education
Percentage of Days Absent				
Grade 10	Mean	6.1	3.5	8.2
	SD	5.2	3.9	8.1
	Range	0-32.6	0-43.1	0-61.3
	N	461	479	412
Grade 11	Mean	8.0	4.2	9.3
	SD	7.4	3.9	8.9
	Range	0-69.6	0-24.1	0-63.3
	N	475	491	395
Grade 12	Mean	8.8	5.4	10.4
	SD	7.4	5.2	9.3
	Range	0-44.2	0-43.4	0-100
	N	491	513	352
Numbers of Days Absent				
Grade 10	Mean	10.65	6.14	14.10
	SD	9.05	5.80	13.91
	Range	0-57	0-75	0-106
	N	461	480	412
Grade 11	Mean	13.74	7.12	15.64
	SD	12.36	6.58	14.16
	Range	0-87	0-42	0-95
	N	475	491	396
Grade 12	Mean	15.00	9.38	17.71
	SD	12.82	9.01	16.17
	Range	0-76	0-75	0-174
	N	491	513	352

.001 level. Follow-up tests (Student-Newman-Keuls) indicated that at each grade level, students in special education were absent a significantly greater proportion of days than were students in either the college or vocational groups, and that at each grade level, students taking vocational courses were absent a significantly greater proportion of days than were students in the college group.

Class standing. Grade point averages (calculated on a 12-point scale, with 12 = A+) and class percentile ranks for students in the three groups are presented in Table 2-47. For both of these variables, ANOVAs were statistically significant at the .001 level. In both cases, follow-up tests indicated that students in the college group were significantly higher than those in the vocational and special education groups, and students in the vocational group were significantly higher than those in the special education group. (Differences could be a result of differential sampling procedures.)

Special evaluations and treatments. A summary of the extent to which students in each group received special evaluations and/or treatments outside the school setting during their school years is presented in Table 2-48. Few students without handicaps (vocational and college groups) received any of these specialized treatments. The students in special education also showed relatively minimal use of these evaluations and treatments.

Related services. Related services were non-special education services provided by the school district, such as work placement programs and vocational training, as well as the specialized non-special education treatments and evaluations that the school district contracted to have provided by outside agencies. Table 2-49 is a summary of the types of related services received by students in the three groups. In general, students in the college group showed much lower levels of participation in these services than did students in the vocational group or students in special education. Statistical analyses confirmed that significant differences existed in the use of each type of related services by the three groups: Work - $x^2(2) = 394.32$, $p < .001$; Vocational - $x^2(2) = 240.78$, $p < .001$; Chemical - $x^2(2) = 15.60$, $p < .001$; Psychological - $x^2(2) = 27.64$, $p < .001$. For specialized work placement, 58% of students in special education and 47% of students in the vocational group participated in these programs. Very few students in the college group (2%) took part in these services. A similar pattern emerges among groups for vocational services, with students in the vocational group (96%) and students in special education (81%) showing higher participation rates than students in the college group (57%). Although rates of participation differed among groups for chemical and psychological service programs, the rates were extremely low for all three groups.

Group test scores. Aptitude and achievement percentile rank test scores that were available for the three groups of students (from group administrations, generally during grade 10) are provided in Table 2-50. Because of differences in the tests administered to students and the manners in which they were summarized, percentile rank scores were the only scores examined. (However, in all groups, at least 75% had the same aptitude measure, the SCAT, and at least 76% had the same achievement measure, the SRA.) In all groups, the ranges of scores were great. On aptitude measures, significant differences were found among the three groups for each of the scores (verbal, performance, and total) at the .001 level. In each case, students in the college group had statistically higher scores than students in the vocational group and students in special education; furthermore, students in the vocational group had statistically higher scores than students in special education.

Table 2-47

Grade Point Averages and Class Percentiles of Students in Three Groups

	Group		
	Vocational Program	College Program	Special Education
Grade Point Average[a]			
Mean	7.05	9.04	5.99
SD	1.58	1.69	1.56
Range	3.15-11.39	3.89-11.99	1.67-10.06
N	494	513	420
Class Percentile			
Mean	35.42	64.16	22.22
SD	23.10	25.88	19.21
Range	0-98	1-99	0-88
N	489	514	417

[a]Grade point average could range from 0 to 12.00.

Table 2-48

Special Evaluations and Treatments Received by Students in Three Groups[a]

		Group		
		Vocational Program	College Program	Special Education
Chemical Dependency Evaluation	N	4	--	5
	%	1		1
Chemical Dependency Treatment	N	2	1	11
	%	0	0	2
Psychological Evaluation	N	--	--	9
	%			2
Psychiatric Treatment	N	1	--	8
	%	0		2
Neurological Evaluation	N	--	--	1
	%			0
Incarceration	N	--	--	12
	%			3

[a]For this table, numbers of students in programs are: Vocational Program = 519; College Program = 519; Special Education = 466.

Table 2-49

Summary of Related Services Received by Students in the Three Groups[a]

		Group			
		Vocational Program	College Program	Special Education	Significance Level
Work[b]	N	244	9	270	.001
	%	47	2	58	
Vocational[c]	N	500	294	377	.001
	%	96	57	81	
Chemical Program[d]	N	5	1	14	.001
	%	1	0	3	
Psychological Program[e]	N	1	--	14	.001
	%	0		3	

[a]For this table, numbers of students in programs are: Vocational Program = 519; College Program = 519; Special Education = 466.

[b]Work = Work program or WECEP or Summer School work program.

[c]Vocational = Vocational or Vo-Tech.

[d]Chemical Program = Chemical treatment or evaluation.

[e]Psychological Program = Psychiatric treatment or psychological evaluation.

Table 2-50

Aptitude and Achievement Percentile Ranks on Group-Administered Tests for Students in Three Groups

		Group		
		Vocational Program	College Program	Special Education
Aptitude				
Verbal				
	Mean	46.41	69.50	21.18
	SD	28.00	23.45	19.59
	Range	1-99	1-99	1-97
	N	442	469	389
Math				
	Mean	51.55	75.07	23.12
	SD	27.42	23.35	23.04
	Range	1-99	6-99	1-99
	N	442	469	389
Total				
	Mean	48.97	76.47	19.63
	SD	25.77	21.31	20.90
	Range	1-99	7-99	1-98
	N	441	467	384
Achievement				
Reading				
	Mean	48.28	74.13	22.20
	SD	23.80	20.02	18.82
	Range	1-98	12-99	1-99
	N	451	471	378
Language Arts				
	Mean	45.47	67.31	16.82
	SD	25.05	24.50	17.14
	Range	1-99	4-99	1-98
	N	450	471	379
Math				
	Mean	50.49	76.96	29.21
	SD	25.16	19.88	22.96
	Range	1-99	4-99	1-99
	N	448	470	376
Composite				
	Mean	48.13	75.68	19.88
	SD	23.81	20.04	18.39
	Range	1-99	15-99	1-99
	N	445	468	367

Achievement test scores for the areas of reading, math, and language also were significantly different for the three groups ($p < .001$), with students in the college group having higher scores than students in the vocational group and students in special education, and students in the vocational group having higher scores than students in special education.

Reasons for referral. The extent to which students had been referred for problems in the areas of math, reading comprehension, reading rate, attention, written language, or another area are presented in Table 2-51. This table provides a summary across handicapping conditions for students in special education (see Table 2-25 for a breakdown of reasons). For students in special education, the primary referral reason was a problem in reading comprehension (35% of students), followed by a problem in math (18%), written language (14%), or oral language (13%). The large "other" category includes a variety of reasons, such as memory, self-concept, speech, attendance, and social difficulties.

Referral information on students in the vocational and college groups also was available since these records were maintained in the special education files (at least back to 1977). As might be expected, referral rates for these two groups were small, with the highest rate being for oral language difficulties (7% of students in vocational group, 6% of students in college group). All other rates were less than 2%. Some of the students in the vocational and college groups who were referred did receive special education services during their school careers (most often, speech services), while for others the referral did not result in special education services. Given the referral files in this sample, it could be estimated that up to 10% of students in regular education who did not receive special education services in high school had been referred at some point.

Special education services. The average numbers of daily minutes of special education received by the total sample of students in special education during pre-elementary years, elementary school, junior high school, and senior high school are presented in Table 2-52. This table includes times only for those students in special education receiving direct services (i.e., services in which the student has direct contact with the teacher for an average of at least 15 minutes per day). A number of students did receive indirect services (such as monitoring or consultation with the teacher); these data for all students in special education are presented in Table 2-53. In general, there is an increase across grades in the number of students served, and in the average amount of time during which they received services.

Summary. School record information was obtained from students' cumulative files and from special education files. Information from the cumulative files provided data that could be compared for students in the vocational and college groups, and students in special education. Some of the comparisons are shown graphically in Figure 2-7. Table 2-54 is a summary of the findings for those variables that could be tested statistically for differences among the three groups. The differences among groups are quite clear, with students in the college, vocational, and special education groups significantly different from each other, in that order, on all but the absenteeism and participation in programs variables, where students in special education and students in the vocational group had higher levels than students in the college group.

Information from special education files provided additional data for students in special education. On the average, these students initially had been referred for reading comprehension problems. They received special education services for varying

Table 2-51

Reasons for Referral Cited for Students in Special Education

Reason	Number	Percentage[a]
Reading Comprehension	164	35%
Math	84	18%
Written Language	64	14%
Oral Language	59	13%
Behavior	46	10%
Attention	34	7%
Reading Rate	23	5%
Other	157	34%

[a]Percentages are based on the number of students referred for a given reason divided by the total number of students (N=466). Percentages total more than 100% because more than one reason was listed for some students.

Table 2-52

Summary of Daily Minutes of Direct Special Education Services for Those Students in Special Education Receiving Services

	N	Mean	Standard Deviation	Range
Preschool (Pre, K, T)	25	39.60	69.67	15-360
Elementary (1-6)	215	61.26	46.98	15-360
Junior High (7-9)	308	74.42	56.51	15-595
Senior High (10-12)	391	86.13	76.49	15-595

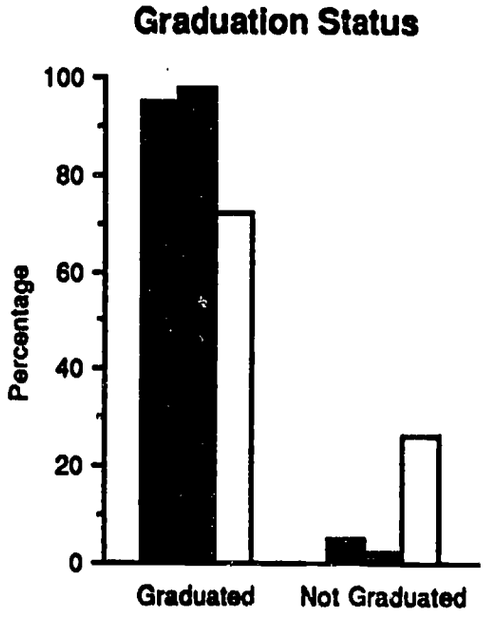
Table 2-53

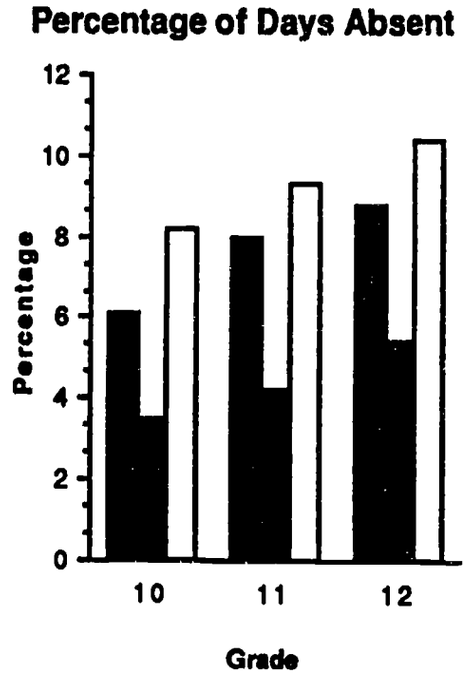
Summary of Numbers and Percentages of Students in Special Education Receiving Indirect Special Education Services in Each Grade

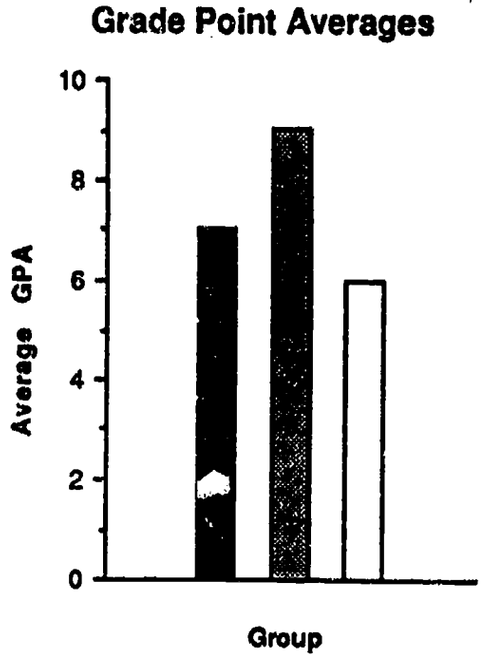
Grade	Number	Percentage[a]
Preschool	--	--
Kindergarten	1	0%
Transition	1	0%
Grade 1	2	0%
Grade 2	--	--
Grade 3	1	0%
Grade 4	2	0%
Grade 5	7	2%
Grade 6	16	3%
Grade 7	18	4%
Grade 8	31	7%
Grade 9	76	16%
Grade 10	107	23%
Grade 11	103	22%
Grade 12	86	18%

[a]Percentages are based on all students in special education (N = 466).

Figure 2-7. School Record Information for Three Groups.







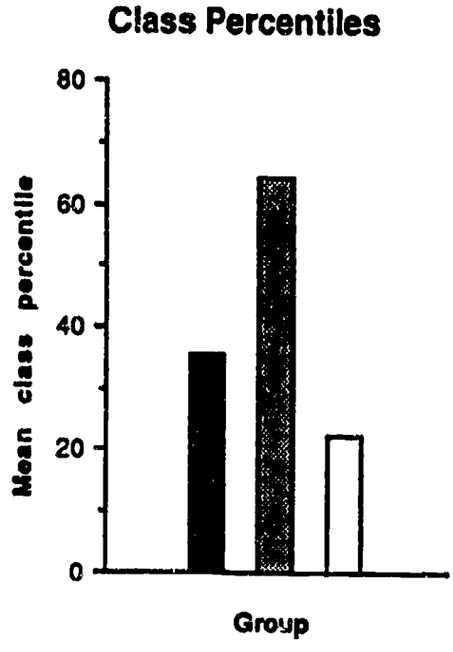


Table 2-54

Summary of Statistical Comparisons of Students in Vocational, College, and Special Education Groups on School File Variables

Variable	Significance Level	Nature of Difference among Groups
Graduation rate	.001	College Program, Vocational Program > Special Education
Absenteeism - grade 10	.001	Special Education > Vocational Program > College Program
Absenteeism - grade 11	.001	Special Education > Vocational Program > College Program
Absenteeism - grade 12	.001	Special Education > Vocational Program > College Program
Grade Point Average	.000	College Program > Vocational Program > Special Education
Class percentile	.001	College Program > Vocational Program > Special Education
Work program	.001	Special Education, Vocational Program > College Program
Vocational program	.001	Special Education, Vocational Program > College Program
Chemical program	.001	Special Education, Vocational Program > College Program
Psychological program	.001	Special Education, Vocational Program > College Program
Verbal aptitude	.001	College Program > Vocational Program > Special Education
Performance aptitude	.001	College Program > Vocational Program > Special Education
Total aptitude	.001	College Program > Vocational Program > Special Education
Reading achievement	.001	College Program > Vocational Program > Special Education
Math achievement	.001	College Program > Vocational Program > Special Education
Language achievement	.001	College Program > Vocational Program > Special Education

amounts of time over their school careers. On the whole, however, these times increased with grade level, as did the number of students receiving special education services.

Outcome Information

Information collected from the project follow-up form is included in this section. The three groups who are the focus of attention here again are students in the vocational coursework programs, students in a college-bound program, and students in special education. The numbers of students for whom data are reported are only those who responded to the follow-up forms. The possible numbers of respondents for each group were: vocational = 226, college = 255, special education = 246. The outcome results are organized within four broad categories of outcomes: (a) occupational, (b) educational, (c) financial, and (d) social.

Occupational Outcomes

Information on four types of variables related to occupational outcomes is included here: current activities, employment characteristic ob satisfaction, and how the job was found.

Current activities. A summary of the numbers and percentages of respondents in the college, vocational, and special education groups involved in six kinds of occupation-related activities is presented in Table 2-55. (Percentages may add to more than 100% because respondents could be involved in more than one activity.) Table 2-55 also indicates the results of chi-square tests to compare the three groups on each variable. The percentages of subjects who were in paid employment in the three groups were within six points of each other, with 79% of those in the special education group, 84% of those in the college group, and 85% of those in the vocational group. A significant difference was not found among the three groups on this variable. Significant differences were found on two variables related to current occupation-related activities: (a) homemaker: $x^2(2) = 15.06$, $p < .001$, and (b) other activities: $x^2(2) = 11.80$, $p < .003$. Within the "homemaker" category, subjects in the vocational group had the highest percentage (35% versus 20% or 24%). In the other activities, subjects in the college group had the highest percentage (10% versus 4%). The differences on "unemployed - looking for work" between respondents in the vocational (3%), college (7%), and special education groups (13%) approached significance, $x^2(2) = 7.73$, $p < .022$.

Employment characteristics. Several characteristics related to employment are shown in Table 2-56. Earnings were of primary interest in this study. Both hourly earnings and total earnings during 1984 are presented in Table 2-56, along with the number of hours worked per week on the average, and the number of different employers. Also indicated in Table 2-56 are the results of statistical procedures (either analyses of variance or chi-squares) to test the significance of differences among the three groups. Significant differences were found in the average number of hours worked per week, $F(2, 617) = 9.42$, $p < .001$. Student-Newman-Keuls follow-up tests indicated that respondents in the college group, as expected, had a significantly lower number of hours per week than did respondents in the vocational group or respondents in the special education group.

Average hourly earnings were very similar across the three groups, with the greatest difference among the average values being only 84 cents. However, the ranges in hourly earnings were great, ranging from less than $1 per hour to over $35 per hour.

Table 2-55

Current Activities of Subjects in Three Groups[a]

	Group			
	Vocational Program	College Program	Special Education	Significance Level
Homemaker				
N	79	51	59	.001
%	35	20	24	
Military				
N	6	6	7	ns
%	3	2	3	
Unemployed -- looking				
N	16	18	33	ns
%	7	7	13	
Unemployed -- not looking				
N	6	16	16	ns
%	3	6	6	
Paid employment				
N	194	219	197	ns
%	85	84	79	
Other				
N	9	26	9	.003
%	4	10	4	

[a]For this table, numbers of subjects in programs are: Vocational Program = 228; College Program = 259; Special Education = 250. Percentages may not total to 100% because respondents could select multiple activities.

Table 2-56

Employment Characteristics of Subjects in Three Groups

		Group			
		Vocational Program	College Program	Special Education	Significance Level
Hours Per Week					
	Mean	37.91	31.86	38.88	.001
	SD	12.85	13.96	10.82	
	Range	6-160	4-104	4-80	
	N	251	275	228	
Hourly Earnings					
	Mean	7.85	7.40	7.01	ns
	SD	3.56	3.95	3.47	
	Range	11.00-25.00	.86-35.58	.64-25.00	
	N	186	202	177	
Total Earnings: 1984					
	Mean	14,313	11,094	12,818	.002
	SD	7941	9359	9377	
	Range	17-51,000	300-80,000	300-81,250	
	N	183	204	173	
Number of Different Employers					
	Mean	2.96	3.51	3.92	.003
	SD	2.07	2.20	4.14	
	Range	1-15	1-23	1-30	
	N	223	253	240	

With these wide ranging hourly earnings, the averages were $7.85 for respondents in the vocational group, $7.40 for respondents in the college group, and $7.01 for the respondents in special education group. An analysis of variance indicated that the differences among the three groups were not significant. For total earnings during 1984, however, a significant difference was found, $F(2, 557) = 6.30$, $p < .003$. Follow-up tests indicated that the average earnings for respondents in the vocational group ($14,313) were significantly higher than for respondents in either the college ($11,094) or special education ($12,818) group.

Number of different employers was also relatively similar for the three groups (see Table 2-56); however, a significant difference was found: $F(2,713) = 6.05$, $p < .003$. Follow-up tests indicated that students in the vocational group had a significantly lower number of different employers than students in either the college or special education groups.

Job satisfaction. Information related to job satisfaction is presented in Table 2-57. The table shows the number of respondents indicating either "not satisfied," "satisfied," or "very satisfied" to three items related to the use of abilities, the pay and amount of work, and the chance to get ahead. For both the abilities and pay/amount of work items, all groups had more than 75% indicating that they were satisfied (responded either "satisfied" or "very satisfied"). For the chance to get ahead item, smaller percentages of respondents expressed satisfaction, with 71% of the vocational did not change as a function of activity (i.e., greater numbers of college students participated, regardless of the activity). There is evidence that former students in special education do think that their activities are limited in some way; most often the identified limitation is health related.

How job was found. Information on how the respondents found their jobs is presented in Table 2-58. For this table, certain responses were combined to more closely reflect those generally presented in the research literature. As is evident in Table 2-58, most individuals found their jobs through the parent-relative-friend network. This was true for students in both vocational and special education programs. However, for the college students, slightly more found their jobs by themselves rather than through parents, relatives, and friends. Both the school and an employment or other agency were used by less than 15% of the subjects. This distribution was statistically significant, $x^2(6) = 21.55$, $p < .002$. Further examination of responses indicated that "friends" were cited by more subjects than "parents/relatives," and that few subjects cited the Division of Vocational Rehabilitation or a recruiting office when indicating a job was found through an agency.

Summary. Results for the occupational outcomes that could be tested statistically are provided in Table 2-59. Significant differences were identified for several of the variables that were tested. Among these were a significant difference in (a) the number of hours worked per week (more by special education and vocational groups than by the college group), (b) 1984 earnings (more by vocational group than by college and special education groups), and (c) the number of different employers (more by special education and college groups than by vocational group). No differences were found in the numbers involved in paid employment or in their hourly earnings. Some of these comparisons are shown graphically in Figure 2-8.

Table 2-57
Job Satisfaction of Subjects in Three Groups[a]

	Group		
	Vocational Program	College Program	Special Education
Use of Abilities			
Not Satisfied	35 (17%)	52 (23%)	38 (19%)
Satisfied	103 (51%)	112 (50%)	111 (55%)
Very Satisfied	63 (31%)	61 (27%)	52 (26%)
Pay and Amount of Work			
Not Satisfied	46 (23%)	53 (24%)	49 (24%)
Satisfied	117 (58%)	125 (56%)	112 (56%)
Very Satisfied	38 (19%)	47 (21%)	40 (20%)
Chance to Get Ahead			
Not Satisfied	58 (29%)	92 (41%)	71 (35%)
Satisfied	90 (45%)	74 (33%)	80 (40%)
Very Satisfied	51 (26%)	58 (26%)	49 (24%)

[a]Entries are numbers, with percentages in parentheses. For this table, numbers of subjects in programs are: Vocational Program = 201; College Program = 225; Special Education = 201.

Table 2-58
How Job Was Found by Subjects in Three Groups[a]

		Group		
		Vocational Program	College Program	Special Education
Parents, Relatives, Friends				
	N	148	122	123
	%	53	39	51
School				
	N	25	36	16
	%	9	12	7
Self				
	N	75	126	72
	%	27	40	30
Employment Agency or Other				
	N	33	28	30
	%	12	9	12

[a]For this table, numbers of subjects in programs are: Vocational Program = 281; College Program = 312; Special Education = 241.

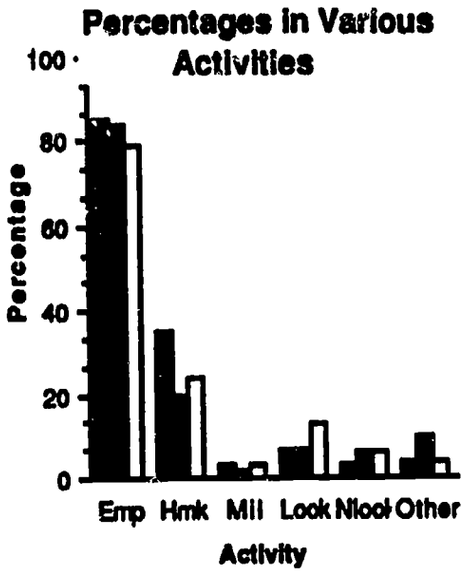
Table 2-59

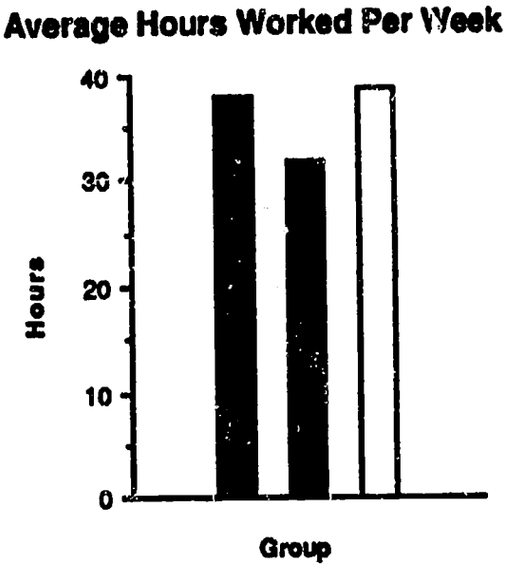
Summary of Statistical Comparisons of Subjects in Vocational, College, and Special Education Programs on Occupational Outcomes Variables

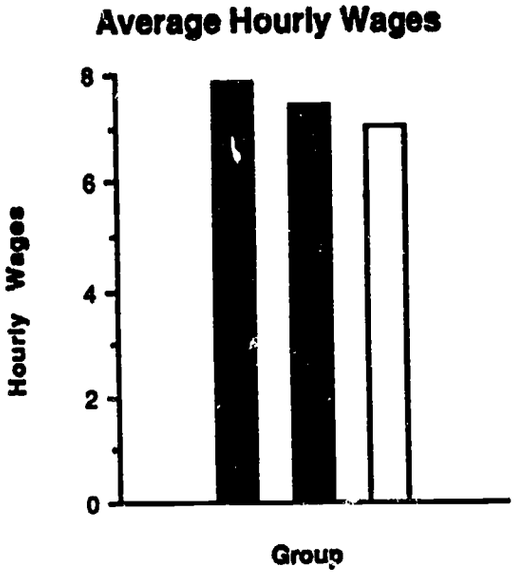
Variable	Significance Level	Nature of Difference among Groups
Homemaker	.001	Vocational Program > College Program, Special Education
Military	ns	--
Unemployed -- looking	ns	--
Unemployed -- not looking	ns	--
Paid employment	ns	--
Other	.003	College Program > Vocational Program, Special Education
Hours Per Week	.001	Special Education, Vocational Program > College Program
Hourly earnings	ns	--
1984 earnings	.003	Vocational Program > College Program, Special Education
Number of different employers	.003	Special Education, College Program > Vocational Program
How job was found	.002	*

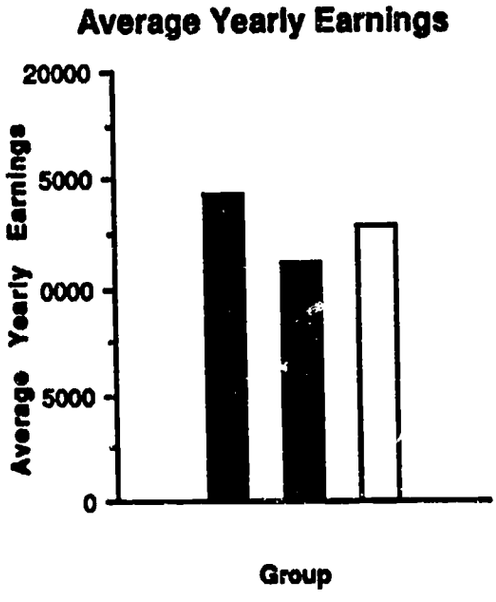
*Differences here were in the distribution of responses. It appeared that subjects in the vocational and special education groups used the parent-family-friend network to find jobs more often than did those in the college group.

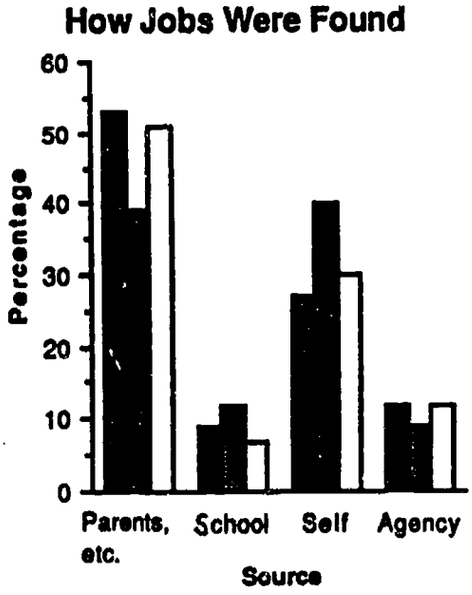
Figure 2-8. Occupational Outcomes for Three Groups.











Educational Outcomes

Information on two variables related to educational outcomes is presented here: current activities and special training since high school. The possible numbers of subjects for these variables are limited to those who responded to the follow-up forms (vocational = 226, college = 255, special education = 246).

Current activities. Table 2-60 is a summary of the current educational activities of the respondents. (Percentages may total more than 100% because respondents could be involved in more than one type of educational activity.) Statistical tests indicated that differences existed among the three groups in their participation in only two of the educational activities: other - $x^2(2) = 10.26$, $p < .006$; none - $x^2(2) = 119.06$, $p < .001$. All other activities except the apprenticeship activity approached statistical significance: vocational school - $x^2(2) = 6.59$, $p < .04$, community college - $x^2(2) = 7.04$, $p < .03$, college or university - $x^2(2) = 9.89$, $p < .05$. For three of the activities (community college, college or university, and other), it appeared that the difference was due to the greater participation of the students in the college group. For two activities (vocational school participation and no educational participation), the respondents in the vocational and special education groups had higher numbers than those in the college group.

Special training. Participation in any kind of training activities since high school, and the number of weeks in the first training activity are summarized in Table 2-61. The participation rates for the three groups ranged from 52% for respondents in the special education group to 68% for respondents in the college group. The total number of weeks in the first training experience ranged from 1 to 312. Significant differences were found among the three groups in the total number of weeks of special training: $F(2, 434) = 18.21$, $p < .001$. Follow-up tests indicated that respondents in the college group had a significantly greater number of weeks of training (105.11) than respondents in either the vocational group (64.38) or the special education group (60.04).

Summary. Educational outcome data indicated that few differences existed among respondents in the three groups in their current participation in various activities. This is reflected in comparisons shown in Figure 2-9. Overall, the greatest participation was in college or university activities. Over the period of time since they left school, the subjects had participated in training activities that varied considerably in their duration. As expected, individuals in the college group had the highest average number of weeks of post high school training. Individuals in the special education group had the lowest average number of weeks of such training.

Financial Integration Outcomes

Four general variables related to the financial integration of respondents are included here: checking account possession, credit card possession, vacations in 1984, and other income sources and amounts. The maximum number of potential subjects is 229 in the vocational group, 261 in the college group, and 247 in the special education group. For many of the items related to financial integration, however, respondents chose not to respond. In addition, subjects in the 1984 groups were not asked to provide information related to these items.

Checking account. Information about the number and percentage of respondents in each group who indicated that they had a checking account is shown in Table 2-62. The percentages ranged from 55% for respondents in the special education group to 81% for

Table 2-60

Current Education Activities of Subjects in Three Groups

		Group			
		Vocational Program	College Program	Special Education	Significance Level
Vocational School	N	9	3	13	ns
	%	4	1	5	
Community College	N	5	14	4	ns
	%	2	5	2	
College or University	N	27	121	16	ns
	%	12	47	6	
Apprenticeship	N	5	4	10	ns
	%	2	2	4	
Other Education	N	13	32	14	.006
	%	6	12	6	
None	N	166	92	197	.001
	%	74	36	79	

[a]For this table, numbers of students in programs are: Vocational Program = 224; College Program = 257; Special Education = 250. Percentages may not total to 100% because respondents could select multiple activities.

Table 2-61

Special Training Activities of Subjects in Three Groups

		Group		
		Vocational Program	College Program	Special Education
Special Training Since High School[a]	N	152	177	130
	%	67	68	52
Weeks in First Training	Mean	64.38	105.11	60.04
	SD	60.95	88.61	60.98
	Range	1-234	1-312	1-312
	N	144	167	125

[a]For this table, numbers of students in programs are: Vocational Program = 228; College Program = 259; Special Education = 249.

Figure 2-9. Educational Outcomes for Three Groups.

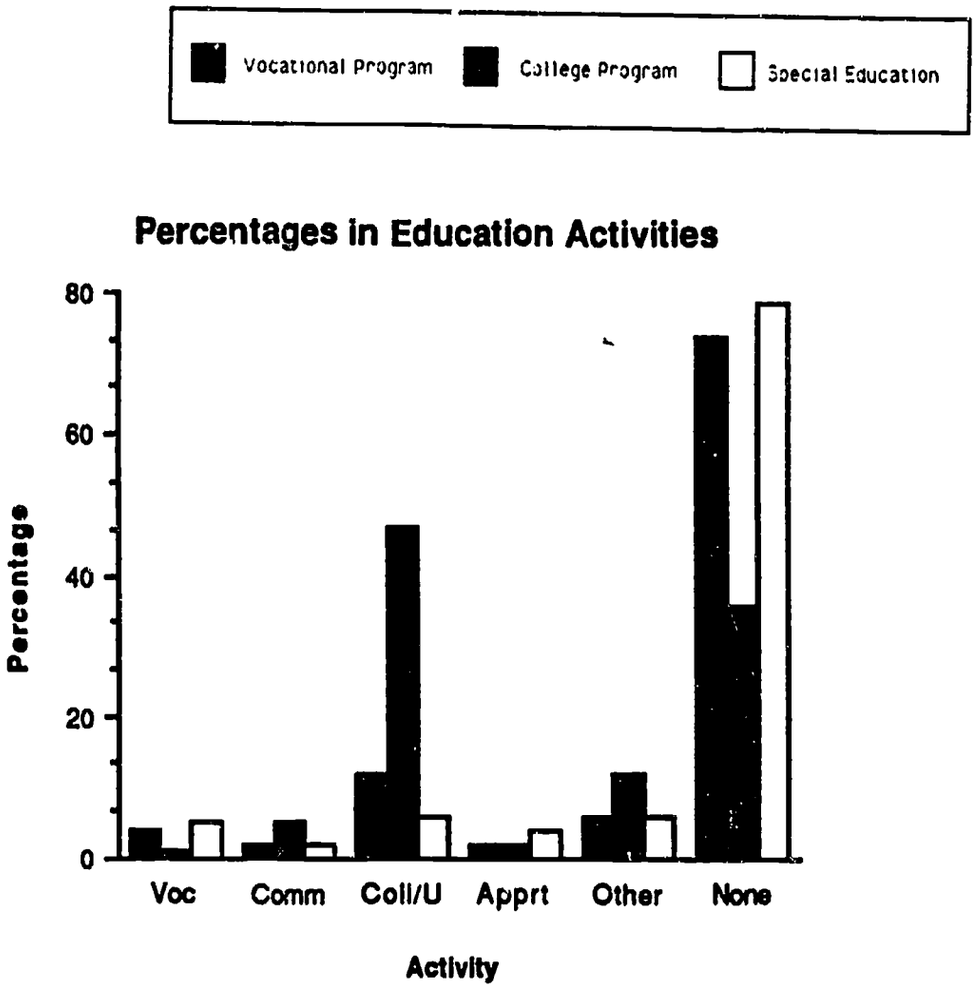


Table 2-62

Current Financial Characteristics of Subjects in Three Groups[a]

		Group			
		Vocational Program	College Program	Special Education	Significance Level
Checking Account	N	184	228	137	.001
	%	81	88	55	
Credit Card/ Charge Account	N	169	191	124	.001
	%	74	74	50	
Vacation in 1984	N	170	215	156	.001
	%	75	83	63	

[a]For this table, numbers of subjects in programs are: Vocational Program = 228; College Program = 260; Special Education = 248.

respondents in the vocational group and 88% for respondents in the college group. A chi-square test indicated that these rates were significantly different from those expected by chance, $x^2(2) = 79.50$, $p < .001$.

Credit card/charge account. Table 2-62 also shows the number and percentage of respondents in each group who indicated that they had a credit card or a charge account. The percentages ranged from 50% for respondents in the special education group to 74% for respondents in both the college and vocational groups. This difference also was statistically significant, $x^2(2) = 41.82$, $p < .001$.

Vacations. An indication of the numbers and percentages of respondents taking a vacation in 1984 also is shown in Table 2-62. These percentages ranged from 63% for respondents in the special education group to 75% for respondents in the vocational group to 83% for respondents in the college group. Again, a significant difference was indicated by the chi-square analysis, $x^2(2) = 25.03$, $p < .001$.

Other income. The sources from which respondents received income, other than from a job, are summarized in Table 2-63. The largest percentage of respondents in each group, however, received no other income. These percentages ranged from 62% of the respondents in the college group to 80% of respondents in the vocational group; 65% of respondents in the special education group had no other income. Other than income from family or relatives, the percentages of students receiving income from the other sources listed in Table 2-63 were quite low, always 5% or less. Chi-square tests indicated a significant difference among groups only for the family/relative variable, $x^2(2) = 32.60$, $p < .001$. On this variable, the percentage of respondents in the college group (25%) was higher than the percentage of respondents in either the special education group (11%) or the vocational group (8%).

A summary of the amounts of income from these same sources is shown in Table 2-64. The numbers of respondents on which these data are based often are considerably lower than the numbers possible, due to the failure of respondents to provide dollar information. Statistically significant differences among the three groups were found in the amounts received from other sources, $F(2, 33) = 11.06$, $p < .001$. The respondents in the vocational group received a significantly greater amount of income from other sources than did the special education or college groups. Differences among groups in the amount received from federal sources approached significance, $F(2, 33) = 4.49$, $p < .030$; respondents in the college group received a greater average amount of income from federal sources than did respondents in the other two groups, although the number of respondents receiving income from this source was lower.

Summary. Graphical representations of group comparisons are provided in Figure 2-10. A summary of the results of statistical tests on variables related to financial integration is provided in Table 2-65. Several significant differences did appear. In each case where a significant difference did emerge, except for income items, respondents in the special education group were on the lower end of the scale.

School Integration Outcomes

Four general variables related to social integration of respondents are included here: driver's license possession, number of close friends, leisure activities, and activities limitations. These data were not collected from subjects in the 1984 groups.

Table 2-63

Other Income Sources for Subjects in Three Groups

		Group		
		Vocational Program	College Program	Special Education
Family/Relative	N	17	63	25
	%	8	25	11
Friend	N	3	2	7
	%	1	1	3
County	N	5	--	4
	%	2		2
State	N	7	9	12
	%	3	4	5
Federal	N	10	6	10
	%	5	2	4
Other	N	11	18	23
	%	5	7	10
None	N	180	162	163
	%	80	62	65

Table 2-64

Amount of Other Income Received Each Month by Subjects in Three Groups

		Groups		
		Vocational Program	College Program	Special Education
Family/Relative				
	Mean	326.76	241.09	141.40
	SD	566.08	287.75	160.77
	Range	6-1800	8-1200	1-500
	N	11	42	15
Friend				
	Mean	50.00	20.00	300.40
	SD	--	--	399.62
	Range	--	--	2-1000
	N	1	1	5
County				
	Mean	266.00	--	289.50
	SD	233.47		99.19
	Range	80-528		199-431
	N	3		4
State				
	Mean	372.00	151.10	366.37
	SD	324.04	157.62	262.36
	Range	6-750	50-500	41-852
	N	4	7	9
Federal				
	Mean	298.54	625.00	197.95
	SD	185.97	397.48	147.61
	Range	66-620	208-1000	23-434
	N	8	3	8
Other				
	Mean	732.50	205.85	193.23
	SD	470.28	138.26	248.45
	Range	160-1500	150-500	10-850
	N	8	13	15

Figure 2-10. Financial Outcomes for Three Groups.

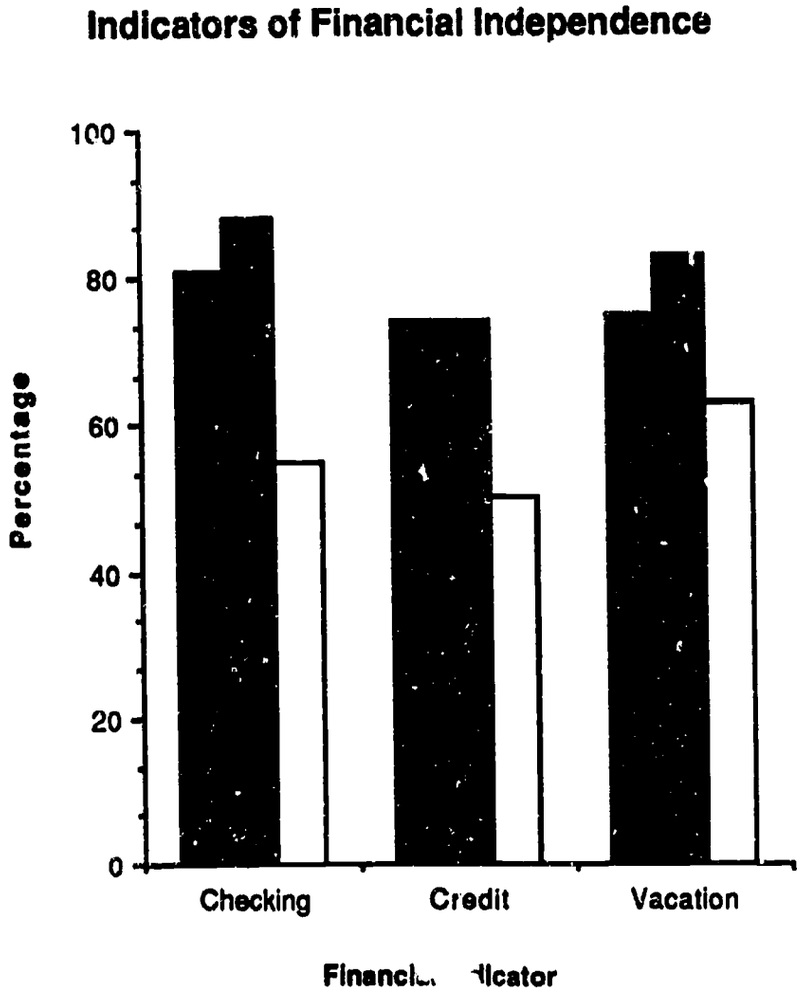


Table 2-65

Summary of Statistical Comparisons of Subjects in Vocational, College, and Special Education Programs on Financial Integration Outcomes

Variable	Significance Level	Nature of Difference among Groups
Checking Account	.001	College Program, Vocational Program > Special Education
Credit Card/ Charge Account	.001	College Program, Vocational Program > Special Education
Vacation in 1984	.001	College Program, Vocational Program > Special Education
Income Source:		
Family/Relative	.001	College Program > Vocational Program, Special Education
Friend	ns	--
County	ns	--
State	ns	--
Federal	ns	--
Other	ns	--
None	ns	--
Amount of Income from:		
Family/Relative	ns	--
Friend	ns	--
County	ns	--
State	ns	--
Federal	ns	--
Other	.001	Vocational Program > College Program, Special Education

Therefore, potential numbers of respondents were: vocational = 229, college = 261, and special education = 247.

Driver's license. The number and percentage of respondents in each group who indicated that they had a driver's license is shown in Table 2-66. All percentages are quite high, with 84% of respondents in the special education group, 97% of those in the vocational group, and 98% of those in the college group having driver's licenses. The differences reflected in these percentages were statistically significant, $x^2(2) = 50.94$, $p < .001$.

Number of close friends. The number of close friends reported by respondents also is shown in Table 2-66. The differences in numbers among the three groups were not statistically significant.

Leisure activities. Table 2-67 is a summary of the number and percentage of respondents in each group indicating that they participated in each of the listed leisure activities during the seven days preceding the day on which they completed the survey form. The level of significance indicated by a chi-square test for each activity also is reported in the table. As indicated in the table, several significant ($p < .01$) differences (7 of 19 possible) were found among the three groups of students in their rates of participation. All except one of the significant findings reflected a greater participation rate by respondents in the college group, followed by respondents in the vocational group, and then by respondents in the special education group. The one exception was for "went shopping," on which the greatest participation rates were found for respondents in the vocational group, followed very closely by respondents in the college group, and then by respondents in the special education group.

The 18 specific leisure activities were organized into those considered to be more interactive in nature (e.g., attended party, participated in sports), and those considered to be more noninteractive in nature (e.g., worked on hobbies, went to movie). The average numbers of each of these types of activities are summarized in Table 2-68. There were significant differences among the groups on both variables: Interactive - $F(2, 735) = 17.19$, $p < .001$; noninteractive - $F(3, 735) = 10.43$, $p < .001$. The actual differences in means, however, were quite small, as is evident in Table 2-68. For both interactive and noninteractive activities, respondents in the college group participated more than respondents in the vocational group, who also participated more than respondents in the special education group.

Activities limitations. Results of the request for information about the extent to which activities are limited and the nature of the primary limitation are presented in Table 2-69. While the greatest percentage of respondents in each group indicated no limitations, there were substantial percentages indicating from "a little" to "a great deal" of limitation, ranging from 7% of the respondents in the college group, to 11% of the respondents in the vocational group, to 20% of the respondents in the special education group. These were significantly different, $x^2(8) = 24.00$, $p < .003$. For respondents in the college group, the primary limitation was time. For respondents in the vocational group, the primary limitation was almost evenly divided between health related and time. For respondents in the special education group, the primary limitation was health related.

Summary. Social integration outcome data indicated some differences among the three groups (see Table 2-70). Significantly fewer subjects in special education had driver's licenses (see Figure 2-11), and significantly fewer participated in certain types

Table 2-66

Social Integration Characteristics of Subjects in Three Groups

	Group		
	Vocational Program	College Program	Special Education
Driver's License[a]			
N	221	256	209
%	97	98	84
Number of Close Friends			
Mean	7.15	7.40	8.15
SD	6.62	5.55	7.05
Range	1-50	1-50	1-46
N	221	255	237

[a]For this table, numbers of subjects in programs are: Vocational Program = 228; College Program = 260; Special Education = 250.

Table 2-67

Current Leisure Activities of Subjects in Three Groups

	Group			
	Vocational Program	College Program	Special Education	Significance Level
Went out to eat	199 (87%)	232 (89%)	197 (79%)	.003
Went on trip	67 (29%)	99 (38%)	49 (20%)	.001
Worked as volunteer	15 (7%)	42 (16%)	27 (11%)	.004
Went shopping	199 (87%)	219 (84%)	187 (75%)	.002
Worked on hobbies	104 (46%)	138 (53%)	125 (50%)	ns
Went to sports event	57 (25%)	72 (28%)	50 (20%)	ns
Went to movie, etc.	63 (28%)	114 (44%)	94 (38%)	.001
Participated in sports	103 (45%)	163 (63%)	84 (34%)	.001
Attended party/dance	110 (48%)	133 (51%)	113 (45%)	ns
Went on date	92 (40%)	123 (47%)	89 (36%)	ns
Visited friend	180 (79%)	219 (84%)	191 (76%)	ns
Went to meeting	38 (16%)	69 (27%)	48 (19%)	ns
Watched/listened to TV	223 (98%)	252 (97%)	243 (97%)	ns
Spent time with relative	177 (78%)	183 (70%)	169 (68%)	ns
Attended religious service	71 (31%)	110 (42%)	50 (20%)	.001
Went to park or on walk	134 (59%)	164 (63%)	126 (50%)	ns
Played cards, games, toys	97 (43%)	95 (37%)	115 (46%)	ns
Sat around	171 (75%)	183 (70%)	174 (70%)	ns
Other	21 (9%)	39 (15%)	24 (10%)	ns

[a]For this table, numbers of subjects in programs are: Vocational Program = 230; College Program = 261; Special Education = 250.

Table 2-68

Average Numbers of Interactive and Noninteractive Leisure Activities for Subjects in Three Groups

		Group		
		Vocational Program	College Program	Special Education
Interactive[a]				
	Mean	5.59	6.06	5.08
	SD	1.82	1.84	2.03
	Range	0-11	0-11	0-11
	N	228	260	250
Noninteractive[b]				
	Mean	3.61	3.97	3.45
	SD	1.36	1.31	1.32
	Range	0-7	1-7	1-7
	N	228	260	250

[a]Interactive leisure activities included: went out to eat, went on trip, worked as volunteer, went to sports event, participated in sports, attended party/dance, went on date, visited friend, went to meeting, spent time with relative, and attended religious service.

[b]Noninteractive leisure activities included: went shopping, worked on hobbies, went to movie, watched/listened to TV, went to park or on walk, played cards, games, toys, and sat around.

Table 2-69

Activity Limitations for Subjects in Three Groups[a]

	Group		
	Vocational Program	College Program	Special Education
Extent to Which Activities are Limited[b]			
Not at all	202 (89%)	242 (93%)	197 (80%)
A little	16 (7%)	13 (5%)	25 (10%)
Some	7 (3%)	3 (1%)	16 (7%)
A great deal	2 (1%)	2 (1%)	7 (3%)
Nature of First Listed Limitation			
Health-related	22 (40%)	15 (21%)	34 (51%)
Time	20 (36%)	48 (67%)	18 (27%)
Money	4 (7%)	5 (7%)	6 (9%)
Transportation	2 (4%)	2 (3%)	3 (4%)
Other	7 (13%)	2 (3%)	5 (7%)

[a]Entries are numbers of subjects, with percentages in parentheses.

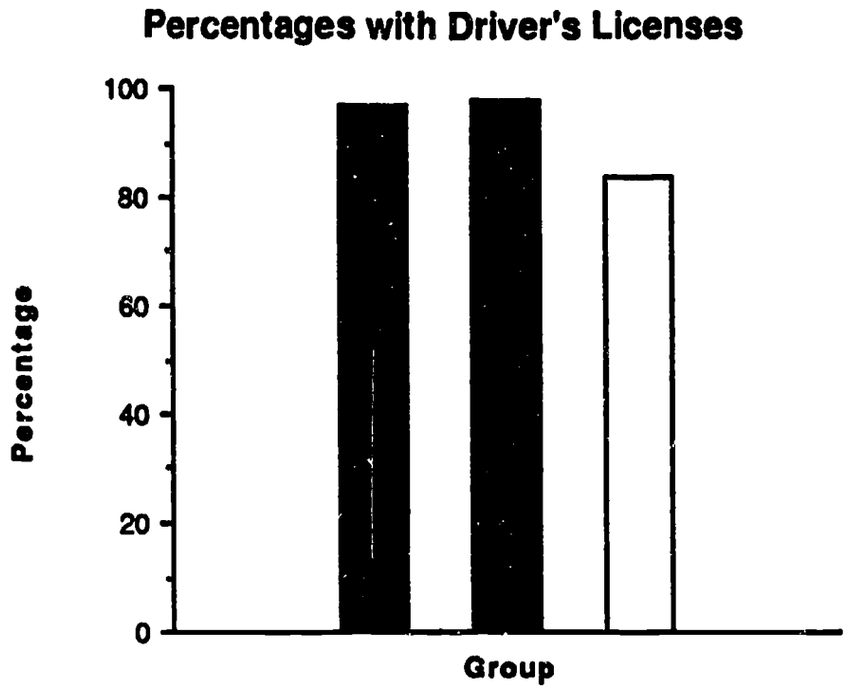
[b]Percentages are based on numbers of subjects in three programs responding to this item: Vocational Program = 227; College Program = 260; Special Education = 245.

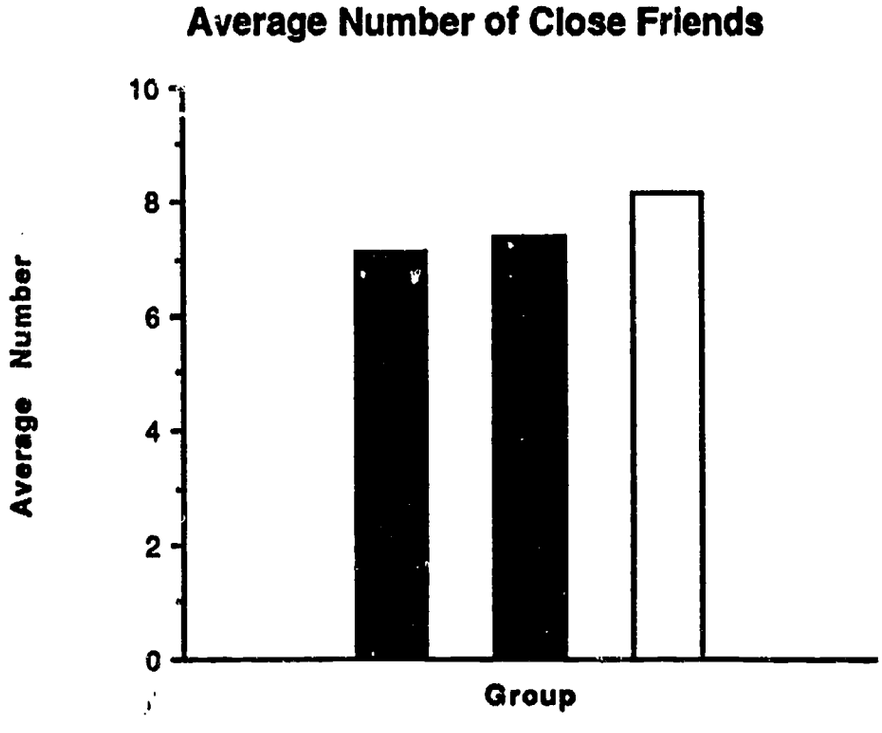
Table 2-70

Summary of Statistical Comparisons of Subjects in Vocational, College, and Special Education Programs on Social Interration Outcomes

Variable	Significance Level	Nature of Difference
Driver's License	.001	College Program, Vocational Program > Special Education
Number of Close Friends	ns	--
Interactive Leisure	.001	College Program > Vocational Program > Special Education
Noninteractive Leisure	.001	College Program > Vocational Program > Special Education
Activities Limited	.003	Special Education > College Program

Figure 2-11. Social Integration Outcomes for Three Groups.





of leisure activities than subjects in vocational and college programs. These differences, however, may be of questionable practical significance since 84% of the subjects in special education did have driver's licenses, and since differences in leisure activity participation did not change as a function of activity (i.e., greater numbers of respondents in the college group participated, regardless of the activity). There is evidence that former students in special education do think that their activities are limited in some way; most often the identified limitation is health related.

DISCUSSION

The school data and outcome analyses reported in this paper indicate several findings that deserve further attention. Because of the large number of comparisons and the comprehensiveness of the data, it is not always easy to sort out the major points. To facilitate that process, this discussion will review the major findings, relate these findings to the findings of other outcome research studies, and then draw some conclusions regarding implications for services and for future research.

Major Findings

At the time when students leave school, there are clear differences among those who have been identified as students in special education programs, those who have followed a vocational program, and those identified as college bound. These differences are evident in school measures, such as grade point averages, class percentile ranks, and graduation rates. The differences also are evident in various indices of school participation (e.g., absenteeism) and use of auxiliary services, as well as in measures of cognitive ability and measures of achievement. The students in the college and special education groups are at the extremes, with the students in the vocational group somewhere in the middle. In all cases, each group was significantly different from the other two.

When students in special education leave school, there are some consistent differences among those with different handicapping conditions; the most obvious differences involve the students with emotional disabilities. Categorical differences in school measures (e.g., graduation rate, grade point averages, class percentile ranks), in school participation (i.e., absenteeism), and in services received consistently involve students with emotional disabilities, who do more poorly on school measures, participate less in school, and receive more extensive services than other students with disabilities. They do not differ considerably from most other students in terms of performance on aptitude and achievement measures. Some caution must be exercised in reaching these conclusions, however, because of the small number of subjects with emotional disabilities.

The characteristics that most uniquely separate students with different handicapping conditions during school years are the original reason for referral and the intensity of special education services during high school. The original reason for referral generally is different for students with mild mental retardation ("low ability") and students with speech impairments ("oral language"). For students with learning disabilities or emotional disabilities, problems in academic areas are more commonly noted. "Behavior" referrals clearly occur most often for students with emotional disabilities. The amount of time that special education services are received is similar across categories at all grade levels, except high school, where students with emotional disabilities receive significantly more direct service time than students with other handicapping conditions.

After leaving school, students who had been in special education and students who had been in vocational education appear to be more similar than different. Despite several differences in the characteristics of students in special education, vocational, and college programs when they were in school, many post-school outcome measures (up to eight years after high school) do not differentiate students who had been in vocational and special education programs. In fact, several measures generally considered important (e.g., percent in paid employment, hourly earnings) did not differentiate between any of the three groups. Some of these nonsignificant differences, however, appeared to vary as a function of time out of school, most notably for students in the college group. When differences did emerge between students in special and vocational education, they frequently were in the area of financial integration, with former students in special education having fewer checking accounts or credit accounts.

When post-school outcomes are compared for students with different handicapping conditions, those with speech impairments and learning disabilities have the most positive outcomes while students with emotional disabilities have the poorest outcomes. The most striking differences in post-school outcomes always involved the students with emotional disabilities. These students were less likely to be employed, and less likely to be involved in educational activities. These findings are more striking, perhaps, because of the findings related to their greater use of services and resources while in school.

The post-school outcomes that are reported here probably are slightly more positive than might be found if data had been obtained from all potential respondents. This conclusion is based on the findings from examining certain types of school record information for respondents and nonrespondents. In general, those who responded had performed better than their counterparts who did not respond. The true effect of this response bias is not clear, however, given the tendency for differences among groups to disappear even when their school record data had indicated that they were statistically different at the end of high school. There also is a potential bias in favor of students in the vocational and college groups due to the way in which samples had to be selected for those groups.

Current Findings Compared to Findings of Other Outcome Studies

In Table 2-1, eight recent follow-up studies were summarized according to the major areas in which information was collected. The findings from the current study have been compared to the findings from those studies and a judgment made about their agreement with each other ("+" = agree, -- = disagree, "0" = not addressed in study). The results of these comparisons are provided in Table 2-71.

Edgar and Levine (1986) thus far have presented their data in summary form in graphs and tables, and in some brief descriptions of preliminary findings. In the April 1986 summary, they reported that 58% of their total sample of students who had been in special education is currently employed, compared to 64% of a cohort without handicaps. This six percentage point discrepancy is similar to the five to six percentage point discrepancy found in the present study. However, the percentages of employed are higher in the present study (79% - 85%) than in the Edgar and Levine study (58% - 64%). Edgar and Levine also found that about 65% of students with learning or behavior disabilities are employed, while only 39% of the students with severe disabilities and 43% of the students with mild mental retardation are employed. These findings are not reflected in our data; 80% of individuals with mild mental retardation or learning disabilities, and 73% of individuals with emotional disabilities had paid employment.

Table 2-71

Consistency in Findings of Current Study With Findings of Other Follow-Up Studies[a]

Area/Subtopic	Study[b] ED	FA	HA	MI	SC	SE	WE	ZI
Employment								
Current job status	--	--	--	+	--	+	--	--
Current earnings	+	+	--	--	--	o	--	o
Satisfaction	o	o	o	+	o	o	+	o
How found job	o	o	+	+	o	+	+	o
Previous job	o	o	o	o	o	o	o	o
Job search	o	o	o	o	o	o	o	o
Education								
Current status	+	+	--	--	--	o	o	o
Job training	o	o	o	o	o	o	o	o
Financial Integration								
Support income	o	o	o	--	--	o	o	o
Pay taxes	o	o	o	--	o	o	o	o
Banking	o	o	o	--	o	o	o	o
Shopping	o	o	o	o	o	o	o	o
Social Integration								
Leisure activities	o	o	o	o	o	o	o	o
Marital status	o	o	o	o	o	o	o	o
Friendships	+	o	o	o	o	o	o	o
Living arrangements	o	o	o	o	o	o	o	o
Votes	o	o	o	o	o	o	o	o
Legal problems	o	o	o	o	o	o	o	o
Driver's license	o	o	o	--	o	o	o	o

[a]A "+" indicates agreement in the findings in this research and the cited study, a "--" indicates disagreement, and a "o" indicates the area/subtopic was not addressed by one of the studies.

[b]Studies are identified as follows: ED = Edgar et al. (1985), FA = Fardig et al. (1985), HA = Hasazi et al. (1985), MI = Mithaug et al. (1985), SC = Schalock et al. (1986), SE = Semmel et al. (1985), WE = Wehman et al. (1985), ZI = Zigmond & Thornton (1985).

Cohort comparison groups in this study also showed employment rates that were relatively high (e.g., 80%).

Edgar and Levine (1986) reported earnings information in terms of the percentages of individuals falling within three ranges ($0-$50, $51-$134, $135+) of salary per week. Over 50 weeks, these ranges translate to incomes of: $0-$2500, $2550-$6700, $6750+. For individuals with mild mental retardation, most salaries (57%) fell within the middle range ($2550-$6700). For the individuals with learning/behavior disabilities, most salaries (61%) fell within the high range ($6750+). These findings are consistent with our findings, although slightly lower perhaps. The mean earnings for respondents with mild retardation in our study was $8,000, the mean for respondents with learning disabilities was $14,000, and the mean for respondents with emotional disabilities was $9,000.

The route through which jobs were found was reported by Edgar and Levine to be mainly either the school (31%) or family/friends (22%) for subjects with mild mental retardation and self (44%) or family/friends (32%) for subjects with learning/behavior disabilities. Persons without handicaps in their sample found their jobs also mainly through self (61%) or family/friends (32%). These findings vary somewhat from those of this study. In agreement with this study is the finding that parents, friends, and relatives play a significant part in obtaining jobs. The school, however, was mentioned less frequently by our sample of respondents with mild mental retardation. Our samples of individuals with mild mental retardation or learning disabilities relied much more often on themselves. Our sample of individuals with emotional disabilities was different from the other categories in that they showed virtually complete reliance on the family/friend network for finding a job. It must be noted, however, that Edgar and Levine asked about how the first employment after school was obtained, while we asked about the respondents' current jobs. This difference certainly could account for shifts away from the school as one service. Because of these differences, a "o" is entered in Table 2-71 for this comparison.

In terms of educational status, Edgar and Levine (1986) found that 14% of their sample of individuals with mild retardation and 18% of their sample of individuals with learning/behavior disabilities were in some type of school program. In our sample, approximately 11% of respondents with mild mental retardation, 21% of respondents with learning disabilities, and 18% of respondents with emotional disabilities were involved in educational activities. These percentages are fairly comparable across the two studies. The sample without handicaps in Edgar and Levine's study had 51% currently involved in an educational activity. We found 26% of respondents in the vocational group and 64% of respondents in the college group involved in educational activities. Additional training measured by our study and the Edgar and Levine study cannot be compared since they measured the percentages of subjects in various types, and we measured the length of participation in special training activities.

Edgar and Levine (1986) also obtained parent reports about friendships of their children with handicaps. These data are reported in terms of no friendships versus any friendships. The percentages for which parents said their children had no friends were 14% for children with mild mental retardation, 4% for the children with learning/behavior disabilities, and 0% for the nonhandicapped sample. Although the present study did not directly request information about having no friends, the results appear to be comparable in that approximately 10% of respondents with mild mental retardation, and 4% of those with learning disabilities did not indicate a specific number of close friends. Peers

without handicaps, however, had slightly higher rates of not specifying friends (vocational = 3%, college = 2%) than would be expected from the Edgar and Levine data.

Fardig et al. (1985) examined several post-school outcome variables for a sample of 113 students with handicaps (mild mental retardation, severe learning disabilities, emotional disabilities) from a rural area. They found that 62 subjects (55%) were employed or in the armed services. This percentage is even lower than that reported by Edgar and Levine, which was lower than the percentages found in our study. Fardig et al. found a wage range from $25.00 per week to $250.00 per week; these transform to yearly (50 week) wages from $1250 to $12,500. This range is more restricted and lower than that from our study, though not as different apparently as the findings of Edgar and Levine. Fardig et al. also found that 14% of their sample was in school; this is lower than the 21% found in the current study, but still within the same approximate range.

Hasazi et al. (1985) studied former students in a primarily rural area in Vermont. Employment status was their major focus of interest. Their results indicated that over half the sample was employed (55%), and that most found their jobs through the "self-family-friend" network. Percentages for the latter three sources of jobs were 55%, 18% and 10%, respectively. As for the other studies, employment rates reported by Hasazi et al. were much lower than those found in the current study. However, Hasazi et al. did find that there was a variation in percentages employed that was related to location even within primarily rural Vermont. Percentage employed in rural and metropolitan areas was about 45%, whereas percent employed in urban areas was 64%. While the "self-family-friend" source for finding jobs was consistent between studies, Hasazi et al. reported greater frequencies for the self category than in the current study.

Hasazi et al. reported the wages of their sample in terms of earnings per hour. For graduating students, the largest percentage (45.7%) earned between $3.35 and $5.00 per hour. This was also true for students who left school at age 18 or older (33.3%) and students who dropped out of school before age 18 (50.0%). These percentages seem to reflect considerably lower wages than those found in the current study. In terms of educational activities, Hasazi et al. found that 11 of their 301 subjects were full-time students or in a job training program. This 4% involvement is much lower than our finding of 21% involvement. Definitions of educational activities, however, may account for some of the difference in these percentages.

Mithaug et al. (1985) reported on their statewide follow-up of students who had completed special education services in 1978. In summarizing their 1982 survey findings, they concluded that:

> Although most graduates were employed, their earnings were at minimal levels. Furthermore, most of the respondents lived at home with their parents, suggesting a pattern of financial instability and family dependence. (p. 397)

These findings, again, are generally more pessimistic than those of the current study. Mithaug et al. found that 69% of their sample were working, compared to our 79% finding. These percentages are relatively close, much more so than other studies have been. Wage levels in the Mithaug et al. sample, however, were much lower than our findings for wages; 43% of their subjects earned less than $3.00 per hour and 13% earned less than $4.00 per hour. These lower rates cannot be attributed to differences in time (1982 vs 1984). Mithaug et al. also reported that most of their sample (63%) indicated

satisfaction with their jobs. This percentage is fairly similar to the 74% to 80% found in the current study. Jobs were found mainly by themselves (29%) in the Mithaug et al. sample. Friends were cited by 13% of the sample, but parents and relatives were not found to be influential. The self percentage is virtually identical to those found in the current study.

Educational activities were summarized by Mithaug et al. (1985) in terms of any participation since high school. They found that 18% had attended a community or junior college, 13% had attended a state college or university, 14% had attended classes in some other setting, and 8% had attended a vocational or technical school. The findings from the current study are not based on the same time frame because respondents were asked about their current educational activities. However, even the relationships among participants in the different types of educational activities are different for the two studies. In our study, more respondents in special education participated in college/university and other classes than in community college classes.

Mithaug et al. (1985) also found that few of their subjects received money from sources other than their job; 19% received financial support from parents. The current study found more frequent occurrences of outside support, in addition to the 11% of respondents who received support from the family or a relative. Findings related to other financial activities reported by Mithaug et al. were that 85% paid cash for items rather than using a credit card or charge account (11%). Respondents in the current study, in contrast, used credit cards (50%) and checking accounts (55%) with considerable frequency. Driver's license possession can be inferred from the data of Mithaug et al. that indicated that half of their respondents drove to work and other places. Our findings about driver's license possession indicated that 84% of our sample of individuals in special education had driver's licenses.

Schalock et al. (1986) reported on the employment and living status of 108 individuals with mental handicaps in Nebraska who had graduated between 1979 and 1983 from rural schools that followed a community-based job exploration and training vocational model. They found that 61% of the graduates were working competitively, a level somewhat below that found in the current study (79%). They also found an average hourly wage of $2.40, compared to our $7.01 average for students in special education. Schalock reported current schooling participation levels at 5% over all of their sample, compared to the approximately 17% level found in our study (for vocational school, community college, and college or university). Schalock et al. also looked at primary sources of income, as opposed to other sources of income (which in some cases might be in addition to job income). They found that 31% of their total sample received their primary income from parents or relatives, 7% from a public source, and 62% from a personal source (most likely, a job). While not directly comparable, these data appear to be quite different from the findings of the current study where only 11% received income from family or relatives. It appears, on the other hand, that greater percentages of subjects in our sample, especially students in the college group, received assistance from public sources. These differences also may be partially attributed to differences in the level of functioning of samples in the two studies.

Semmel et al. (1985) conducted a comparative study of employment outcomes for students in special education in a cooperative work placement program. They found employment rates for these students to be about 78%, very comparable to the overall special education employment rate found in the current study. Semmel et al. found that most of the subjects had obtained their first jobs through a public agency (such as

Rehabilitation). The next most frequent way was through personal means (e.g., newspaper, parents, friends). These two strategies appeared to differ for the individuals who had been in their work placement program (who more often use public agencies) and those who had not.

Semmel et al. (1985) also provided information on participation in driver's education. Approximately 7[illegible]% of their sample enrolled in and passed driver's education. Although this is a rough estimate of those actually driving, it does appear to be lower than the 84% we found to have driver's licenses. Judgment as to the agreement, however, is inappropriate given the discrepancy in the data sets.

Wehman et al. (1985) examined employment outcomes for 300 young adults with mental retardation who had left special education school programs between 1979 and 1983. They found a total employment rate of 41.6%, but this included individuals with moderate and severe retardation (N = 116) as well as those with mild handicaps. For the individuals with mild mental retardation (N = 184), 60% were employed. This level is below the 80% level found for the respondents with mild mental retardation in the current sample. The wage levels for the Wehman et al sample were low, with 25% reporting monthly earning below $200, 48% reporting monthly earnings between $201 and $500, and 17% reporting earnings between $501 and $700. It is not possible to separate the sample of individuals with mild mental retardation from the sample of those with moderate to severe mental retardation, but the fact that 60% of the total sample had mild mental retardation confirms that the earnings levels were low, considerably below those reported by our sample.

Wehman et al. (1985) found that the individuals in their sample were generally satisfied with their employment, and that they had found their jobs mainly through friends, parents, relatives and individual job seeking (65%). Both of these findings are consistent with the results of the current study.

Zigmond and Thornton (1985) focused their investigation on individuals who had been classified as learning disabled in school. They found that 74% of the graduates with learning disabilities and 44% of the dropouts with learning disabilities were employed. These levels are both below the 80% employment level found for respondents with learning disabilities in the current sample, most of whom had graduated (72%).

Summary. The comparison of findings from different studies leads to four major conclusions. First, different studies ask different questions and report their findings in different ways. This means that we do not yet have good comparability in our data bases related to the post-school adjustment of individuals with handicaps. We still can talk, for the most part, only in terms of general findings. Second, environmental variables play a large part in influencing outcomes. These environmental variables cover a wide range of factors, from criteria used to identify students with handicaps, to the effectiveness of specific special education interventions, to the economic condition of the surrounding communities. What happens in rural Florida may not happen in urban Pennsylvania; factors influencing outcomes in California may not influence outcomes in the same way in Vermont.

Third, the comparison of results across studies is difficult to make with much confidence that the findings are based on comparable samples. The individuals with mild mental retardation in this sample appeared to perform higher on achievement and aptitude measures than did individuals with retardation in other studies. However, the

lack of comparable measures to describe samples makes it difficult to derive broad generalizations about post-school outcomes of former students in special education.

Finally, a number of shortcomings are apparent in the procedures followed in post-school outcome studies of former students of special education programs. An important consideration in evaluating findings of post-school studies resides in the characteristics of research samples. In this study, special attention was paid to describing the follow-up research procedures and the response rates. Further, comparisons were reported between the characteristics of respondents and non-respondents. These comparisons showed that respondents were somewhat better on school-related variables than nonrespondents. These accepted conventions of survey research are frequently absent in most studies, making it difficult to synthesize reliably the research findings. Community contextual characteristics (e.g., SES, employment rates, per capita household income, etc.) are also not reported routinely in most studies. (See report by Halpern, Close & Nelson, 1985, for a good use of available census and employment statistics.) Regrettably, this study did not use community base rate statistics for comparative purposes. The use of the two comparison groups from the same high schools, however, served to place the findings of this study in a somewhat broader context.

Implications for Services and Future Research

The overall findings from the present follow-up study are quite positive. They suggest that the post-school outcomes for this group of students with mild handicapping conditions are not as low as might be expected from the differences observed between them and non-special education students during their school years. The outcomes on employment rates, earnings, financial skills and social leisure activities presented by this sample appear more positive than those of many other studies. There could be many interacting factors contributing to these results. First, the community of metropolitan Minneapolis-St. Paul has historically registered lower unemployment rates than the national average (4.7% vs 7.4% nationally in 1984). Second, this school district enjoys a good reputation for its special education services. Third, this particular suburban district sample may enjoy stronger parent-family support than that of other reported studies, as reflected in rather strong support from this source for securing employment. In any event, all of these factors could be influential in the post-school outcomes of former students of special education, and deserve some concerted attention in further studies.

The findings of this study suggest the value of maintaining and improving present special education services. Areas to strengthen would be those that contribute to the student's ability to show greater financial independence (such as using credit cards or checking accounts), and the transition to employment from school programs. Available school services apparently were weakly related to finding and maintaining post-school employment. It may be prudent to consider ways to link community education programs to former students. Such programs might increase skills needed in the workplace and expand the social-leisure activities of many former students.

The results also suggest an area of great service need. Students in special education who end up being categorized as having an emotional disability do not appear to be receiving services that help them succeed after leaving high school. One possibility, of course, is that the nature of the disability is precluding effective special education (e.g., these students attend school many fewer days than do other students). It is also possible that these students are identified too late to receive effective services. This possibility is supported by the finding that few students with emotional disabilities

receive services before the junior high school level. Whatever the reasons, it is obvious that practitioners and policy makers alike need to address the issues involved in the identification of students with emotional disabilities and the interventions used with them.

Absenteeism in itself is another issue that deserves the attention of school personnel. Students in special education, in particular, miss many more days of school than do other students. Vocational students have greater absenteeism rates than do college students. Absenteeism appears to be related to school record data on achievement and other school outcomes, and partially to post-school outcomes. It is a likely contributor to premature leaving of school, a factor found to contribute negatively to post-school and life outcomes (Beck & Muia, 1980; Vice President's Task Force on Youth Employment, 1980). Although cause-effect relationships cannot be assumed between attendance and post-school outcomes, specific interventions to decrease unnecessary absenteeism should be considered. This factor, along with curricular changes, requires careful examination of current practices at the secondary level in order to promote retention and effective learning for adolescent students with handicaps.

Many of the proposed implications for services are intertwined with the need to conduct further research. Many issues remain to be addressed. It will be important to investigate some of the possible relationships among school record data and post-secondary outcomes. For example, do students who graduate fare better than students who leave school without graduating (cf. Zigmond & Thornton, 1985)? Also, do students who have taken vocational coursework have better post-school outcomes than students who do not take this coursework (cf. Hasazi et al., 1985)? Do students who work during high school have higher employment rates than students who do not? Many such questions can be answered, and many others require further research.

Clearly, we are not at an endpoint in research designed to follow-up students who have received special education services. Studies reported to date have contributed considerably to our understanding of the post-school outcomes of former students in special education programs. There is need, however, to expand knowledge on the correlations and dimensions of adjustment in community settings. An important set of related questions addresses the benefits and costs of special education services and their relationships to each other. These issues are addressed in a benefit-cost analysis (see Chapter 5) that incorporates cost data (see Chapter 3) and outcome data from the present study. It is equally important that our studies begin to explore, more fully, factors during the school years and early post-school years that influence the quality of life for persons with handicapping conditions. By understanding better the factors contributir , to quality of life during the post-school years, the prospects will increase for designing more effective school curricula and outside support programs for persons with special needs in learning and adjustment.

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CHAPTER 3

Benchmark Cost Descriptions of School-Based Special Education

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Questions concerning costs in special education have been raised increasingly at Federal, State and local levels. Such costs and resource use have been increasing in both absolute terms and relative to those of regular instruction. For example, it has been estimated that during the past eight years alone Federal funds on a per pupil basis for special education have increased over 380% (U.S. Department of Education, 1985). As compared with annual per pupil increases of 7% for regular instruction, special education has experienced annual increases of over 12% during the same period (National Center for Education Statistics, 1984). Much of this increase is directly attributable to recent Federal and State legislation (and appropriations) along with society's expressed political and social priority for issues of equity and educational opportunities for children with handicapping conditions. Many of these increased educational costs resulted from the expansion of services to children and youth with more severe disabilities who previously had been served by social and human service agencies outside the schools. Other sources of increased expenditures resulted from the expansion of special educational services as a result of mandates from the courts. Nevertheless, with almost 10% of all district level expenditures currently being devoted to special education programs and services, this sector of the budget is coming increasingly under administrative and budgetary scrutiny (Research for Better Schools, 1984). The issues have not focused so much on the "need" for special education, but rather on questions about "where the money is going" and whether local and state educational agencies, and society more generally, are "getting their money's worth." Greater concerns for accountability of expenditures and questions of cost-effectiveness are at issue at all levels in education.

Recent efforts to address these expenditure issues in special education even have been mandated by Congress (Public Law 98-199, The Education for All Handicapped Children Act, Amendments of 1983) wherein studies have been commissioned to survey nationally representative data on special education expenditures for comparative purposes. However, little systematic attention has been given to assisting local school districts in their planning, budgeting and allocating of resources for special education. With questions increasingly being focused on issues of accountability, cost containment and program efficiency, it is clear that the primary locus of control for these matters lies within the local districts. District policy makers and administrators need reliable and complete cost information for planning and assessing their educational programs and services. There are many important local management decisions that can be better informed by the availability of cost information. First of all, such information helps in identifying inefficiencies in resource use and in suggesting needed improvements in the curricular and instructional design for each area. Second, cost information aids in determining whether certain instructional services are feasible given whatever budget or cost constraints might exist within the program or district. Administrators and policy makers need to know marginal or incremental costs, for example, in order to make decisions about program and service area expansions and contractions. They need to know what it costs to provide a particular service, or a program for different students with differing needs, or actions regarding a particular model of service. Third, such cost information also contributes to a determination of the service area's overall value (i.e., whether the service is worth the cost) when linked to the area's overall outcomes or

benefits. And fourth, cost information is essential for any type of cost-benefit comparison of alternative instructional activities.

In order to assess the cost consequences of special education, one needs first to establish a workable framework by which to assess the direct resource requirements for each activity, along with a method for translating these requirements into cost estimates; and second, one needs to collect program data for subsequent cost-analysis and for the establishment of benchmarks to assess the outcomes of programs. Such a framework and cost-analysis is presented in this chapter.

In the past, when others attempted to address these concerns with cost studies in special education they often encountered a number of methodological problems and data limitations. Even when data were collected at the local level, many previous studies simply collected data from district or state reimbursement budgets rather than from actual district expenditure records. While focusing almost exclusively on printed budgets, they almost always defined their cost centers in terms of categories of disability or reimbursement rather than on the actual program or service areas that employed the special education resources and delivered the educational services (see, for example, Anderson, 1982; Arizona State Department of Education, 1983; Bentley, 1970; Clemmons, 1974; Cost Study Committee, 1983; Gifford, 1977; Henderson & Hage, 1979; Kakalik et al., 1973; Keefe, 1982; Lander & Sederberg, 1983; Marriner, 1977; Milne et al., 1982; Price et al., 1982; Rossmiller et al., 1982; Snell, 1973; Sorensen, 1973). Similarly, most of these studies focused on annualized student headcounts identified by disability and not on individual student variations in actual use of special education services. Consequently, many service areas of special education and many categories of resources were simply ignored, left out of the analyses, or confounded within total budget considerations.

Purposes of the Study

The purposes of this study are related directly to strengthening the policy and administrative capacity of local school districts and to overcoming the shortcomings and weaknesses of previous cost studies in special education. Specifically, this study: (a) developed a generic school-based model wherein costs can be described more fully and accurately for local district planning, budgeting and decision making in the allocation of resources to instructional program and service areas; (b) adapted the model to the specific programmatic needs of special education; (c) presented a case study from a large suburban school district to show both the feasibility and utility of the model for special education service programs; (d) reported empirical data within special education whereby these data can be used both by this district and others for future comparative purposes in special education; (e) concluded from both the model and empirical results whether some current policy assumptions, practices, and resource allocations in special education are realistic or economically rational; and (f) provided recommendations to local districts concerning planning, budgeting, and administrating of special education programs. It is expected that a local district could replicate the paradigm and cost analysis of this paper for its own purposes with only minimal effort in data collection. All of the primary components for the cost analysis employed in this study are illustrated in the form of actual algorithmic micro-computer templates such that they could be replicated. [The templates were developed on an Apple IIe micro-computer employing Appleworks software; they are available from the authors.] And, all of the data inputs employed in this study are currently available in some form in almost all school districts.

The following set of research questions was developed to guide the study in targeting its design, data collection, and subsequent analysis. Basically, the questions revolve around three general concerns: (1) What are the resources employed and the costs of these resources in the delivery of local school district special education programs and services? (2) What parties bear the burden of these costs? And, (3) what are the factors that explain variations in these costs?

In the context of these three general concerns, the study focused the cost model and data collection on the following specific questions:

(1) What is the average per pupil expenditure (per year, per day, and per student hour of instruction) for each of the special education programs and service areas (grouped by age and grade levels) currently being provided to children and youth with handicapping conditions?

(2) What is the average per pupil expenditure for regular instruction currently being provided for these students?

(3) What is the average per pupil expenditure (per year, per day and per student hour of instruction) for each of the special education programs and service areas currently being provided to students with handicapping conditions by public and private agencies external to the district?

(4) What are the total resource costs to the district for special education and for each of its constituent programs and service areas?

(5) What are the total resource costs to society (i.e., to the district, state, external agencies, and others) for special education in this district and for each of its constituent programs and service areas?

(6) What are the relationships of costs in special education to those in regular instruction?

(7) Who bears the financial burden of special education?

(8) What are the factors that explain variations in costs for each of the special education programs and service areas?

It is important to note again that although some variations of these questions have previously been addressed in other state and national surveys dealing with special education, the design of this study is unique in its focus on actual student use of educational resources and services and in its focus on local district management control.

Methods of the Study

The cost analysis technique employed in this study is a resource components approach to costing out educational programs. This approach requires the listing of a comprehensive set of educational programs within a district, or a comprehensive set of service areas within a program; the determination and measurement of the specific resources that are employed within each of these programs or service areas; and the valuing of these resources to determine program or service area costs. On the basis of these standardized cost data and the number of pupils or instructional hours of service

that the school district enrolls or provides per pupil in each program or service area, the overall cost of education can be determined along with various per pupil unit costs. Table 3-1 illustrates this costing paradigm and identifies the essential components of the cost model for one of the defined 16 special education service areas in this study--i.e., early intervention for preschool children.

A number of assumptions within this study were necessarily required concerning school district resource allocations and their assignment within and to each of the special education service areas. These assumptions were especially important in prorating district wide resources, such as capital and administration, to each service area. Similarly, some additional assumptions concerning the valuation of these resources were also required. The most important of these assumptions and procedures for subsequent cost derivations are summarized in Table 3-2. Other data adjustments and sources are noted in each of the other tables included in this chapter.

Based on the assumptions of Table 3-2 (with supporting information in Tables 3-3 to 3-6), a total cost function for specifying, measuring, and valuing all resource components for each special education service area of this case study can be made explicit and is illustrated within Table 3-1. This cost function has been programmed onto a micro-computer template that can be used by any local district as a prototype for their cost analysis. Accordingly, each cost function template accounts for the number and salaries of teachers, number and salaries of other personnel assistance, quantity and cost per unit of space and equipment, instructional and other supplies, quantity and cost per unit for transportation, quantity and cost per unit for tuition, quantity and cost per unit for health services, and like specifications for all other resource items. Similarly, the average cost function for each type of service/program also accounts for the number of students, along with duration and intensity of service. [This methodology and these data facilitated the related cost-benefit study wherein special education instructional service costs were assigned to individual students on the basis of their actual use of such services over time.]

With some variations, this approach to costing of educational programs has been applied to special education by Kakalik et al. (1981), Hartman (1981), Chambers and Hartman (1983), and Raphael et al. (1985). More recently, a variation of this approach has been developed under the name of the "Resource Cost Model" by Chambers and Parrish (1984) for use as a cost model for state level school finance, and recently proposed as a "special education expenditure model" for a national survey by Decision Resources Corporation (1984). However, no other previously reported cost studies in special education have used such an "ingredients" or "resource components" approach, nor have they focused on district level decision making. Most other cost studies in special education, including the widely quoted and emulated National Education Finance Program study by Rossmiller and his colleagues in the 1970s (1970 and 1974), simply took their data directly from school district budget records according to reimbursement or summary budget categories without regard to the actual allocations of resources employed or without regard to any imputed value for district or other social resources that might lie outside of the district cash budget. Moreover, most previous studies dealing with special education costs have attempted to examine only the annual budgetary costs of a handicapping condition or administrative category without regard to multiple services to students with multiple conditions, to differences in services by grade levels, or to variations in actual student use of services within particular service areas.

The cost analysis and methodology of this study focus on actual student use of services and hours of instruction in special education "service areas," not on categories

Table 3-1

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Early Intervention/Preschool (EI)

Number of Students Per Year: [40]
Average In-District Minutes Per Week: [750]
Total Minutes Per Week: 30,000
Hours of Service Per Year: 17,500
One-Quarter Hours Per Year: 70,000

Annual Cost	Ingredient
	PERSONNEL
$143,429	[4.50] FTE licensed teachers with fringe benefits
$ 19,792	[3.00] non-licensed aides, all at average five hours per day with fringe benefits
$ -0-	[0.00] FTE licensed substitute teachers/extended time
$ 7,950	[.50] FTE secretarial/clerical with fringe benefits
$ 15,715	[.50] FTE supervisor with fringe benefits
[-0-]	professional technical services
[$4,576]	program administration
[$4,414]	extra healthcare in pupil support services
[$1,595]	other personnel costs
	FACILITIES
$ 10,526	classroom space; total classrooms: [2.00]
$ 380	office space, including program administration proration; total office space: [.27]
$ 998	classroom/office furnishings
$ 18,675	maintenance/utilities/insurance (sq. ft. space: 1,868)
	EQUIPMENT AND MATERIALS
[$ 575]	printing and publishing
[-0-]	94-142 supplies et al. allocations
[$ 382]	travel
[$1,927]	general and instructional supplies/tests
	OTHER
[$ 10,721]	student tuition for outside agencies; student membership days: [721]
$ 25,016	state reimbursement and other costs to external agencies
[$ 72,988]	transportation costs
[$ 11,475]	other educational costs
$ 351,134	total program costs per year
$ 8,778	average costs per students per year
$ 52	average costs per student per day with 170-day year
$ 17	average costs per actual student hour of instruction

NOTE:
(1) Includes eight students served by external agencies with additional hours of instruction by external agencies estimated to be 3,007 per year.

(2) Data noted in brackets are primary input data. All other cost data are derived from computations within a microcomputer spreadsheet template. The technical steps and assumptions in the derivation of these costs are identified and discussed in Table 3-2 and in the Appendix to this study.

Table 3-2

Special Education Cost Study (Data From 1983-84)
Assumptions for Table 3-1 and Cost Analysis

A. HOURS OF INSTRUCTION:

1. All special education costs in this analysis were assumed to be additive and extra costs beyond those provided in regular instruction. Average costs per actual student hour of instruction include in-district actual hours of service per year along with actual hours of service by external agencies where it was assumed that the external agency provided a full membership day of instruction of 250 minutes -- i.e., five instructional periods of 50 minutes each. When determining the actual student hour (60 minutes) of instruction for external agencies, conversions were made with a factor of 4.17 hours (250/60) per day of instruction.

2. All average in-district minutes per week of instruction devoted to each service area were taken from teacher and program records as primary data.

3. The district school year for teachers in 1983-84 was 175 days or 35 school weeks. The school year for students and transportation was 170 days. The district school day for teachers was five teaching hours and was assumed to be the hours per day of professional service per teacher in special education.

4. Nonpublic (private and parochial) students living within the school district and being served by special education in the public schools were included in the data for each of the service areas of special education. All student numbers are annual headcounts.

B. PERSONNEL

5. In 1983-84 there were 69.55 FTE licensed special education teachers teaching in the school district. In addition, there were 15 FTE at a special school administered by the district for an area-wide treatment program for students with emotional disabilities. The special education service provided for students with emotional disabilities by this special school were considered and treated in this study as being provided by an external agency.

6. Average salaries and fringe benefits for licensed teachers in special education were computed separate from teachers of regular instruction. Wages for nonlicensed aides and licensed substitute teachers were computed from a standard hourly rate. Average salaries with fringe benefits for secretarial and clerical were computed from district-wide data. Computational descriptions for determining average unit prices for all personnel and other resources are identified in Table 3-3.

7. Professional technical services and other personnel costs were taken from actual expenditures for each service area.

8. Personnel paid from federal funds under provisions of P.L. 94-142 were allocated to special education service areas from a review of actual assignments and were included in the FTE data for each category within each service area.

9. It was estimated by district administrators that approximately 80% of the total resources devoted to "program administration for exceptional education" were allocated to special education. Prorations of such costs were made according to numbers of licensed teachers in each special education service area.

10. District records and estimates by administrators indicated that students in special education used health care services within the district at over twice the rate of regular students (i.e., 9% of the students used 20% of all health care services). Consequently, 20% of all district health care service costs were allocated to special education. Prorations of these costs to each of the special education service areas were estimated by special education program administrators.

C. FACILITIES:

11. All districts assignable square feet were being used in 1983-84 for education purposes and totaled 1,598,118 square feed with an insurable replacement value of $45.35 per square foot. Classroom and office furnishings were assumed to cost $2,000 and $500 for each unit, respectively; while classroom and office space standards were computed on the basis of 750 and 250 square feet, respectively. It was also estimated and assumed that the average useful life for buildings was 30 years and 10 years for equipment; and both were annualized at a 10% interest rate. These estimates and standards are consistent with estimates given by key district personnel and the State Department of Education "Guide for Planning of School Buildings and Sites for Minnesota" for 1983-84.

12. All space allocations to program service areas were made on the basis of actual use. When space was shared with multiple service areas, program area teachers estimated the prorations. A summary of all district space facilities allocations to special education services is presented in Table 3-4.

13. Average price per square foot for routine "maintenance, utilities, and insurance" was derived from district-wide data and was estimated to be $2.22 per square foot per year as noted in Table 3-3.

Table 3-2 (continued)

D. EQUIPMENT AND MATERIALS:

14. Supplies and equipment purchased from P.L. 94-142 funds were allocated to the special education service areas by proration according to their proportion of the total special education budget. Other supplies, equipment, and travel costs were allocated to each service area on the basis of actual use and expenditures.

E. OTHER:

15. Expenditures for tuition to external agencies were computed for each service area on the basis of actual student membership days and average daily tuition rates for each external agency. Similarly, transportation costs were computed for each service area on the basis of actual student days and average daily transportation to each external location. Details for both tuition and transportation expenditures within special education are given in Tables 3-5 and 3-6.

16. As noted above, the costs of all instructional hours of service provided by external agencies were included in the cost analysis for each of the special education service areas. Based on state reimbursement guidelines and conventional wisdom in the district, it was assumed that district expenditures for special education tuition to all external agencies represented approximately 30% of all costs necessary to deliver the external program service -- i.e., the remaining 70% of all costs were assumed to be covered by the external agencies either through state reimbursement or private contributions. The only exception in the cost analysis was for the special school in the service area for students with emotional disabilities where other nontuition reimbursed costs were actually computed and estimated to be 66% of total costs.

Table 3-3

Special Education Cost Study (Data From 1983-84)
District Average Unit Costs of Resources

Ingredient	Description	Components	Costs
[Personnel]			
Teacher (1 FTE)	Elementary and Secondary Regular Service (FTE: 603 - 73.85 = 529.15	Salary and Fringe ($28,500 + $6,854)	$35,354 per year $40.40 per hour*
Teacher (1 FTE)	Elementary and Secondary Special Education (FTE: 73.85)	Salary and Fringe $25,335 + $6,093)	$31,428 per year $35.92 per hour*
Teacher Aide	Elementary and Secondary (8-hour day/5-day week)	Hourly rate $6.70 (plus fringe 11%)	$47.44 per hour
Program Administrator	Special Education	Total Expenditure (80% of $68,078 + $15,264 fringe)	$66,674 per year $1,107 per teacher**
Other Paraprofessional (1 FTE)	Secretaries, etc.	Salary and Fringe $12,315 + $3,692) (175-day year/8-hour day)	$16,007 per year $11.43 per hour
Transportation	Regular Instruction	Total K-12 (Total Expenditure/Res. ADM of $11,669)	$1,900,996 per yr $163 per student
Transportation	Special Education	Total K-12 (177 students)	$201,996 per year $163 per student
[Facilities]			
District Space	Total Buildings	Cost per square foot $45 x 1,598,118 square feet annualized at 10% interest over 30 years	$71,915,310 per district; $7,626,219 per yr
Classroom Instruction	Elementary and Secondary Classrooms	Cost per square foot per classroom: $45 x 750 square feet annualized at 10% interest over 30 years	$33,750 per room $3,581 per year
Office Space	Central/Program Offices	Cost per square foot per office: $45 x 250 square feet annualized at 10% interest over 30 years	$11,250 per office
[Equipment]			
District Equipment	Total Contents	Cost per square foot per district: $8.46 x 1,598,118 square feet annualized at 10% interest over 10 years	$13,520,078 per district $2,197,013 per yr
Classroom Furnishings	Teacher and Student Desks and Chairs; Tables and Bookcases	Market price: $2,000 annualized 10% interest over 10 years	$325 per year
Office Furnishings	Desks and Chairs, Cabinet, Telephone	Market price: $500 annualized at 10% interest over 10 years	$82 per year
[Other]			
Facilities Maintenance, Utilities, and Insurance	Routine Maintenance, Utilities and Insurance	Total Expenditure: (District total square feet: 1,598,118) Annual rate per square foot: $2.22	$3,555,099 per year

*Computed from average teacher wage, assuming a 175-day (5-hour day) teacher year.
**Computed from total expenditures averaged over number of FTE teachers.

FOOTNOTES:
All salary, FTE, and fringe benefit data were derived from 1983-84 expenditure records within the school district. Classroom and office standards were computed on the basis of 750 and 250 square feet respectively, with each costing $45 per square foot. Classroom and office furnishings were assumed to cost $2,000 and $500 respectively. Estimates from records in the school district indicate insurable replacement value for 1983-84 to be $45.35 per square foot. These estimates and standards are consistent with Minnesota Department of Education, "Guide for Planning and School Buildings and Sites for Minnesota 1983-84."

Table 3-4

Special Education Cost Study (Data From 1983-84)
District Space and Facilities Allocations to Special Education Service Areas

Area	Area Description	Office	Class
Emotional Disability	No offices, 4 small classrooms, 22 students, 5 aides with 4 teachers	.12	4.00
Speech Impairment (1-6)	Office in 1 large classroom, 226 students, 7 teachers	.20	.99
Speech Impairment (7-12)	Office in 1 large classroom, 79 student, 3 teachers; Students with Speech impairments, mild mental retardation, and learning disabilities	.07	.35
Mild Mental Retardation (1-6)	No offices, 5 teachers, 38 students, 1.5 classrooms with desks	.10	1.50
Mild Mental Retardation (7-12)	No offices, 3.5 teachers, 65 students, 2.5 classrooms with desks	.17	2.50
Learning Disability (1-6)	No offices, 19 teachers, 8 aides, 378 students, .57 secretaries .28 FTE supervisor (share with students in programs for speech impairment and mild mental retardation)	1.06	4.20
Learning Disability (7-12)	No offices, 14.35 FTE teachers, 4 aides, 347 students, .43 FTE secretaries, .22 FTE supervisor (share with students in programs for speech impairment and mild mental retardation	.97	3.80
Adapted Physical Education	2 teachers, 1 aide, 25 students	.07	.33
Physical Handicap	No classroom, 2 aides, 36 students	.03	0.00
Occupational Therapy	Office space for 2 teachers, no classroom, 35 students	.04	.33
Psychological Services	Office space for teachers in one old large classroom, not students classrooms, 5.2 teachers, 1 secretary	.17	1.00
Moderate Mental Retardation	No space, serviced by outside agencies	0.00	0.00
Visual Impairment	Only 3 students, 1 aide	0.00	0.00
Hearing Impairment	Only 12 students, no teachers or aides, technical service	0.00	0.00
Early Intervention	4.5 teachers, 2 classrooms, 40 students, 6 aides, .5 secretaries, .5 supervisors	1.27	2.00
TOTAL OFFICE AND CLASSROOMS (Includes program administration)		4.27	21.00

FOOTNOTES:
There are 21 small classrooms in 12 locations throughout the district allocated to special education services. Also included in space facilities allocated to special education services is 80% of the space used by program administration, i.e., two offices. Program administration space has been prorated by percentage of budget to service areas. The above space allocations do not include the facilities at special school. The classroom and office standards are computed on the bases of 750 and 250 square feet. Furnishings are assumed to cost $2,000 and $500 respectively.

SOURCES:
Based on estimates from review of special education space in use within the school district. Estimates from records in school district indicate insurable replacement value for 1983-84 to be $45.35 per square foot. These estimates and standards are consistent with Minnesota Department of Education, "Guide for Planning School Buildings and Sites for Minnesota" for 1983-84.

Table 3-5

Special Education Cost Study (Data From 1983-84)

External Placements, Tuition, and Transportation for Special Education

Service	Placement	Number of Students	Number of Days	Average Daily Tuition	Total Tuition	Average Daily Transport	Total Transport
Multiple Severe	A	0	0	$ 15.00	$ 0		$ 0
Handicaps	B	2	289	46.53	13,447	$ 11.08	3,202
	C	0	0	23.00	0		0
	D	0	0	16.15	0	11.08	0
	E	3	513	5.52	2,832	7.79	3,996
	F	7	1,072	3.94	4,224	4.55	4,878
Totals		12	1,874	10.94	20,502	6.44	12,076
Emotional	A	0	0	20.52	0		0
Disabilities	B	1	30	21.39	642		0
	C	1	120	22.85	2,743		0
	D	0	0	20.52	0		0
	E	1	91	15.15	1,380	11.08	1,008
	F	23	4,838	19.34	95,573	2.87	7,920
	G	3	101	15.52	1,569		0
	H	1	170	16.69	2,837	13.57	2,307
	I	2	113	22.42	2,658		0
	J	1	163	22.74	3,707		0
	K	3	43	37.12	1,596		0
	L	1	38	5.52	210		0
	M	11	2,026	5.52	9,487	4.55	9,218
Totals		48	7,733	15.57	120,401	2.64	20,453
Hearing	A	3	399	17.81	6,331	3.55	1,812
Impairments	B	3	515	27.71	13,473	6.93	3,569
	C	3	525	44.82	23,531	6.93	3,638
Totals		9	1,439	30.11	43,335	6.27	9,019
Visual Impairments	A	1	173	17.71	3,065	3.55	604

Table 3-5 (continued)

Service	Placement	Number of Students	Number of Days	Average Daily Tuition	Total Tuition	Average Daily Transport	Total Transport
Learning	A	1	101	23.47	2,370		0
Disabilities	B	4	680	20.29	13,796	13.57	9,228
	C	1	18	11.44	206		0
	D	1	35	26.00	910	7.79	273
	E	1	2	23.00	46		0
	F	1	36	29.83	1,074		0
	G	1	8	40.50	324		0
	H	1	29	23.00	667		0
Totals		11	909	21.33	19,393	10.45	9,501
Physical	A	1	172	30.26	5,205	7.79	1,340
Disabilities	B	1	85	24.52	2,084		0
	C	5	809	25.76	14,879	6.93	5,606
	D	3	513	8.65	4,437	6.93	3,555
Totals		10	1,579	16.85	26,505	6.65	10,501
Moderate Mental	A	30	5,174	5.52	28,290	7.79	40,305
Retardation	B	25	4,369	3.94	17,212	4.35	19,005
	C	9	1,669	5.56	8,552	4.35	7,260
	D	0	0	5.56	0		0
	E	0	0	5.56	0		0
	F	0	0	5.56	0		0
	G	0	0	5.56	0		0
	H	0	0	5.56	0		0
	I	0	0	5.56	0		0
	J	0	0	5.56	0		0
	K	0	0	5.56	0		0
Totals		64	11,212	5.16	57,851	5.94	66,570
Early	EI bus	(40)	(6,800)	0.00	0	9.97	67,810
Intervention	A	1	20	4.47	89	6.93	138
	B	1	88	15.05	1,325	6.93	610
	C	1	130	4.23	550	6.93	901
	D	1	112	32.98	3,694	6.93	958
	E	4	371	13.65	5,063	8.55	2,571
Totals		8	721	14.87	10,721	9.70	72,988
Total and Averages		164	25,681	11.79	302,676	6.22	201,996

SOURCES: School District expenditure records and Transportation Office records for 1983-84 and Table 3-6.

Table 3-6

Special Education Cost Study (Data From 1983-84)
Special Education Transportation Costs

Trip	Number of Buses	Number of Students	Adjusted Total Cost	Average Costs	Average Pupil Costs
Route A	4	36	$ 47,655	$ 1,324	$ 7.79
Route B	2	27	19,966	739	4.35
Route C	2	26	20,154	775	4.55
Route D	1	12	14,127	1,177	6.93
Route E	1	5	9,418	1,884	11.08
Route F	1	4	9,229	2,307	13.57
Route G	2	40	67,810	1,695	9.97
Totals	13	150	$188,359	$ 1,256	$ 7.39
Route H	0	4	$ 2,416	$ 604	$ 3.55
Route I	(shuttle)	23	11,220	488	2.87
Totals	13	13	$201,996	$ 1,141	$ 6.71

FOOTNOTES:
External transportation for special education in 1983-84 totaled $188,360 and internal shuttles for special education totaled $13,636. Two lift buses were used for four students with physical disabilities at a total cost of $7,924; with average student costs of $1,981 and average daily student costs of $11.65. These latter costs are averaged in with Routes A and D above.

SOURCES:
School District Transportation Office records and State Transportation Survey dated October 15, 1984.

of budget or reimbursement or administrative classifications of students. The methodology permits an examination of costs according to individual student differences, different age/grade levels, different handicapping conditions, and different service areas independent of student classifications. The costing framework of this study permits the examination of average costs per actual student hour of instruction (e.g., costs per student hour spent in adaptive physical education) and allows for individual student variations in the use of this specific service and in the simultaneous use of other instructional services as well. Consequently, data derived from this method give usable management information directly to the local district. If one knows, for example, the average cost per service hour for any type of service and the number of service hours any individual student or group of students utilized over any span of time, the total costs can be estimated for any individual or representative group of students (e.g., by handicapping condition or otherwise).

Table 3-7 illustrates the various forms of cost information that resulted from the 16 service areas defined within this study. (See Tables 3-13 to 3-29 at the end of this chapter for summaries of cost and student data by service area.) Both direct school district costs and other non-budgetary costs to society are accounted for in the analysis and are illustrated in both Tables 3-1 and 3-7. Total costs of special education services to individual students within a district include not only direct program expenditures according to their ingredients or resource components (including fringe benefits to all personnel), but extraordinary transportation costs, tuition to external agencies, state and other reimbursement of costs to external agencies, extra health care necessary to facilitate special education, imputed and annualized costs for facilities and equipment, and other special education administrative costs.

Cost indices were developed for each of the areas of educational service within special education and are identified in Table 3-8. The cost index represents the percentage increase over the expenditure per pupil (per hour, per day or per year) in the school district's regular educational program needed to serve pupils in each of the special education service areas. For example, a cost index of 3.0 indicates that the district is spending three times more per pupil in a special education service area as it spends per pupil in its regular program. Unlike a per pupil expenditure, which tends to be both time- and place-bound, such a cost index has the advantage of permitting comparisons to be made between districts and within a district over time. It is patterned after a similar methodology developed by Rossmiller and his colleagues (1970 and 1974) and employed by many others since (Clemmons, 1974; Price et al., 1982; Snell, 1973; Sorensen, 1973 among others). However, unlike previous studies, the cost indices developed in this study employ different cost bases and allow for variations in actual student use of specific special education services.

Sources of the Data

Information and data on resources employed and their respective costs were collected through examination of school district budget and expenditure records, state and district reimbursement records, state Department of Education printed reports and guidelines, and discussions with key district personnel. Similarly, information and data on students and program service areas were collected through examination of special education program and student records and discussions with key district and program administrators and teachers. All data are from the 1983-84 school year of a large Minnesota suburban school district.

Table 3-7
Special Education Cost Study (Data From 1983-84)
Summary of Cost and Student Data by Service Area

Program Service Area:	Cost Data (1)	(2)	(3)	(4)	(5)	(6)	Student and Service Data (7)	(8)	(9)	S/T Ratio (10)
Autism and Other Multiple Severe Handicaps	$ 80,749	$ 6,729	$40	$10	$10.94	$ 6.44	12	7,808	0.00	0.00
Adapted Physical Education	90,887	2,575	15	72	0.00	0.00	36	1,260	2.00	18.00
Behavior Management/Secondary (for students with emotional disabilities)	539,515	11,011	65	13	15.57	2.64	49	42,108	4.00	12.25
General Learning Disability (for students with mild mental retardation) (1-6)	190,843	5,022	30	14	0.00	0.00	38	13,300	5.00	7.60
General Learning Disability (for students with mild mental retardation) (7-12)	148,313	2,282	13	7	0.00	0.00	65	22,750	3.50	18.57
Hearing Impairments	160,733	10,716	63	23	17.71	3.55	15	6,876	0.00	0.00
Visual Impairments	16,262	2,323	14	13	30.11	6.27	7	1,211	0.00	0.00
Learning Disabilities (for students with mild mental retardation) (1-6)	740,462	1,959	12	14	0.00	0.00	378	49,612	19.00	19.89
Learning Disabilities (for students with mild mental retardation) (7-12)	630,044	1,816	11	13	21.33	10.45	347	45,544	14.35	24.18
Occupational Therapy	57,277	1,636	10	94	0.00	0.00	35	612	2.00	17.50
Speech Impairments (1-6)	228,479	1,011	6	48	0.00	0.00	226	4,746	7.00	32.29
Speech Impairments (7-12)	96,905	1,227	7	58	0.00	0.00	79	1,659	3.00	26.33

Table 3-7 (continued)

	Cost Data						Student and Service Data			S/T Ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Physical Handicaps	132.997	3,694	22	12	6.65	6.65	36	10,779	0.00	0.00
Psychological Services	213,512	788	5	79	6.93	6.93	271	2,700	5.20	52.12
Moderate Mental Retardation	264,028	4,125	24	6	5.94	5.94	64	46,750	0.00	0.00
Totals and Averages:	3,591,006	2,166	13	14	11.69	5.17	1,658	257,715	65.05	25.49
Unduplicated Pupil Count:	3,591,006	3,359	20	14	11.69	5.17	1,069	257,715	65.05	16.43
Early Intervention	351,134	8,778	52	17	14.87	9.70	40	20,507	4.50	8.89
Totals and Averages:	3,942,140	2,322	14	14	11.79	6.22	1,698	278,222	69.55	24.41
Unduplicated Pupil Count:	3,942,140	3,555	21	14	11.79	6.22	1,109	278,222	69.55	15.95
Regular Instruction:	$ 39,886,370	$ 3,418	$20	$ 5	---	$ 1.24	11,669	8,272,154	529.15	22.05
Special Education (Net District Cost)	2,048,316	1,206	7	7	11.79	6.22	1,698	278,222	69.55	24.41
Unduplicated Pupil Count:	2,048,316	1,847	11	7	11.79	6.22	1,109	278,222	69.55	15.95

(1) Total Program Costs Per Year
(2) Average Costs Per Student Per Year
(3) Average Costs Per Student Per Day (with 170-Day Year)
(4) Average Costs Per Actual Student Hour of Instruction
(5) Average Daily Tuition Per Student for Students Served by External Agencies
(6) Average Daily Transporation Costs Per Student
(7) Number of Students Served Per Year
(8) Student HOurs of Service Per Year (including both external and internal instruction)
(9) FTE Licensed Teachers in Program Service Area (not including special school)
(10) Ratio of Students to Teachers

FOOTNOTES: The above summary of costs includes all expenditures and social costs, except where "net reimbursements" are noted. Total costs include $654,263 in "state reimbursement and other" nontuition reimbursed costs to external agencies. They also include $141,867 in "imputed costs" for facilities within the school district; $201,996 for transportstion; $302,676 for tuition; $465,045 for fringe benefits; $66,674 for special education administration; and $29,424 for extra health care for students in special education. The Net District Cost data noted in the bottom two lines adjust for state and federal aid to the district wherein 1983-84 such aid totaled $1,531,785 (state reimbursement to special school in the amount of $327,244 is not included in this total) and for reimbursement aid to external agencies which in 1983-84 totaled $624,263. It also adjusts for the special tax levy to the multi-district cooperative special education unit of $292,224 as noted in Table 3-9. The Unduplicated Pupil Count in the totals above is an adjustment for the fact that some students were given service by more than one service area. Without this adjustment average costs per student for the total of special education would be understated when "service area counts" are used as

Table 3-8

Special Education Cost Study (Data From 1983-84)
Cost Data and Indices by Services Area in District Special Education

Program Services Area:	Cost Data (1)	(2)	(3)	(4)	Cost Indices (5)	(6)
Autism and Other Multiple Severe Handicaps	$6,729	$40	$ 10	1.97	2.73	2.00
Adapted Phyeical Education	3,635	21	104	1.06	---	20.80
Behavior Management/Secondary	11,011	65	13	3.22	2.83	2.60
Emotional Disabilities	5,022	30	14	1.47	1.87	2.80
General Learning Disabilities (for students with mild mental retardation) (1-6)	2,282	13	7	.67	1.87	1.40
General Learning Disabilities (for students with mild mental retardation) (7-12)	10,716	63	23	3.14	2.99	4.60
Hearing Impairments	2,323	14	13	.68	2.97	2.60
Visual Impairments	1,959	12	14	.57	2.16	2.80
Learning Disabilities (for students with mild mental retardation) (1-6)	1,816	11	13	.53	2.16	2.60
Learning Disabilities (for students with mild mental retardation) (7-12)	1,636	10	94	.48	---	18.80
Occupational Therapy	1,011	6	48	.30	1.18	9.60
Speech Impairments (1-6)	1,227	7	58	.36	1.18	11.60
Speech Impairments (7-12)	3,694	22	12	1.08	3.64	2.40
Physical Handicaps	788	5	79	.23	---	15.80
Psychological Services	4,125	24	6	1.21	2.10	1.20
Moderate Mental Retardation	2,180	13	14	.64	---	2.80
Totals and Averages	3,359	20	14	.98	---	2.80
Unduplicated Pupil Count	8,778	52	17	2.57	---	3.40
Early Intervention	2,337	14	14	.68	2.00	2.80
Totals and Averages	3,555	21	14	1.04	---	2.80
Unduplicated Pupil Count						
Regular Instruction:	3,418	20	5	1.00	1.00	1.00

Note:
(1) Average Costs Per Student Per Year
(2) Average Costs Per Student Per Day
(3) Average Costs Per Actual Student Hour of Instruction
(4) Ratio of Special Education Costs (column 1) to Regular Instruction Per Student Per Year
(5) Ratio of Special Education Costs to Regular Instruction Per Student Per Year From 1970
(6) Ratio of Special Education Costs (column 3) to Regular Instruction Per Hours of Instruction
Sources:
Adapted from Table 3-7, "Summary of Cost Data by Service Area: 1983-1984" and for column (5), from Rossmiller (1970).

Results of the Study

As expected, average costs varied greatly across special education service areas. This finding was consistent across all the cost indices, including average costs per student per year, per day or per student hour of service. As illustrated in Table 3-7, such costs can vary by factors of 10 times or more depending upon a number of program characteristics, including the numbers of students being served, the duration of their service, and the type and intensity of their service. Consequently, it is important to note that simple comparisons of average costs per student per year across service areas, as employed in some past studies (e.g., Rossmiller, 1970) give an incomplete picture as to instructional costs or efficiency.

In assessing program costs, it is important to know something about the duration and intensity of service. For example, while the service area for students with emotional disabilities in this study has the highest average costs per student per year (see Table 3-7), when viewed in terms of average costs per student hour of service its costs become less than many other special education service areas in the district. On the other hand, while the occupational therapy and psychological services areas are among the lowest cost areas when viewed in terms of average costs per student served per year, they are among the highest when viewed in terms of average costs per student hour of service.

Use of average costs per actual hours of instruction provides important information across service areas for evaluating basic issues of program efficiency and resource usage. In addition, the cost profiles change in major ways when compared with those observed only for costs per student per year. For example, the ratio of special education costs to regular instruction increases, on average, from only a factor of .68 to a factor of almost 3 -- i.e., the cost of an additional hour of special education increases, on average, to almost three times the cost of regular instruction. Such normalized marginal costs of instruction are masked when only average costs per year and per day are reviewed. The cost data and indices by service area in special education in Table 3-8 clearly illustrate this proposition. Note that the rank order and magnitude of costs change in profound ways when costs are viewed in more standardized units of instructional time (i.e., in hourly units of service or instruction).

It is also important to note that mode of delivering the service has a major influence on unit costs. In Table 3-7, for example, we note that the four highest cost areas per hour of instruction (column 4) are adapted physical education, occupational therapy, clinical speech and psychological services. A major contributing factor to these high unit costs is the fact that these are the four service areas in special education where teachers are employed as "itinerants" in the delivery of services across as many as 13 different buildings in the district. Staff hours for instructional service are obviously limited by their hours of travel and set-up time necessary to move around the district. In other service areas, such as the secondary behavior management program for students with emotional disabilities and psychological services, the nature of the services provided are difficult to measure in per pupil instructional hour terms. In such cases many hours of staff effort are devoted to test review and other forms of diagnostic effort outside the context of instructional time and consequently are not directly measured in instructional hour terms.

In all of these types of cases, it would be inappropriate to make direct comparisons across different special education service areas within a single district at a given point in time (as in the case and setting of this study) solely for purposes of cost

containment. Comparisons of instructional efficiency can be made for purposes of cost containment, but only in the context of comparing similar programs or service areas across districts or across time. The cost indices developed in this study do allow for such longitudinal analyses and cross-sectional comparisons of districts or other administrative units. The data and analyses in this study allow for establishing both a basis for future comparisons and for examining other more immediate policy and administrative concerns.

Another issue of interest is the assessment of costs within a broader social context. For example, it is important to note that the total public costs to society of providing special education in this school district are almost two times the amount normally identified as special education programs in the printed budget available to the school board and community--i.e., $3.9 million versus $2.2 million as noted in Table 3-9 for the district under study. [This study examines only public social costs and does not address the private costs that individual students and their families undoubtedly incur for books, extra transportation and health care, foregone incomes and the like as they pursue special education for themselves and their children.] Similarly, total costs to the school district (before adjusting for State or Federal reimbursements to the district) are over one and one-half times the amounts normally identified in the printed budget--i.e., $3.6 million versus $2.2 million as noted in Table 3-9. After adjusting for State and Federal reimbursements to the district, net real costs to the school district are still almost 91% of the printed program budget--i.e., $2.0 million versus $2.2 million, as noted in Table 3-9.

Equally important to note is the fact that the current publicly acknowledged State reimbursement rate of approximately 70% for "special education personnel expenditures" misrepresents the real reimbursement rate for special education costs to this school district. [Although the current State reimbursement rate is only 50% for materials and equipment and 55% for external agency contracts for service, these items total less than 1% percent of the entire costs of special education to this district, as noted in Table 3-10.] The actual reimbursement rate as identified in Table 3-9 is approximately 43% of all special education school district costs--i.e., $1.5 million in State/Federal reimbursements against total district costs of $3.6 million. (See Tables 3-11 and 3-12 for additional information on district budgets and expenditures). When one of the special education external service agencies (i.e., the Special School) was examined as a separate external agency in this study, similar results were found wherein the effective reimbursement rate was only 44 percent of costs--i.e., $327,244 in State reimbursements against total service agency costs of $738,633 as noted in Table 3-29 at the end of this chapter.

It is necessary to make a number of adjustments in the data in order to determine the real incidence of costs upon an individual school district. First, special education cost data must be added to the costs of regular instruction. This is necessary because almost all the students in special education programs in this district in 1983-84 were being "mainstreamed" and special education costs were in addition to regular instruction costs. [Some have argued that costs for regular instruction were "saved" when students are placed for long-term service with external agencies. However, as a practical matter such costs for regular instruction are "fixed" (at least in the short-term of a year) to the local district in the form of staff and space and must be available to the student upon return. Only in long-term and in viewing the student as having left the district could such regular instructional resources and financial costs be considered "saved."] Second, all State, Federal and other reimbursements to both the district and the external

Table 3-9

Special Education Cost Study (Data From 1983-84)
Reconciliation of Special Education Expenditures with Budget

Printed Special Education Program Budgets in School District Records:	$2,180,304	
Subtotal:		$2,180,304
Expenditure Adjustments to Printed Budget:		
Transition Costs	$ 201,996	
Tuition to External Agencies	302,676	
Imputed Costs of Facilities:	141,867	
Fringe Benefit Costs for Personnel:	465,045	
Special Education Administration Costs:	66,674	
Extra Health Care for Students:	29,424	
State and Other Reimbursement Costs to Special Education External Agencies:	654,263	
Expenditure Adjustments to Program Areas:	(100,109)	
Subtotal:		1,761,836
Total Public Costs of Special Education in District:		3,942,140
Adjustments to Costs for Payments from Outside District:		
Net State/Federal Reimbursement to District:	(1,531,785)	
State/Other Reimbursements to External Agencies:	(654,263)	
Subtotal:		(2,186,048)
Adjustments to Costs for Payments from Special Tax Levy:		
In-District Tax Levy for Cooperative District:	292,224	
Subtotal:		292,224
Net Costs of Special Education to School District:		2,048,316
Plus State/Federal Reimbursements to District:		1,531,785
Gross Costs of Special Education to School District:		3,580,101

Notes: The above summary of costs includes all district and public/social costs, except where reimbursements are noted. External aid and reimbursement to this school district in 1983-84 totaled $1,859,029 for special education (State special aids totaled $1,635,738) Federal aid totaled $209,880; Federal preschool aid totaled $5,850; and State residential aid totaled $7,561). State reimbursement for the Special School was $327,244 and was deducted from these totals. "Expenditure Adjustments to Program Services Areas" represents allocation of special education budgets for regular instruction (e.g., psychological services, administration, and other). The in-district special tax levy for the multi-district cooperative special education services unit was .6 million and totaled $292,224 in 1983-84. In the algorithmic computations for each of the program areas these taxes were accounted for and assumed to be a part of the support for "State Reimbursements and Other Costs to External Agencies."

Table 3-10

Special Education Cost Study (Data From 1983-84)
Reconciliation of Special Education Expenditures by Function

PERSONNEL:		
Instructional Staff:	$2,395,028	(60%)
Administration/Supervisory/ Clerical/Other:	161,888	(4%)
Health Care:	29,424	(1%)
Total:	$2,586,340	(65%)
FACILITIES:	$ 141,867	
Total:	$ 141,867	(1%)
EQUIPMENT AND MATERIALS:	$ 43,523	
	$ 43,523	(1%)
OTHER:		
Tuition:	$ 302,676	(8%)
Transportation:	201,996	(5%)
Costs to External Agencies:	654,263	(17%)
Other:	11,475	(---)
Total:	$1,170,410	(30%)
TOTAL EXPENDITURES FOR SPECIAL EDUCATION:	$3,942,140	(100%)

Table 3-11

Special Education Cost Study (Data From 1983-84)
List of Budgets in School District Records

Education/Nonpublic	$ 73,366
Psychological Services	145,722
Early Intervention	149,936
Orthopedic Handicaps	39,169
Visual Impairments	874
Hearing Impairments	589
Speech and Language Impairments	212,016
Moderate Mental Retardation	3,852
General Learning Disabilities	218,071
Learning Disabilities	938,892
Emotional Disabilities	70,424
P.L. 94-142	309,297
Dial Screening	11,475
Preschool Incentive Grant	6,621
Total:	$2,180,304

Note: Each of the above budget items have "programmatic and budget status" in the annual school district budget records.

Table 3-12

Special Education Cost Study (Data From 1983-84)
Expenditures for School District

Expenditure Item	Total	Per Unit
Total District Expenditures	$36,862,290	
(Pupil Units with Weighted ADM 13,770)		$ 2,677
(Pupil Units with Resident ADM 11,669)		3,159
Capital Outlay, Building Construction, Debt Service	(3,511,350)	
(Pupil Units with Weighted ADM 13,770)		255
(Pupil Units with Resident ADM 11,669)		301
Total District Expenditures Less Capital and Debt Service	33,350,940	
(Pupil Units with Weighted ADM 13,770)		2,422
(Pupil Units with Resident ADM 11,669)		2,858
Total District "Imputed" Facilities/Content Costs	9,823,232	
(Pupil Units with Weighted ADM 13,770)		713
(Pupil Units with Resident ADM 11,669)		842
Total District Expenditures with "Imputed" Facilities Costs	43,174,172	
(Pupil Units with Weighted ADM 13,770)		3,135
(Pupil Units with Resident ADM 11,669)		3,700
Total District Expenditures for Special Education (Net of Reimbursements to External Agencies, i.e., $3,942,140 minus $654,263)	(3,287,877)	
Total District Expenditures minus Special Education	39,886,295	
(Pupil Units with Weighted ADM 13,770		2,897
(Pupil Units with Resident ADM 11,669)		3,418

FOOTNOTE: Because all special education average cost data per pupil are computed on the basis of headcounts, the comparable average per pupil unit for regular instruction cost is "Residential ADM."

SOURCES: Minnesota Department of Education, "School District Profiles 1983-84;" and Printed and Amended School District Budgets as submitted to the School Board, April 1984. Facilities Costs were imputed from district records indicating 1983-84 insurable replacement value per square foot to be $45.35 for buildings and $8.36 for contents. These costs were assigned to the available 1,598,118 total square feet in the district and then annualized at 10% over 30 and 10 years respectively. These estimates are consistent with the Minnesota Department of Education, "Guide for Planning of School Buildings and Sites for Minnesota" for 1983-84.

agencies need to be deducted from the district cost data. As noted in Table 3-9, such reimbursements totaled $2,186,048 for the district. Third, taxes paid by school district residents for a special public levy for a cooperative multi district special education unit need to be added back to district cost data. In the district under study such special taxes were $292,224 in 1983-84 and were assumed to be included in the original cost data for "State and Other Reimbursements to External Agencies" as identified in Table 3-9. When all three adjustments are made as in Tables 3-7 and 3-9, we note that net resource costs to the district taxpayers for special education totals $2,048,316. Consequently, the average per student in-district net costs become $31 per day (i.e., regular instruction costs of $20 plus special education costs of $11). With public costs for student services in special education in this district totaling $3,942,140 (Tables 3-7 and 3-9), we note that the net costs to this district total only $2,048,316 or 51%. State, Federal and other reimbursements represent $1,893,824 ($2,186,048 minus the tax levy of $292,224) or approximately 49% of the original figures. Almost one-half of the total financial burden of special education in this district is carried by agencies and sources outside the local district.

The results from this study indicate that significant cost savings to the school district can be achieved when special education is secured from an external agency. External agencies are defined as those organizations outside of an individual's immediate school district boundaries or direct administrative jurisdiction. They may represent particular public or private agencies or special cooperative multi-district units for providing services. Both types of external agencies are represented in this study and are identified in Table 3-5. Tuition receipts plus State reimbursements typically do not cover all costs to external agencies when they provide special education services. Costs to society are not reduced, only the incidence of costs is transferred from the district to the external agency. In short, most tuition rates being charged by external agencies for special education are real "bargains" to local school districts. This analysis of costs, of course, makes no assumptions about the educational need or effectiveness of such alternative service options.

When viewed at the margin (as in individual cases), in all but three service areas the average daily tuition rates charged by external agencies, as identified in Table 3-7 (even when added to their concurrent transportation costs), were less than the average daily district costs in this study. Instructional tuition rates to external agencies averaged almost $12 a day (with an extraordinary daily rate range of $3.94 to $46.53 as identified in Table 3-7), transportation costs averaged approximately $6 a day (with a range from $2.87 to $13.57 as noted in Table 3-5), while average daily in-district costs based on an unduplicated student count (before reimbursements) were $21 (with a range from $5 to $65).

When special education costs are converted into hourly rates of actual instruction (as in column 4 in Table 3-7), the cost differences between in-district and external agency services become even more apparent, even after adjustments for transportation, tuition and reimbursements. Net District Costs per average student hour of instruction in special education within the district averaged over $7 (with regular instruction added at $5 per hour, the in-district hourly averages exceeded $12), while district hourly rates for external service agencies (which included both transportation and tuition costs) averaged only $4.32.

Consequently, whenever this school district or any other external service agency is contemplating serving students in special education outside of normal statutory

boundaries/constituency, as a policy matter they generally must be prepared to either (a) absorb the additional costs, or (b) seek additional outside assistance in the form of greater State reimbursement or other external private or public resources, or (c) elect not to undertake the additional responsibilities of service. [Obviously, such economic budgetary considerations must be combined with essential programmatic concerns of service availability, appropriateness and quality in evaluating alternative means of providing services.]

Recent criticism has been directed at Federal special education legislation for reimbursing local districts on the basis of the number of students with handicapping conditions identified as needing specialized services. The argument is that such formulas create an incentive to identify too many students. The results of this study, however, show that no such incentive is likely to exist. Only a small portion of total local district costs for special education are covered by Federal student count reimbursements. As noted in the footnotes to Table 3-9, only 9% of total special education expenditures within the district are covered by Federal student count reimbursements. It is quite unlikely that this modest fiscal incentive could, by itself, increase the identification and placement of students within special education. On the contrary, cost data in Table 3-7 indicate that the district will incur, on average, over $1800 in additional costs to the local school district for each student identified as in need of such services.

Transportation costs within special education have always been recognized as a necessary component for the delivery of such educational services; however, the magnitude of such costs has not always been appreciated. For example, it is important to note that in almost every case of special education service by an external agency in this study, there were significant concurrent transportation costs to the district beyond just tuition charges. Although daily transportation costs for students in special education being served by external agencies averaged only $6, as compared to average daily tuition rates of $12, in almost half of the individual student cases daily transportation costs exceeded or almost equaled the average daily tuition rate being charged by the external agencies to which the student was being transported (see Table 3-5). In this study, transportation costs represented almost one-half of all costs to the district in sending students out to external agencies. Consequently, it is very important to include such transportation costs with external tuition rates when making judgments about such services.

Contrary to conventional wisdom, the average salaries of teachers in special education within the district under study were less than those of regular teachers by over 11%--i.e., $25,335 versus $28,500 (see Table 3-3). It is typically assumed that because teachers in special education necessarily must have additional training and licensure in their respective service areas (generally after initial certification as regular teachers), and with salary schedules closely aligned with such training and experience, the average salaries in special education will necessarily exceed those of regular teachers. Consequently, it often is assumed that the average cost of instructional staff in special education will inherently always be more expensive than regular instruction. This case study indicates that these assumptions and results are not necessarily always true. The teaching staff of regular classes in this school district apparently also had considerable advanced training and experience and/or the special education personnel in this district were, on average, younger than the staff of regular instruction.

In the period of time before "mainstreaming," a number of early special education cost studies (Clemmons, 1974; Rossmiller, 1970, 1974; Snell, 1973; Sorensen, 1973)

attempted to profile average district-wide costs by special education categories. However, as noted previously, important differences exist between these earlier studies and the design of this study. One of the most important differences is the fact that costs in the earlier studies were under-estimated when compared with the estimates obtained in this study. Costs in the earlier studies were under-estimated by the exclusion of (a) external service agency costs, (b) a number of service areas, and (c) all regular instructional costs. Total costs in the earlier studies were also under-estimated by the fact that they drew their cost data only from printed budgets.

Nevertheless, in spite of these major cost exclusions, special education costs in the late 1960s and early 1970s (Rossmiller, 1970, 1974), with less policy emphasis on mainstreaming and with presumably less service to students with severe handicaps, were significantly greater than those in this study today. With only two exceptions, when all regular instructional costs were similarly excluded from the current study data, all other comparable special education service/program areas had cost indices (ratios of special education costs to costs of regular instruction per pupil) significantly below those of similar service/program areas identified in the earlier studies. These ratios, in comparison to those in the earlier study, ranged from less than one-fourth in services to students with learning disabilities to a high of only one-half for students with moderate degrees of retardation. The two exceptions (for students with emotional disabilities or hearing impairments) were in areas in which special education was provided primarily by external service agencies in both studies. These results give considerable credence to the proposition that "mainstreaming," independent of its educational and social value, does result in significant cost-savings in both direct budgeted special education costs and in total costs to the district. [This, of course, assumes that the district does not reduce the class size of their regular instructional offerings in order to accommodate any extra-ordinary needs or attention to "mainstreamed" students with handicapping conditions.] Even if one were to add the entire average per pupil costs of regular instruction to those of special education, wherein the current costs of special education would double on average (see Table 3-7), special education still appears to cost less today than in 1970. Mainstreaming is apparently not only more effective education (Meisel, 1986; Reynolds & Birch, 1982), but it also may be more efficient education as well. On the other hand, it is also possible that as a result of the new legislation during the past decade, which required that special education services be extended to larger numbers of students, especially in the area of the "learning disabilities," economics of scale may be taking place. Service area groups have become larger and this may account for some of the reduced per pupil costs.

Summary of the Results

In this paper we have focused on the development of a resource components cost model and on the use of this model for local planning, policy and decision-making in special education. In the context of this model and data collected from a local school district case study, it was found that (1) any systematic examination of instructional costs in special education must allow for variations in student use of such services; (2) school district budgets in special education materially understate the real costs of special education to both the district and society; (3) representations of current State reimbursement rates and contributions to special education costs are materially overstated and misrepresent the real reimbursement rate to a local school district; (4) cost savings to a school district are frequently gained when special education services are received from external agencies; (5) some costs in the delivery of special education services are often over-estimated (e.g., teacher salaries) while other costs are often under-estimated

(e.g., transportation, fringe benefits, and the use of facilities); and (6) unit costs for special education services in the 1980s appear to be less than those reported in studies approximately 15 years ago.

The decade of the 1980s has produced considerable concern over the costs of services in special education. Discussion of cost issues, however, can never be considered independently from matters of values, appropriateness, and effectiveness. The issues involved in managing special education are often inherently complex. To reduce costs of transporting students, for example, a district might need to increase the transportation costs of itinerant teaching personnel as the student placements become more decentralized. Cost issues, moreover, often become secondary issues in relationship to policy directives or important social values. In this district, for example, efforts have been undertaken to increase the social and academic integration of learners with severe disabilities in normal school environments. These initiatives will alter many of the costs and cost relationships developed throughout this study. The central thesis of this report is not that cost data should direct policy decisions. Rather, it is being argued that such data can become a powerful tool in planning programs, evaluating services, and in considering alternative actions to increase the efficiency, appropriateness and effectiveness of services. These data become most useful in management and policy decisions when considered in the context of important values and concepts for providing special education services to students with disabilities.

Table 3-13

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Autism and Other Multiple Severe Disabilities

Number of Students Per Year: [12]
Average In-District Minutes Per Week [0]
Total Minutes Per Week: 0
Hours of Service Per Year: 0
One-Quarter Hours Per Year: 0

Annual Cost	Ingredient
	PERSONNEL
$ 0	[0.00] FTE licensed teachers with fringe benefits
0	[0.00] FTE nonlicensed aides at average of four hours per day
0	[0.00] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
314	[.01] FTE supervisor with fringe benefits
[0]	professional technical services
[0]	program administration
[0]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
0	classroom space (total classrooms: [0.00])
0	office space (includes program administration proration) (total office space: [0.00])
0	classroom/office furnishings
0	maintenance/utilities/insurance (square foot space: 0)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[19]	94-142 supplies et al. allocations
[0]	travel
[0]	general and instructional supplies/tests
	OTHER
[20,502]	student tuition for outside agencies: student membership days: [1,874]
47,838	state reimbursement and other costs to external agencies
[12,076]	transportation costs
[0]	other educational costs
[80,749]	total program costs per year
[6,729]	average costs per student per year
[40]	average costs per student per day with 170-day year
[10]	average costs per actual student hour of instruction*

FOOTNOTE: *Includes seven students with autism and five with severe multiple disabilities all served by external agencies. Estimated hours of instruction by external agencies: 7,808. [Although three of the 12 students were in junior or senior high school, services for those with multiple severe disabilities in time and resources allocated per student from the external agencies were approximately the same as for elementary students.]

Table 3-14

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Adapted Physical Education (APE)

Number of Students Per Year: [36]
Average In-District Minutes Per Week: [60]
Total Minutes Per Week: 2,160
Hours of Service Per Year: 1,260
One-Quarter Hours Per Year: 5,040

Annual Cost	Ingredient
	PERSONNEL
$ 73,223	[2.00] FTE licensed teachers with fringe benefits
6,327	[1.00] FTE nonlicensed aides at average of five hours per day
222	[.01] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
2,728	[.01] FTE supervisor with fringe benefits
[0]	professional technical services
[2,034]	program administration
[2,942]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
1,182	classroom space (total classrooms: [.33])
84	office space (includes program administration proration) (total office space: [.07]
113	classroom/office furnishings
588	maintenance/utilities/insurance (square foot space: 265)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[344]	94-142 supplies et al. allocations
[1,100]	travel
[0]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies
[0]	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other external agency educational costs
[90,887]	total program costs per year
[2,525]	average costs per student per year
[15]	average costs per student per day with 170-day year
[72]	average costs per actual student hour of instruction*

FOOTNOTE: *There were no students in APE served by external agencies. [Although 10 of the 36 students were in junior high or senior high school, APE services in time and resources allocated per student from the two APE teachers were approximately the same as for elementary students.]

Table 3-15

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Emotional Disabilities/Secondary

Number of Students Per Year: [49]
Average In-District Minutes Per Week: [345]
Total Minutes Per Week: 16,905
Hours of Service Per Year: 9,861
One-Quarter Hours Per Year: 39,445

Annual Cost	Ingredient
	PERSONNEL
$ 107,788	[4.00] FTE licensed teachers with fringe benefits
30,482	[5.00] FTE nonlicensed aides at average 4-6 hours per day with fringe benefits
378	[.01] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
[4,068]	program administration
[1,177]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
14,324	classroom space (total classrooms: [4.00])
143	office space (includes program administration proration) (total office space: [.12])
1,310	classroom/office furnishings
6,727	maintenance/utilities/insurance (square foot space: 3,030)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[586]	94-142 supplies et al. allocations (% of $9,300)
[0]	travel
[2,727]	general and instructional supplies/tests
	OTHER
[93,573]	student tuition for special school; average daily tuition: $19.34 (34% costs); student membership days: 4,838; student head count served: 23.
[166,352]	state reimbursement and other costs to special school
[62,599]	state reimbursement and other costs to other external agencies
[20,453]	transportation costs
[0]	other external agency educational costs
[539,515]	total program costs per year
[11,011]	average costs per student per year
[65]	average costs per student per day with 170-day year
[13]	average costs per actual student hour of instruction*

FOOTNOTE: *Includes 23 students served at special school and 25 other students served by other external agencies. Estimated hours of instruction by all external agencies, including special school: 32,247. [All of the above students were in junior or senior high school.]

Table 3-16

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Mild Mental Retardation
Students in Grades 1-6

Number of Students Per Year: [38]
Average In-District Minutes Per Year: [600]
Total Minutes Per Week: 22,800
Hours of Service Per Year: 13,300
One-Quarter Hours Per Year: 53,200

Annual Cost	Ingredient
	PERSONNEL
$ 144,512	[5.00] FTE licensed teachers with fringe benefits
23,384	[5.00] FTE nonlicensed aides at average 4-6 hours per day with fringe benefits
437	[.02] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
4,620	[.25] FTE supervisor with fringe benefits
[0]	professional technical services
[5,381]	program administration
[1,629]	extra healthcare in pupil support services
[589]	other personnel costs
	FACILITIES
5,372	classroom space (total classrooms: [1.50])
119	office space (includes program administration proration) (total office space: [.10])
488	classroom/office furnishings
2,553	maintenance/utilities/insurance (square foot space: 1,150)
	EQUIPMENT AND MATERIALS
[31]	printing and publishing
[470]	64-142 supplies et al. allocations (% of $9,300)
[140]	travel
[1,097]	general and instructional supplies/texts
	OTHER
[0]	student tuition for outside agencies
[0]	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[190,842]	total program costs per year
[5,022]	average costs per student per year
[30]	average costs per student per day with 170-day year
[14]	average costs per actual student hour of instruction*

FOOTNOTE: *There were services for students with mild mental retardation provided by external agencies. [65 of the 103 students with mild mental retardation were in junior or senior high school; 3.5 of the FTE teachers and four of the nine part-time aides were employed in the 7-12 program.]

Table 3-17

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Mild Mental Retardation
[Students in Grades 7-12]

Number of Students Per Year: [65]
Average In-District Minutes Per Week: [600]
Total Minutes Per Week: 39,000
Hours of Service Per Year: 22,750
One-Quarter Hours Per Year: 91,000

Annual Cost	Ingredient
	PERSONNEL
$ 101,256	[3.50] FTE licensed teachers with fringe benefits
1[illegible]73	[4.00] FTE nonlicensed aides at average of four hours per day with fringe benefits
365	[.01] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
3,238	[.25] FTE supervisor with fringe benefits
[0]	professional technical services
[3,771]	program administration
[2,785]	extra healthcare in pupil support services
[1,006]	other personnel costs
	FACILITIES
8,952	classroom space (total classrooms: [2.50])
203	office space (includes program administration proration) (total office space: [.17])
834	classroom/office furnishings
4,257	maintenance/utilities/insurance (square foot space: 1,918)
	EQUIPMENT AND MATERIALS
[52]	printing and publishing
[804]	94-142 supplies et al allocations
[240]	travel
[1,877]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies
0	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[148,313]	total program costs per year
[2,282]	average costs per student per year
[13]	average costs per student per day with 170-day year
[7]	average costs per actual student hour of instruction*

FOOTNOTE: *There were no services for students with mild mental retardation provided by external agencies. [65 of the 103 students with mild mental retardation were in junior or senior high school; 3.5 of the 8.5 FTE teachers and four of the nine part-time aides were employed in the 7-12 EMR program.]

Table 3-18

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Hearing Impairments

Number of Students Per Year: [15]
Average In-District Minutes Per Week: [100]
Total Minutes Per Week: 1,500
Hours of Service Per Year: 875
One-Quarter Hours Per Year: 3,500

Annual Cost	Ingredient
	PERSONNEL
$ 0	[0.00] FTE licensed teachers with fringe benefits
0	[0.00] FTE nonlicensed aides
12	[0.00] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
389	[.01] FTE supervisor with fringe benefits
[3,430]	professional technical services
[0]	program administration
[2,942]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
0	classroom space (total classrooms: [0.00])
0	office space (includes program administration proration) (total office space: [0.00])
0	classroom/office furnishings
0	maintenance/utilities/insurance (square foot space: 0)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[19]	94-142 supplies et al. allocations
[0]	travel
[472]	general and instructional supplies/tests
	OTHER
[43,335]	student tuition for outside agencies: student membership days: [1,439]
101,115	state reimbursement and other costs to external agencies
[9,019]	transportation costs
[0]	other educational costs
[160,733]	total program costs per year
[10,716]	average costs per student per year
[63]	average costs per student per day with 170-day year
[23]	average costs per actual student hour of instruction*

FOOTNOTE: *Included are three students at Faribault and six other students served by other external agencies. Estimated hours of instruction by external agencies: 6,001. [Although eight of the 15 students were in junior or senior high school, services for students with hearing impairments in time and resources allocated per student from mainly external agencies were approximately the same as for elementary students.]

Table 3-19

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Visual Impairments

Number of Students Per Year: [7]
Average In-District Minutes Per Week: [120]
Total Minutes Per Week: 840
Hours of Service Per Year: 490
One-Quarter Hours Per Year: 1,960

Annual Cost	Ingredient
	PERSONNEL
$ 0	[0.00] FTE licensed teachers with fringe benefits
1,221	[1.00] FTE nonlicensed aides, all at average of five hours per day with fringe benefits
480	[0.00] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
389	[.01] FTE supervisor with fringe benefits
[0]	professional technical services
[0]	program administration
[2,942]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
0	classroom space (total classrooms: [0.00]
0	office space (includes program administration proration) (total office space: [0.00]
0	classroom/office furnishings
0	maintenance/utilities/insurance (square foot space: 0)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[9]	94-142 supplies et al. allocations
[0]	travel
[400]	general and instructional supplies/texts
	OTHER
[3,065]	student tuition for outside agencies: student membership days: [173]; [external agencies: Faribault: $3,065]
7,152	state reimbursement and other costs to external agencies
[604]	transportation costs
[0]	other educational costs
[16,272]	total program costs per year
[2,323]	average costs per student per year
[14]	average costs per student per day with 170-day year
[13]	average costs per actual student hour of instruction*

FOOTNOTE: *Included is one student at Faribault. Estimated hours of instruction by external agencies: 721. [Although two of the seven students were in junior or senior high school, services for students with visual impairments in time and resources allocated per student were approximately the same as for elementary students.]

Table 3-20

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Learning Disabilities
[Students in Grade 1-6]

Number of Students Per Year: [378]
Average In-District Minutes Per Week: [225]
Total Minutes Per Week: 85,050
Hours of Service Per Year: 49,612
One-Quarter Hours Per Year: 198,450

Annual Cost	Ingredient
	PERSONNEL
$ 613,585	[19.00] FTE licensed teachers with fringe benefits
40,548	[8.00] FTE nonlicensed aides, all with average of four hours per day with fringe benefits
1,785	[.05] FTE licensed substitute teachers/extended time
9,125	[.57] FTE secretarial/clerical with fringe benefits
8,959	[.28] FTE supervisor with fringe benefits
[0]	professional technical services
[19,336]	program administration
[1,380]	extra healthcare in pupil support services
[12,324]	other personnel costs
	FACILITIES
14,926	classroom space (total classrooms: [4.20])
1,262	office space (includes program administration proration) (total office space: [1.06]
1,451	classroom/office furnishings
7,582	maintenance/utilities/insurance (square foot space: 3,415)
	EQUIPMENT AND MATERIALS
[354]	printing and publishing
[2,529]	94-142 supplies et al. allocations
[875]	travel
[4,441]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies: student membership days: [0]
0	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[16,262]	total program costs per year
[2,323]	average costs per student per year
[14]	average costs per student per day with 170-day year
[13]	average costs per actual student hour of instruction*

FOOTNOTE: *Included are 11 students served by external agencies. Estimated hours of instruction by external agencies: 3,791. [347 of the 725 students with learning disabilities were in junior or senior high school; 14.35 of the 33.35 FTE teachers and four of the 12 part-time aides were employed in the program for grades 7-12.]

Table 3-21

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Learning Disabilities
[Students in Grades 7-12]

Number of Students Per Year: [347]
Average In-District Minutes Per Week: [225]
Total Minutes Per Week: 78,075
Hours Per Week: 1,301
Hours of Service Per Year: 45,544
One-Quarter Hours Per Year: 182,175

Annual Cost	Ingredient
	PERSONNEL
$ 462,880	[14.35] FTE licensed teachers with fringe benefits
20,244	[4.00] FTE nonlicensed aides, all at an average of four hours per day with fringe benefits
1,347	[.05] FTE licensed substitute teachers/extended time
6,884	[.43] FTE secretarial/clerical with fringe benefits
6,757	[.22] FTE supervisor with fringe benefits
[0]	professional technical services
[14,586]	program administration
[1,268]	extra healthcare in pupil support services
[11,331]	other personnel costs
	FACILITIES
13,722	classroom space (total classrooms: [3.80])
1,160	office space (includes program administration proration) (total office space: [.97])
1,315	classroom/office furnishings
6,865	maintenance/utilities/insurance (square foot space: 3,092)
	EQUIPMENT AND MATERIALS
[326]	printing and publishing
[2,326]	94-142 supplies et al. allocations
[805]	travel
[4,084]	general and instructional supplies/tests
	OTHER
[19,393]	student tuition for outside agencies: student membership days: [909]
45,250	state reimbursement and other costs to external agencies
[9,501]	transportation costs
[0]	other educational costs
630,044	total program costs per year
1,816	average costs per student per year
11	average costs per student per day with 170-day year
13	average costs per actual student hour of instruction*

FOOTNOTE: *Included are 11 students served by external agencies. Estimated hours of instruction by external agencies: 3,791. [347 of the 725 students with learning disabilities were in junior or senior high school; 14.35 of the 33.35 FTE teachers and four of the 12 part-time aides were employed in the program for grades 7-12.]

Table 3-22

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Occupational Therapy

Number of Students Per Year: [35]
Average In-District Minutes Per Week: [30]
Total Minutes Per Week: 1,050
Hours Per Week: 18
Hours of Service Per Year: 612
One-Quarter Hours Per Year: 2,450

Annual Cost		Ingredient
		PERSONNEL
$ 45,706		[2.00] FTE licensed teachers with fringe benefits
0		[0.00] FTE nonlicensed aides, all at an average of 0 hours per day with fringe benefits
186		[0.00] FTE licensed substitute teachers/extended time
0		[0.00] FTE secretarial/clerical with fringe benefits
2,729		[0.00] FTE supervisor with fringe benefits
[0]		professional technical services
[2,034]		program administration
[2,942]		extra healthcare in pupil support services
[0]		other personnel costs
		FACILITIES
1,182		classroom space (total classrooms: [.33])
48		office space (includes program administration proration) (total office space: [.04])
111		classroom/office furnishings
572		maintenance/utilities/insurance (square foot space: 258)
		EQUIPMENT AND MATERIALS
[0]		printing and publishing
[288]		94-142 supplies et al. allocations
[1,100]		travel
[380]		general and instructional supplies/tests
		OTHER
[0]	•	student tuition for outside agencies
0		state reimbursement and other costs to external agencies
[0]		transportation costs
[0]		other educational costs
[57,277]		total program costs per year
[1,636]		average costs per student per year
[10]		average costs per student per day with 170-day year
[94]		average costs per actual student hour of instruction*

FOOTNOTE: *There were no occupational therapy services provided by external agencies. [All of the above students were in junior or senior high school.

Table 3-23

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Speech Impairments
[Students in Grades 1-6]

Number of Students Per Year: [226]
Average In-District Minutes Per Week: [36]
Total Minutes Per Week: 8,136
Hours of Service Per Year: 4,746
One-Quarter Hours Per Year: 18,984

Annual Cost	Ingredient
	PERSONNEL
$ 208,019	[7.00] FTE licensed teachers with fringe benefits
0	[0.00] FTE nonlicensed aides, all at average of 0 hours per day with fringe benefits
512	[.02] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
0	[0.00] FTE supervisor with fringe benefits
[0]	professional technical services
[7,119]	program administration
[436]	extra healthcare in pupil support services
[21]	other personnel costs
	FACILITIES
3,556	classroom space (total classrooms: [.99]
239	office space (includes program administration proration) (total office space: [.20])
339	classroom/office furnishings
1,765	maintenance/utilities/insurance (square foot space: 795)
	EQUIPMENT AND MATERIALS
[323]	printing and publishing
[841]	94-142 supplies et al. allocations
[1,617]	travel
[3,692]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies
0	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[288,479]	total program costs per year
[1,011]	average costs per student per year
[6]	average costs per student per day with 170-day year
[48]	average costs per actual student hour of instruction*

FOOTNOTE: *There were no services for students with speech impairments provided by external agencies. [79 of the 305 students were in junior or senior high school; 3.0 of the 10 FTE teachers in this service area were in grades 7-12.]

Table 3-24

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Speech Impairments
[Students in Grades 7-12]

Number of Students Per Year: [79]
Average In-District Minutes Per Week: [36]
Total Minutes Per Week: 2,844
Hours of Service Per Year: 1,659
One-Quarter Hours Per Year: 6,636

Annual Cost	Ingredient
	PERSONNEL
$ 89,151	[3.00] FTE licensed teachers with fringe benefits
0	[0.00] FTE nonlicensed aides, all at an average of 0 hours per day with fringe benefits
220	[.01] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
0	[0.00] FTE supervisor with fringe benefits
[0]	professional technical services
[3,051]	program administration
[152]	extra healthcare in pupil support services
[7]	other personnel costs
	FACILITIES
1,243	classroom space (total classrooms: [.35])
83	office space (includes program administration proration) (total office space: [.07])
119	classroom/office furnishings
617	maintenance/utilities/insurance (square foot space: 278)
	EQUIPMENT AND MATERIALS
[113]	printing and publishing
[294]	94-142 supplies et al. allocations
[565]	travel
[1,290]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies
0	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[96,905]	total program costs per year
[1,227]	average costs per student per year
[7]	average costs per student per day with 170-day year
[58]	average costs per actual student hour of instruction*

FOOTNOTE: *There were no services for students with speech impairments provided by external agencies. [79 of the 305 students were in junior or senior high school; 3.0 of the 10 FTE teachers in this service area were in grades 7-12.]

Table 3-25

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Physical Handicaps

Number of Students Per Year: [36]
Average In-District Minutes Per Week: [200]
Total Minutes Per Week: 7,200
Hours of Service Per Year: 4,200
One-Quarter Hours Per Year: 16,800

Annual Cost	Ingredient
	PERSONNEL
$ 0	[0.00] FTE licensed teachers with fringe benefits
23,566	[2.00] FTE nonlicensed aides, all at an average of 6.75 hours per day with fringe benefits
0	[0.00] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
314	[.01] FTE supervisor with fringe benefits
[0]	professional technical services
[0]	program administration
[8,827]	extra healthcare in pupil support services
[1,106]	other personnel costs
	FACILITIES
0	classroom space (total classrooms: [0.00])
0	office space (includes program administration proration) (total office space: [0.00])
0	classroom/office furnishings
0	maintenance/utilities/insurance (square foot space: 0)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[0]	94-142 supplies et al. allocations
[0]	travel
[0]	general and instructional supplies/tests
	OTHER
[26,605]	student tuition for outside agencies: student membership days: [1,579]
62,078	state reimbursement and other costs to external agencies
10,501	transportation costs
[0]	other educational costs
[132,997]	total program costs per year
[3,694]	average costs per student per year
[22]	average costs per student per day with 170-day year
[12]	average costs per actual student hour of instruction*

FOOTNOTE: *Includes 10 students service by external agencies. Estimated hours of instruction by external agencies: 6,579. [Although 21 of the 36 students were in junior or senior high school, services for students with physical handicaps in time and resources allocated per student were approximately the same as for elementary students.]

Table 3-26

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Psychological Services

Number of Students Per Year: [271]
Average In-District Minutes Per Week: [16]
Two Minutes Per Week: 4,336
Hours of Service Per Year: 2,529
One-Quarter Hours Per Year: 10,117

Annual Cost	Ingredient
	PERSONNEL
$ 170,118	[5.20] FTE licensed teachers with fringe benefits
0	[0.00] FTE nonlicensed aides, at 0 hours per day
492	[.02] FTE licensed substitute teachers/extended time
16,009	[1.00] FTE secretarial/clerical with fringe benefits
0	[0.00] FTE supervisor with fringe benefits
[0]	professional technical services
[5,085]	program administration
[0]	extra healthcare in pupil support services
[6,771]	other personnel costs
	FACILITIES
3,581	classroom space (total classrooms: [1.00])
203	office space (includes program administration proration) (total office space: [.17]).
339	classroom/office furnishings
1,759	maintenance/utilities/insurance (square foot space: 792)
	EQUIPMENT AND MATERIALS
[33]	printing and publishing
[763]	94-142 supplies et al. allocations
[2,370]	travel
[3,024]	general and instructional supplies/tests
	OTHER
[804]	student tuition for outside agencies
1,877	state reimbursement and other costs to external agencies
[284]	transportation costs
[0]	other educational costs
[213,512]	total program costs per year
[788]	average costs per student per year
[5]	average costs per student per year with 170-day year
[79]	average costs per actual student hour of instruction*

FOOTNOTE: *Includes one student served by external agency with an estimated 171 hours of instruction provided by agency. On average, 27 students in special education and 25 other students were given direct services by each FTE psychologist in 1983-84. 90% of all resources in Psychological Services are related to serving special education, with 55% related to direct student services in special education and 35% related to other forms of special education services -- e.g., data collection and research, students in special education assessments, program, and staff development.

Table 3-27

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Trainable Resource (TMR)

Number of Students Per Year: [64]
Average In-District Minutes Per Week: [0]
Total Minutes Per Week: 0
Hours of Service Per Year: 0
One-Quarter Hours Per Year: 0

Annual Cost	Ingredient
	PERSONNEL
$ 0	[0.00] FTE licensed teachers with fringe benefits
0	[1.00] nonlicensed aide, at an average of four hours per day with fringe benefits
12	[0.00] FTE licensed substitute teachers/extended time
0	[0.00] FTE secretarial/clerical with fringe benefits
314	[.01] FTE supervisor with fringe benefits
[0]	professional technical services
[0]	program administration
[0]	extra healthcare in pupil support services
[0]	other personnel costs
	FACILITIES
0	classroom space (total classrooms: [0.00])
0	office space (includes program administration proration) (total office space: [.00])
0	classroom/office furnishings
0	maintenance/utilities/insurance (square foot space: 0)
	EQUIPMENT AND MATERIALS
[0]	printing and publishing
[19]	94-142 supplies et al. allocations
[0]	travel
[0]	general and instructional supplies/tests
	OTHER
[57,851]	student tuition for outside agencies: student membership days: [11,211])
134,986	state reimbursement and other costs to external agencies
[66,570]	transportation costs
[0]	other educational costs
[264,028]	total program costs per year
[4,125]	average costs per student per year
[24]	average costs per student per day with 170-day year
[6]	average costs per actual student hour of instruction*

FOOTNOTE: *Included are 64 students served by external agencies. Estimated hours of instruction by external agencies: 46,750. [Although 37 of the 64 students were beyond elementary school age, TMR services in time and resources allocated per student mainly by external agencies were approximately the same as for elementary students.]

Table 3-28

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Early Intervention/Preschool

Number of Students Per Year: [40]
Average In-District Minutes Per Week: [750]
Total Minutes Per Week: 30,000
Hours of Service Per Year: 17,500
One-Quarter Hours Per Year: 70,000

Annual Cost	Ingredient
	PERSONNEL
$ 143,429	[4.50] FTE licensed teachers with fringe benefits
19,792	[3.00] FTE nonlicensed aides, all at an average of five hours per day with fringe benefits
0	[0.00] FTE licensed substitute teachers/extended time
7,950	[.50] FTE secretarial/clerical with fringe benefits
15,715	[.50] FTE supervisor with fringe benefits
[0]	professional technical services
[4,576]	program administration
[4,414]	extra healthcare in pupil support services
[1,595]	other personnel costs
	FACILITIES
10,526	classroom space (total classrooms: [2.00])
380	office space (includes program administration proration) (total office space: [.27])
998	classroom/office furnishings
18,675	maintenance/utilities/insurance (square foot space: 1,868)
	EQUIPMENT AND MATERIALS
[575]	printing and publishing
[0]	94-142 supplies et al. allocations
[382]	travel
[1,927]	general and instructional supplies/tests
	OTHER
[10,721]	student tuition for outside agencies: student membership days: [721]
25,016	state reimbursement and other costs to external agencies
72,988	transportation costs
11,475	other educational costs
[351,134]	total program costs per year
[8,778]	average costs per student per year
[52]	average costs per student per day with 170-day year
[17]	average costs per actual student hour of instruction*

FOOTNOTE: *Includes eight students served by external agencies with additional hours of instruction by external agencies estimated to be 3,007 per year.

Table 3-20

Special Education Cost Study (Data From 1983-84)
Special Education Service Area: Special School (OGED)
Behavior Management/Emotional Disabilities

Number of Students Per Year: [76]
Average In-District Minutes Per Week: [1,134]
Total Minutes Per Week: 86,184
Hours of Service Per Year: 50,274
One-Quarter Hours Per Year: 201,096

Annual Cost	Ingredient
	PERSONNEL
$ 519,603	[15.00] FTE licensed teachers with fringe benefits
79,964	[9.00] FTE nonlicensed aides, all at an average of 5.5 hours per day with fringe benefits
8,814	[.35] FTE licensed substitute teachers/extended time
18,974	[1.00] FTE secretarial/clerical with fringe benefits
0	[0.00] FTE supervisor with fringe benefits
[146]	professional technical services
[15,255]	program administration (assume same administrative costs as in public schools)
[2,648]	extra healthcare in pupil support services
[17,105]	other personnel costs
	FACILITIES
35,810	classroom space (total classrooms: [10.00])
3,579	office space (includes program administration proration) (total office space: [3.00])
3,496	classroom/office furnishings
18,315	maintenance/utilities/insurance (square foot space: 8,250)
	EQUIPMENT AND MATERIALS
[1,018]	printing and publishing
[0]	94-142 supplies et al. allocations
[1,709]	travel
[12,197]	general and instructional supplies/tests
	OTHER
[0]	student tuition for outside agencies
	state reimbursement and other costs to external agencies
[0]	transportation costs
[0]	other educational costs
[788,633]	total program costs per year
[9,719]	average costs per student per year
[57]	average costs per student per day with 170-day year
[15]	average costs per actual student hour of instruction*

FOOTNOTE: *There were no students in the special school served by external agencies, except that 12 district students in special school were mainstreamed in the district public schools for 2-1/2 hours each day. 23 of the 76 students came from the school district; 36 of the students were full-time residents while 40 students were day students.

Total 1983-84 Special School Tuition Receipts:	$ 278,167	(46%)
(Tuition from School District for 23 students:	93,573)	
State Reimbursements:	327,244	(54%)
Special School Total "Cash Budget":	605,411	(100%)

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CHAPTER 4

Benefit-Cost Analysis and Special Education Programs

Craig Thornton and Joanna Will

The extensive changes in the special education system over the past decade have created a dilemma for benefit-cost analysis. On the one hand, interest in this analytical method has increased dramatically as legislators, administrators, and parents search for cost-effective programs in the face of growing demands for service and funding constraints at all levels of government. On the other hand, there is concern that benefit-cost analysis, with its emphasis on dollars and cents, will fail to capture the humanitarian aspects of special education. This dilemma is how to conduct benefit-cost analyses that will retain the important summative features of this approach while at the same time capturing all essential benefits and cost of the education programs.

The growing demand for special education services and the accompanying budget pressures are illustrated by the Education for All Handicapped Children Act (PL 94-142) and its amendment passed in 1983. The Act mandates an expansion and refocusing of education resources to more effectively serve students with handicapping conditions. At the same time, Federal expenditures for services covered by the Act have been only 25% of their mandated level (General Accounting Office, 1986). Local school administrators have been caught in the middle as they try to develop appropriate programs within their limited budgets.

As these administrators, as well as society at large, make decisions about education policy, they seek to find programs that are efficient and equitable. Efficient programs are those that serve to increase the net value of the goods and services available to society. Equitable programs contribute to balancing the needs and desires of the various groups in society.

Administrators also seek methods for organizing information about the various alternative programs. Education programs use a wide variety of resources to produce an equally wide range of outcomes. The inputs to this process include teachers, buildings, materials, administrative resources, and transportation services. The outcomes include increases in students' knowledge, in their ability to participate in society, and in their overall well-being. Analysts examining these programs need to aggregate information about all these aspects of education programs in order to make appropriate decisions.

Benefit-cost analysis is a tool developed for analyzing this type of situation. It is designed to facilitate assessments about whether a program produces effects that in some sense justify the cost incurred to operate the program. It does this by providing a means for organizing and summarizing information about a program so that it can be used to assess whether a program is likely to be efficient and to determine the nature of its effects on the distribution of income and opportunities. Benefit-cost analysis summarizes information about a program by attempting to measure in dollars all program inputs and all resulting effects. This enables the analyst to then compare all these aspects of the program directly by simply summing up the dollar values of all benefits and costs.

This approach is particularly well suited to helping analysts identify programs that are efficient. In fact, most early benefit-cost studies focused almost exclusively on efficiency. They sought to determine whether a given program is likely to increase the value of social resources or whether the resources that had been used for the program would have been better spent elsewhere. The suitability of this approach for assessing efficiency stems from its focus on resource use and on the dollar value of any resources that a program might use, save, or create.

Despite this orientation toward assessing efficiency, benefit-cost analysis can also examine which groups in society will gain from a program and which groups will pay. This examination of equity is particularly important for assessing social programs since a goal of many such programs is to increase social equity by reallocating resources or equalizing opportunities. In fact, for many social programs equity concerns dominate efficiency concerns, although efficiency is still important since, other things equal, it is desirable to achieve a given equity goal as efficiently as possible.

While benefit-cost analysis seems quite useful for summarizing information and addressing both efficiency and equity issues, it has been adopted slowly by persons studying education programs. In part, this reflects a sense that the emphasis benefit-cost analysis has traditionally placed on efficiency rather than equity is inappropriate for education programs. It also reflects a concern that many effects of special education will be missed in a benefit-cost analysis that focuses only on items that can be valued easily in dollars. Finally, it reflects the complexity of many of the techniques and the dearth of useful paradigms for conducting a benefit-cost analysis of special education programs.

The lack of paradigm is a particularly important problem. Such models are important to help persons interested in the field of special education conduct benefit-cost analyses and interpret the findings of ones they read. Unlike formal statistical analysis, there is no uniformly accepted set of rules for conducting a benefit-cost analysis. There are general guidelines, but each analyst generally makes individual decisions about how to measure program effects and costs, how to value those items, and how to assess whether omitted effects and costs will affect the measured results. This lack of precise rules, along with differences in evaluation budgets, the expertise of the analysts, and the evaluation goals, leads to substantial variation in the analysis methods used.

This variation, in turn, makes it difficult to compare studies and programs, since it is difficult to know whether differences in estimated benefits and costs are due to real program differences or merely to differences in evaluation technique. Such confusion defeats one of the purposes of benefit-cost analysis, which is to make cross-program comparisons easier by measuring all effects in the common denominator of dollars.

To help meet the challenge posed by these problems and the dilemma of using benefit-cost analysis to study special education programs, we present a benefit-cost approach that has been used successfully to evaluate a number of social programs. This approach emphasizes several features of benefit-cost analysis that make it particularly appropriate for assessing alternative program options for special education. They include:

- Use of a comprehensive accounting framework that includes all major benefits and costs, regardless of whether they can be explicitly measured or valued.

- Emphasis on benefit-cost analysis as a process rather than a bottom line -- the knowledge gained by systematically assessing the available information about a program is generally more important than any single estimate of benefits and costs.

- The use of sensitivity tests to assess the relative importance and implications of the various assumptions and estimates used in the analysis.

- Multiple analytical perspectives that indicate how different groups in society will perceive a specific program and how the program will affect the distribution of social resources.

- A general approach to valuing program effects and incorporating unmeasured effects so that all essential effects can be taken into account when making decisions.

This chapter presents the analytical process of a benefit-cost study. In doing so, it defines and discusses each of the logical steps comprising this process, presents guidelines for establishing the analytical scope and framework of the analysis, provides standard procedures for estimating and valuing the full range of outcomes, and recommends how the results should be presented and interpreted.

In the following section, we begin by presenting a general overview of both benefit-cost analysis and our accounting framework. The third section discusses the procedures for setting up the analysis: defining the program and the comparison against which costs and benefits are measured; identifying the analytical perspectives of interest; and listing the expected benefits and costs. The fourth section examines the tasks needed to estimate the benefits and costs of a program: estimating the impacts of the program and their effect on resource use; assigning dollar values to the estimated impacts; and aggregating the benefits and costs that are valued. The final section addresses two major issues that are important in terms of presenting and interpreting the results -- incorporating intangible effects in the analysis and undertaking sensitivity tests.

Overview of Benefit-Cost Analysis

Benefit-cost analysis is essentially a structured comparison. Thus, as the first step in a benefit-cost analysis, the analyst must specify the program or policy being evaluated and the program or options with which it will be compared. This specification should include information on such factors as the persons being served, the treatment being offered, and the environment in which the program or policy will operate. These two alternatives -- the program and the comparison structure -- essentially define the scope, and ultimately the results, of the analysis. All work in the study, including the interpretation of the findings, must be undertaken in relation to these two alternatives.

As noted earlier, benefit-cost analysis, as well as economic analysis in general, makes the comparison between the two alternatives using the criteria of economic efficiency and equity. Specifically, it asks whether the decision to fund the program or policy under study will increase the aggregate value of social resources and whether it will produce desirable effects on the distribution of those resources compared to what would have happened under the alternative program or policy. The basic technique used to determine economic efficiency is to identify all changes in resource use caused by the

decision to fund a program and then assign dollar values to those changes. The changes in resource use include those required to operate the program and those that result from the operations. The values of these changes are then summed together to yield an estimate of the program's net present value, the difference between the benefits and costs where the dollar values of any benefits or costs that occur in future years are adjusted (i.e., discounted) to reflect their value in a specified base period. A positive net present value indicates that the resources are being used more efficiently than they would have been under the comparison situation. A negative net present value indicates that (at least at its current scale) the program's resources could have been used more efficiently elsewhere.

The net present value criteria is also used to address equity issues. However, instead of aggregating all changes in resource use, the analysis considers the changes from the perspectives of the various groups in society that are affected by the program. For example, consider the students enrolled in a special education program. Part of the analysis of equity is to ascertain whether this group will benefit from their participation in the program. Similarly, the analysis will consider whether the taxpayers who fund the program obtain benefits that will outweigh the costs that they must bear. While the analysis can typically identify the major benefits and cost for these groups, it has no special criteria for assessing whether net shifts in resources between these and other groups are desirable. The appropriate criteria will vary depending on the program under study and the groups affected. Thus, the value of shifts between groups must be determined within the broader context of public policy.

To estimate the value of changes in resource use, whether from the aggregate perspective of the economy or from the perspectives of particular groups in society, it is necessary to have a consistent means of assigning values to changes. In this paper we use an approach based on the concepts that underlie the calculation of the gross national product (GNP).

The GNP is a measure of the value of the goods and services a country produces in a year. Nonproductive activities, such as shifts in funds within or between sectors of the economy with no corresponding contribution to overall production, are excluded from the GNP calculation. This measure is estimated by aggregating the dollar values of all the goods and services produced where the dollar values are the market prices of the various items being produced.

This general approach to accounting for economic production is also used in benefit-cost analysis. The net changes in resource use attributable to a program or policy are first identified and then valued using market prices. As was the case for GNP, when a program merely reallocates resources (for example, by transferring them from one group to another) there is no net change in the aggregate resources available to society and the shift in resource ownership will be excluded from the calculations.

The advantage of using this approach is that market prices are readily observable. These prices thus provide a consistent and straightforward means for valuing changes in resource use. They also constitute a reasonable set of values since market prices, which reflect the interaction of supply and demand, are generally viewed as good indicators of the relative values society places on different goods and services.

The straightforwardness of this approach is offset somewhat, however, by the limitations of GNP calculations. GNP is the sum of all market activities and

consequently excludes many activities that affect our well-being. For example, GNP excludes goods and services that are not sold in the marketplace, such as uncompensated work performed in the home by family members, child-care services provided by parents, and underground or illegal activities. Furthermore, the market values used in the GNP estimate may fail to capture true resource costs or social demands. For example, effects not captured by normal markets such as environmental pollution emanating from production processes are excluded from the GNP estimation. In addition, the social value of public services such as education or welfare programs may be inadequately captured by the amount of dollars spent to provide the services and hence, inadequately represented in estimated GNP.

Similarly, social programs often generate outcomes that have no observable market value or whose value is not adequately reflected in the interactions of the marketplace. These include the protection of individual rights and liberties, influences on public attitudes and perceptions, and the provision of special opportunities to specific needy populations. In any of these instances, the GNP-based approach is likely to exclude some key benefits or costs. These excluded items must usually be treated as unmeasured benefits or costs in the analysis or an alternative means for valuing them must be proposed (for example, Weisbrod, 1978, suggests using results from public opinion polls for valuing some outputs of social programs).

This discussion indicates that while the net present value criterion is a fairly straightforward concept and can be easily defined, its actual application in benefit-cost analysis is difficult. As noted, the process of measuring and valuing the diverse inputs to social programs and the various outcomes is inexact. It requires that analysts make numerous assumptions and draw on many estimates. They must decide the appropriate dollar values to assign to program effects, make judgments about the correct interest and inflation rates for the period covered by the analysis, and assess the potential implications of any benefits or costs that could not be explicitly included in the analysis. All these assumptions and decisions make any estimate of net present value uncertain, and so any benefit-cost conclusions based on an application of the net present value criterion will also be somewhat uncertain.

The approach to benefit-cost analysis presented in this chapter provides a method for dealing with uncertainty. It does not eliminate the uncertainty, which is inherent in evaluations of social programs, but, instead, offers a way to organize the available information to facilitate decision making. The approach provides methods for judging the relative importance of different impacts and the importance of the uncertainty surrounding the estimates of those impacts. In fact, the approach emphasizes the value of benefit-cost analysis as a process. The real value of the technique lies in the process of systematically sorting through the available evidence rather than in any single estimate of net present value or a benefit-cost ratio.

The approach starts with a comprehensive accounting framework that includes all benefits and costs, regardless of whether they can be measured or valued. The analysis then proceeds to value as many of those benefits and costs as it can. The number of items that can be valued will depend on the resources available to the analyst, the estimation methods employed, and the nature of the program itself. The analysis then attempts to assess the remaining items that were unmeasured. Some of these unmeasured items can be assessed by examining measures that are closely related to the item of interest. For example, while many programs are expected to improve the quality of life for participants, it has been extremely difficult to include dollar measures of this effect

in benefit-cost analyses. Nevertheless, it is often possible to include measures that indicate the general nature of effects on the quality of life, measures based on the stated attitudes of participants or on observations of things such as their range of activities, health status, or unmet needs. When such indicators are unavailable, the analyst can only list the unmeasured benefits and costs and make conjectures about their potential implications for the findings based on measured items.

When this approach is used, decisions can be made using all the available information. Further, the inclusion of all effects, regardless of whether they are explicitly measured, ensures that the decisions will be made with a comprehensive view of the program -- important, but intangible, benefits will not be excluded when decisions are made. Even when there are important items left unmeasured, the benefit-cost analysis simplifies the decision by summarizing the information about measured items so that they can be more conveniently compared with the information about unmeasured items.

In this approach, the analyst considers whether the conclusions would be changed if the unmeasured items were explicitly valued and included in the analysis. If the measured benefits outweigh the measured costs, then overall net present value will be positive unless there are offsetting unmeasured net costs. If measured benefits fall short of measured costs, then the resulting net measured cost can be viewed as the price that must be paid to obtain any unmeasured net benefits.

Another method of dealing with the uncertainty inherent in this type of analysis is to make several alternative estimates of net present value. This set of estimates includes (1) a benchmark estimate that incorporates the assumptions and estimates with which the analyst feels most comfortable, and (2) several other estimates based on sensitivity tests, each illustrating the effects of changing one or more of the assumptions or approximations used in the benchmark calculation. The process of producing these alternative estimates, identifying the various impacts and outcomes, integrating measures of them, and noting the general patterns that emerge from attempts to assign relative values is quite useful. By basing the findings of a benefit-cost analysis on this range rather than a single set of assumptions and estimates, it is possible to identify both those aspects of the program and its evaluation that are most crucial and those about which the greatest uncertainty exists. Such an understanding of the program, its performance, and its assessment is crucial to rendering valid cross-program comparisons and decisions about the trade offs involved in alternative funding.

Defining the Analytical Question and the Scope of the Analysis

The first step in a benefit-cost analysis is to define the scope of the study. What is the program being studied? What are the alternatives to that program? Who are the primary groups that will be affected by the program? What are the anticipated effects and what resources will be needed to deliver the services? These are the questions that must be answered at the outset of the study.

These questions pertain as much to a general assessment of a program as they do to a benefit-cost analysis. They deal with the goals of the program and the means used to achieve those goals, issues of concern to all administrators. Thus, the first steps of the benefit-cost analysis have broad applicability. In many cases, sorting through these issues can be helpful for undertaking a program, even if no further analysis and estimation is undertaken.

Defining the Program and Its Alternatives

The first task in a benefit-cost analysis is to specify the actual analytical comparison. The analyst must determine and define both the specific program or policy (or component of a program) being assessed and the alternative with which it is to be compared.

The program. The important aspects of a program to be identified include its objectives, its clientele, the services it provides, how it operates, and the environment in which it operates. A careful enumeration of these features is a key aspect of the analysis. It provides readers with an understanding of the program or policy being evaluated, and is an essential first step for establishing the comparison under evaluation.

For special education programs, this program description is particularly crucial, since these programs are multidimensional and vary considerably. These programs typically encompass numerous policy goals and reflect an assortment of educational and therapeutic services provided to a disparate group of clients. The analyst must specify the particular aspects of special education under study.

The diversity of special education is nowhere more evident than in its goals. These include many social and psychological benefits, such as social integration, a more-educated society, greater self-esteem for the individual, and equal access and the right to educational opportunities. They also include economic benefits, such as enabling individuals with handicapping conditions to become more self-sufficient and socially productive.

Diversity is also evident in virtually all aspects of special education. The students differ substantially in their abilities and special needs. There are also differences between districts with regard to the ages of the children entitled to services, which range from pre-school to post-high school. There are differences in the types of instructional and therapeutic services offered, in the types of facilities, equipment, and personnel used, and in the types of educational settings. Finally, there are differences in the local environments that will affect program operations. These include transportation services, the supply of trained teachers, the local tax base, and the types of residential facilities available to persons with disabilities.

With all this variation, it is essential to define exactly what is being studied. An analyst might consider all special education programs or particular individuals or services. There may be interest in, for example, a specific subset of students (e.g., pre-school children with mental retardation or high school students with visual impairments), a specific type of service (e.g., early intervention or physical therapy), a specific educational placement (e.g., special residential schools or regular classrooms), or specific political subdivisions (e.g., how different local districts implement a given state policy).

As an example of this process, consider a local school district that wants to assess the desirability of funding a new vocational education program for high school students in special education. The definition of this program must be sufficiently detailed so that the analyst and user of the study will know exactly what is being examined. Such a definition should include the program goals, its expected effects, the students who will be served (including their backgrounds and the manner in which they will be selected), the services and curricula offered, and the environment in which the services will be offered.

The description of the environment is particularly important since it can have a strong effect on the results of the study. For example, the observed success of a vocational education program with the goal of increasing post-school employment will depend on the nature of the local labor market and the availability of adult services to assist graduating students in their job search and to help them subsequently to remain on that job.

Comparison situation. The relevant comparison situation depends upon the issues of interest to policy makers and the environment in which a program operates. Ultimately, however, the choice of the comparison situation is a critical decision to the analysis, since this decision defines the analytical comparisons and drives all of the results that are generated. Consequently, defining the comparison situation in clear, exact terms is an important analytical task.

The alternative comparison can take several forms. It may be the status quo, defined as the mix of currently available services and programs (if any). Alternatively, it might be a specific alternative program or policy. In our illustrative example in the preceding section (a new vocational education program intended specifically for high school students in special education) we will assume that the comparison situation is the services available under the status quo. Specifically, we will assume that in the absence of the new vocational services designed for students in special education, such students would receive only nonvocational education. Some students might enroll in adult service programs outside the school system, but such enrollments would not be specifically linked to their education or school.

Ultimately, defining the comparison situation requires a detailed examination of the services that those students who are enrolled in the new vocational program would have received either in the absence of the new vocational program or in an alternative program, depending upon the alternative chosen. Again, for either comparison situation, the nature and objectives of available programs (if any), the operation and integration of these programs, and resource needs and uses must all be defined clearly.

The Analytical Perspective

Typically, any public policy or program will affect many groups of individuals. For example, a special education program will clearly affect participating students and their families and may have long-run effects on service agencies and employers in the community. It will also have an impact on government budgets and hence, indirectly, an effect on taxpayers. Each of these groups has a perspective on the program and each of these perspectives will have some relevancy to decision making.

For the issue of economic efficiency, the perspective of society as a whole is relevant. It captures the net effect of the program on the aggregate value of available goods and services. Equity issues are addressed through the perspectives of specific groups affected by the program. These other perspectives are just as important as that of society as a whole given the nature of how decisions are made in our society. They indicate the incentives different groups have to support or oppose a program.

The perspective of participating students is particularly important since it indicates the extent to which they will benefit from the education services intended to help them. It is also useful to consider the perspective of everyone else in society, that is all the

persons not enrolled as students in the program. This perspective will capture all effects that do not accrue to the students. In particular, it will capture the taxes needed to finance the program and any resulting reductions in expenditures for alternative programs.

Depending upon the particular equity concerns of the analysis, other perspectives may also be used. For example, in an analysis in which the comparison situation is an alternative program that affects a different set of clients, it may be useful to illustrate the effects of the policy under analysis from the perspective of the two sets of potential clients. Alternatively, an analyst may find it useful to disaggregate the rest-of-society perspective into funding sources (e.g., federal, state, and local taxpayers). However, since the analysis will require estimates of effects on each perspective, the complexity of the analysis increases rapidly with number of perspectives, and it is usually preferable to disaggregate society only into the two major perspectives described. It is important that, when defining or selecting perspectives for an analysis of equity consequences, the groups chosen be mutually exclusive yet, in total, include everyone in society. By defining perspectives in this way, the sum of the valued benefits and costs for each individual perspective will equal the net effect as seen by the perspective of society as a whole.[1] In our framework, the sum of benefits and costs accruing to program participants (e.g., participating students) and the rest of society will equal the net benefit to society as a whole.

This relationship of analytical perspectives provides a convenient structure to the analysis. The perspective of society as a whole focuses on economic efficiency -- that is, the change in the total resources of society caused by the program under evaluation (relative to the alternative comparison) -- and ignores all redistributional aspects of the program. Because the student and rest-of-society perspectives represent mutually exclusive groups that in total represent all of society, only those benefits (or costs) that accrue to one group within society and have no equal offsetting costs (or benefit) to the other group (i.e., those outcomes that involve the use or production, rather than the redistribution, of resources) will remain in the social perspective. Consequently, the social net present value calculation will include only the value of outcomes that affect the total amount of resources (goods and services) available to society. The equity implications of the program on the other hand, can the be assessed by examining any net shifts in resources between students and the rest of society.

Listing the Benefits and Costs

A list of the expected benefits and costs is the next critical step in developing the accounting framework. This step follows directly from defining the program and the analytical perspectives. The results of this step will define the specific data the analyst will ultimately need in order to estimate benefits and costs. Therefore, the results of

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[1] This adding-up property necessitates assuming that a dollar of benefit or cost to one person is equivalent to a dollar of benefit or cost to any other person. The perspective of society as a whole would thereby ignore all redistributional questions and focus on aggregate resource-use questions. This is a convenient but not critical assumption. The analysis could assume other distributional value systems - giving more or less weight to the resources owned by specific groups in society. However, given the difficulty of defining and using such a system, as well as its inherently controversial nature, we recommend that the "equal value" system used here be adopted.

this task are an important and necessary input into designing the actual analysis and estimation of impacts described in the next section on estimating net present value.

At first consideration, this step in developing the framework appears relatively straightforward. Yet when one actually gets involved in attempting to identify and sort out the various types of potential effects, particularly from the different viewpoints of the relevant groups affected, it becomes evident that this process requires careful consideration of the interactions of outcomes among these different perspectives. Below we first discuss two general rules that the analyst must keep in mind when developing the list of expected benefits and costs for the accounting framework. We then use the previously established example of a vocational education program for students in special education to illustrate in more detail the type of analytical process required to identify and sort out the expected effects of the program.

General rules. The first general rule is that the analyst must try to be as comprehensive as possible when considering the expected impacts and resource uses of a program, even though not all expected benefits and costs will actually be valued. The analyst must attempt to identify all changes in behavior or outcomes that would lead to a real change in the use or availability of resources. For example, special education programs may produce a change in students' use of a variety of other support service programs. Since a change in the use of such services represents a real change in the use of resources available to society, the effect of this change in behavior should also be included in the benefit-cost calculation. It is also important that the benefits and costs that cannot actually be valued monetarily be identified and accounted for in the framework. Sometimes, the programmatic impacts and desired outcomes that cannot be valued are those that are most important -- that is, those that tip the scale toward making a positive assessment of a program when the result of the net present value calculation for those outcomes that are valued monetarily is zero or less.

Given the likely constraints on the scope of an analysis, the analyst will have to set limits on this process. For instance, previous research provides evidence of a relationship between schooling and a variety of outcomes, including labor-market performance, nonmarketed home production, the health status of the individual, child-rearing, crime, social cohesion, marital and divorce rates, charitable donations, political socialization, and voting behavior.[2] An exhaustive effort would be necessary to identify and measure all the secondary effects of special education. Consequently, the analyst, purposefully being comprehensive yet working under time and resource constraints and in recognition of the level of uncertainty associated with estimating the magnitude and value of certain effects, will have to set priorities. The analyst may set such priorities by identifying only those impacts that (1) represent effects that are expected to exceed a particular magnitude, and (2) can be attributed directly to the program under study with a reasonable level of certainty.

The second general rule in identifying the benefits and costs of a program is that benefits and costs are measured relative to what would have happened under the comparison situation. As we stated earlier, the net present value of a program summarizes a comparison between the program and another policy option or program. Each of the identified benefits or costs of a program represents the difference between

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[2] Haveman & Wolfe (1984) and Hanushek (1986) discuss the range of behavior affected by schooling.

the expected outcomes under the policy being evaluated and those under the specified comparison situation. Therefore, benefits and costs are typically measured as changes or differences between what would have occurred under the comparison situation and what actually did occur under the intervention. For example, a special vocational education program may generate an increase in a student's lifetime earnings over what his/her earnings would have been in the absence of the program. Similarly, this program may reduce (relative to the comparison situation) the level at which certain ancillary services may have been used. The impacts to be measured as benefits in these examples are the increase in earnings or the reduction in ancillary-service use.

If a particular use of resources would be the same under either the program or the comparison situation, then it should be omitted from the framework. For example, consider the resources involved in transporting students in special education to a vocational education program. If the alternative is to place them in a nonvocational program that would require the same amount of transportation, then the choice between alternatives would not affect transportation costs; thus, they could be excluded from the framework, despite the fact that transportation is an expensive cost item. In this way, the framework can be simplified, and analytical resources can be devoted to the critical change produced by the program.

The case of special education. Table 4-1 presents a list of benefits and costs for our example in which a school district is evaluating funding a new vocational education program specifically intended for high school students.

The alternative comparison for our example is the status quo, where there is no vocational education program specifically for such students, who could use other available nonvocational special and regular education services and available services from other providers.

Three perspectives are shown in Table 4-1: society as a whole and two specific groups that comprise society as a whole -- students who are offered the vocational educational program and the rest of society. How the anticipated impacts of the program are expected to be perceived (i.e., as benefits or costs) by these different groups is also indicated on this table. What is shown on the table are, of course, expectations. Ultimately, the evaluation will assess empirically whether these expectations are accurate and whether the measured impacts actually represent benefits or costs.

The primary purpose of this format is to help organize and conduct the analysis and ensure that all major impacts of the program are captured accurately in the analysis. The analytical process involved can be summarized as follows: for each outcome that the program is intended to produce (as determined from the program description), the analyst must (1) identify all changes in resource availability (relative to the comparison situation); (2) assess whether those changes actually create, save, or use resources, or whether they simply redistribute resources among groups; and (3) determine how these changes will affect the various perspectives.

This is the procedure used in Table 4-1 to complete a list of benefits and costs for the hypothetical vocational education program for special education students. Benefits from the expected increased employment of students and the reduced use of other education, training, employment, income maintenance, and social service programs are included. Costs include the costs of program operations and any increased use of other programs that might be related to the program under study (for example, transitional employment or job-placement services provided to graduating students). Benefits on this

Table 4-1

Expected Benefits and Costs of a Hypothetical Vocational Education Program for High School Students in Special Education

Impacts	Analytical Perspective		
	Social	Student	Rest of Society
BENEFITS			
1. Increased Output			
Increased output	+	+	0
Indirect labor market effects	0	0	0
Increased taxes	0	-	+
Work preferences	+	+	+
2. Reduced Use of Alternative Programs			
Alternative School Programs (e.g., nonvocational education)	+	0	+
Job training work related programs (e.g., work activity centers, sheltered workshops)	+	0	+
Supportive services (e.g., transportation, healthcare, housing)	+	0	+
Program allowances	0	-	+
3. Reduced Use of Transfer Programs (SSI, welfare, food stamps, etc.)			
Reduced Benefit Payments	0	-	+
Reduced Administrative Costs	+	0	+
4. Other Benefits			
Increased self-sufficiency	+	+	+
Increased self-esteem	+	+	+
Improved quality of life	+	+	+
COSTS			
1. Program Costs			
Operational Costs	-	0	-
Administrative Costs	-	0	-
2. Foregone Nonmarket Output	-	0	-
3. Increased use of complimentary programs (e.g., transitional employment programs, employment service, supported employment programs)	-	0	-

NOTE: The individual components are characterized from the three perspectives as being a net benefit (+), a net cost (-), or neither (0)

table also include a number of program effects that would be difficult to value in a benefit-cost analysis, including changes in self-sufficiency, self-esteem, quality of life, and nonmarket production.

For the most part, the process of filling in the table is a straightforward application of the guidelines and procedures described above. However, some outcomes do require particularly careful analytical reasoning to identify real resource changes and sort out the effects of these changes from the various relevant perspectives. Two specific program effects are discussed in more detail: increased employment and changes in the use of other programs or services.

Program effect: Increased employment. The employment outcomes of the students in special education who enrolled in the new vocational education program will affect not only the students but also the other persons in society. The analysis must capture these effects as well as the effect on the overall level of resources available to society.

The students' perspective is fairly straightforward. They voluntarily accept the employment, and (at least implicitly) decide to forego other opportunities in order to accept that employment. The measure of their net gain is the difference between their actual employment and what their employment (or other activities) would have been under the comparison situation. In our example, a net increase in employment is expected to occur as the vocationally trained students graduate and obtain on average, more and better jobs compared with the jobs that they would have obtained (if any) in the absence of the vocational education program.

This increase in employment will financially benefit the students in the form of increased earnings and fringe benefits (although they will have to give up part of their increased earnings in the form of taxes). The student may also benefit beyond their pecuniary compensation if they derive psychological benefits from their employment (e.g., greater self-esteem). Both types of benefits enter into the accounting framework in Table 4-1.

The situation for the rest-of-society group is more complicated and depends on the mechanics of the labor markets in which the students obtain jobs. In general, the rest-of-society group benefits from any increased taxes paid by the student group since these students will be paying a larger share of the total tax burden. However, two subgroups of the rest-of-society perspective are affected more directly: (1) the employers of the students in vocational education, and (2) the other workers who compete in the same labor market as the students.

For employers, it is probably a reasonable assumption that they break even -- that is, that the wages they pay are equal to the value of the output that their workers produce for them.[3] Since this resource interchange (employers gaining the value of

[3] The equality between the cost of labor (i.e., the compensation paid to workers, including both wages and fringe benefits) and the value of output produced is based on the assumption that product and labor markets function competitively. Union power, government wage subsidies, monopolies, taxes, and other factors can work to break this equality. In general, it is best to assume that the value of output is accurately measured by total compensation, unless there is specific evidence to the contrary - for example, if students were placed in subsidized jobs.

output while paying the compensation) nets out to zero and is internal to the one perspective (that of the rest of society), this redistribution of resources can be excluded from the framework.[4]

For other workers, the situation depends on whether any indirect labor market effects exist. Indirect labor market effects occur in the presence of unemployment.[5] If the students take jobs in a labor market in which workers are unemployed (i.e., in which an excess supply of labor exists), they take jobs that would have been filled otherwise. Alternatively, if students forego jobs in such a market, those jobs would be filled by workers who would have been unemployed otherwise. The presence of these types of effects -- termed displacement and replacement, respectively -- depends on the types of jobs that the students obtain and those that they would have obtained under the comparison situation.

The most favorable case for other workers would be one in which the vocational education program enabled students to avoid entering a labor market characterized by high unemployment and instead obtain jobs in a market characterized by an excess demand for labor. In this case, the other workers in the market with unemployment would gain, since they would fill the jobs that the students would forego and since, due to the shortage of labor in the market the students enter, no other would be displaced. The opposite case -- students entering a market with an excess supply of labor -- would impose costs on the other workers as the students take jobs that otherwise would have been held by someone else.

It is clearly difficult to measure these effects. It requires information on the local labor markets, the jobs held by students, and the decisions of affected employers and workers. Consequently, indirect labor market effects are commonly ignored or assumed away. This approach may be problematic for many special education programs in which students are placed in entry-level minimum-wage jobs. In the past, such labor markets often exhibited a considerable degree of unemployment, and the likelihood of displacement was high. Programs may have simply shuffled workers among a fixed number of jobs (substituting the graduating students for other low-wage workers), with no net increase in aggregate employment. Recently, however, this situation has improved, with signs that the relative supply of entry workers is declining (at least at prevailing wage rates).

In listing the benefits and costs on Table 4-1, we have included a line for indirect labor market effects. Nevertheless, we have continued to follow the conventional approach of assuming that the rest of society perspective is unaffected by any changes in students' employment, except for any preference of society to have the students be more self-sufficient and integrated. This assumption reflects the lack of empirical evidence on indirect labor market effects.

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[4] If such resource uses are critical to the particular analysis question or if the equality between the cost of labor and the value of output does not hold, then a separate perspective may be established to keep track of the distributional implications.

[5] See Johnson (1979) and Hall (1979) for a more in-depth discussion of indirect labor market effects.

A benefit-cost analysis should assess whether this assumption is reasonable, as well as the implications of changing it. If there is interest in the potential of a program under full employment (i.e., no displacement or replacement) then the assumption is clearly reasonable (see Kemper & Long, 1981) and little additional analysis is required. Conversely, if unemployment is assumed to persist, then an accurate program assessment necessitates examining the indirect labor market effects. This is generally done with sensitivity tests that estimate how the overall benefit-cost conclusions would change under alternative assumptions about the extent to which indirect labor-market effects exist. This procedure was used in benefit-cost analyses by Kemper, Long, and Thornton (1981) and Thornton, Long, and Mallar (1982). The issue of sensitivity tests is addressed again in the final section of this chapter, "Interpretation and Presentation."

Once the participant and rest-of-society perspectives have been resolved, they can be summed to yield the overall social perspective. In our example, increases in the value of output produced by the students (as measured by increases in their total compensation) are not offset by any indirect labor-market effects on other workers; thus, they enter the social perspective as a real increase in the value of social goods and services. Any psychological benefits (in excess of the value of output) that students or others derive from the increased student employment will also enter the social perspective. Given a fixed total tax burden, the increased taxes paid by students net out against the increased tax receipts of the rest of society. That is, they represent a redistribution of resources rather than a resource use, and, as such, are excluded from the social perspective.

Program effect: Changes in the use of other programs. In addition to the effects on employment, special education programs can be expected to influence the use of a wide range of other programs. These include income support, vocational, residential, transportation and social service programs. In all of these cases, the special education program may directly affect the extent to which its students use these other programs and may also indirectly affect the extent to which other persons use these programs.

When evaluating the effects a vocational education program might have on the use of other programs, it may initially appear that these indirect effects resemble the indirect labor market effects of displacement and replacement. For example, if students in special education participating in our hypothetical vocational education program reduce their use of other employment and training programs, then new openings may be made available to students otherwise excluded. Alternatively, if the students in vocational education increase their use of other programs that supplement their vocational education, they may fill positions that otherwise would have been filled by other students.

However, these indirect effects differ from those that occur in the labor market, and so, their treatment in the benefit-cost analysis is different. The essential difference between the indirect labor market effects and those for other programs is that changes in the resources devoted to programs reflect government decisions about resource allocation rather than constraints on the economy. When students are diverted from other programs into the new vocational education program (as we assume in our example), the resources that would have been used to provide those other program services could be reallocated to alternative uses. One such alternative would be to reduce the size of the other programs by not filling the spaces vacated by the students who left to enter the vocational education program. In this case the freed resources could be devoted to other social programs, used to pay for the new vocational education

program, or used to reduce the overall government budget. Alternatively, the resources could be left with their original programs, enabling those programs to serve persons who otherwise would have been unserved. In any of these cases, the resources that are saved when the students in vocational education reduce their use of alternative programs are benefits to the persons who would have had to pay for them (in most cases this group will be the taxpayers). This is true regardless of how those persons choose to reallocate and spend their savings.

This situation differs from the indirect labor market effects because unemployment is assumed to be involuntary. Unlike decisions about the resources to be devoted to the programs, unemployment is viewed not as a conscious decision about the allocation of resources, but rather as an unwanted condition resulting from constraints on the economy. There is a presumption that unemployed workers would like to work if they could find a job. If a worker is displaced from a job, there is a resource "saving" in the form of that worker's time. However, unless there is full employment, that work will be unable to be reallocated that time to his or her preferred option, a new job. Thus, there is a loss in the aggregate value of social resources measured by the lost earnings of the displaced worker.

Given that changes in the use of alternative programs can be analyzed without worrying about indirect effects, the central issue facing the analyst is to determine which programs will be affected and whether those effects will be benefits or costs. This issue is best addressed by reviewing all of the programs that are used by the persons who are enrolled in the program under study (the vocational education program, in our example). A change in school curriculum and any subsequent changes in adult activities are likely to affect the use of a wide range of programs and so this process should be as comprehensive as possible. It is essential to include programs that are substitutes for the program under study as well as those that are compliments. You would expect to reduce the use of substitute programs, thereby creating benefits, and to increase the use of complimentary programs, thereby incurring costs.

In Table 4-1 we have assumed that the vocational education program would substitute for other nonvocational school programs and will reduce the need for some adult vocational and support programs. At the same time, we have assumed that the students in vocational education will make greater use of programs such as transitional employment as they move from school to work. These are reasonable expectations, but changes in program use will ultimately be classified as benefits or costs depending on the actual use patterns observed in the evaluation.

Listing benefits and costs for other programs. The list of benefits and costs presented in Table 4-1 is only one example. While many special education programs will generate these benefits and costs, the list of benefits and costs will clearly be different for other programs, groups, or comparison situations. For example, under an evaluation of an early intervention program (compared with no early intervention program), a significant benefit may be the cost savings associated with reducing the special education services that would otherwise be required later on. Such costs savings would represent a benefit to the nonparticipant taxpayer (i.e., the rest of society) and an increase in the resources available to society. Other benefits may be derived from the effects of an early intervention program to the extent that it may reduce dropout rates (indirectly affecting future output and all other educational costs and benefits) and generate psychological benefits by enabling students to participate as fully as possible in regular classes and shed any "special education" stigma sooner than they might have otherwise.

The key to this process is to start with precise definitions of the program or policy being evaluated, the comparison situation, and the perspectives of interests. When these elements are specified, listing the benefits and costs is usually straightforward, although some issues (such as the indirect labor market effects and changes in the use of alternative programs) require careful analysis. This approach has been used in a variety of programs, including transitional employment for young adults with mental retardation (Kerachsky et al., 1985), long-term care for the elderly (Thornton & Dunstan, 1985), employment and training programs (Long, Mallar, & Thornton, 1981), apprenticeship programs (Mallar & Thornton, 1980), and offender rehabilitation programs (Mallar & Thornton, 1978).

Estimating Net Present Value

Thus far, we have described a general model for analyzing benefits and costs of special education programs. We focused on defining the analytical comparisons to be addressed and specifying the various outcomes to be studied. We now turn to the methods of using that framework to assess whether the program or policy under study generates impacts that are, in some sense, worth the costs required to produce them.

In designing the empirical work, the analyst must determine how much precision is needed. The required level will be determined by the needs of policy makers and by the magnitude of the policy question under study. Many decisions can be analyzed with an informal weighing of benefits and costs. Other decisions involve committing substantial resources or are difficult to reverse and therefore require more precise information and a more rigorous comparison of benefits and costs.

The precision of the analysis will be determined by the evaluation design and the analytical methods used. The number of persons observed, the procedures for selecting those persons, data sources, data collection procedures, statistical techniques, and analytical methods all interact to produce the level of confidence and certainty that can be placed in empirical findings. The challenge facing the benefit-cost analyst is to choose among these various factors in order to produce estimates that will provide a good basis for the decisions that must be made. In this regard, he/she must be sensitive to how the analysis will be applied and to how the various trade-offs that are made in designing the evaluation will affect the consequent level of certainty. In general, the more certainty required by the policy audience the more rigorous the evaluation must be.

The analyst must consider three general areas when designing the empirical components of a benefit-cost analysis. The first encompasses the estimation process for assessing the magnitude of program effects. The second area encompasses the procedures for valuing the various program effects. And the final area encompasses the procedures necessary for aggregating the values of individual benefits and costs that occur at different points in time so that overall judgments can be made. Each of these three areas is discussed in this section.

The selection of appropriate sampling and statistical techniques for estimating impacts is common to all empirical policy work and has been discussed widely.[6]

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[6] Lansing and Morgan (1971) provide a good introduction to the issues of evaluation design. Discussion of the appropriate statistical methods can be found in many statistics and econometrics books (see Amemiya, 1985, for example).

Therefore, we provide only a general overview of these issues below. Procedures for valuing and then aggregating the costs and impacts of a program are less standardized; thus, we review those procedures in more detail.

Estimating the Effects of the Program

In many ways, the most difficult task facing benefit-cost analysts is to determine the magnitude of a program's effects. They must estimate the extent to which the activities of the students who were enrolled in the program differ from the activities those students would have had in the comparison situation.

To estimate the effects of a special education program an analyst must determine what the students actually did and what they would have done in the comparison situation. While there are numerous measurement issues, the first step in this process is relatively straightforward. It requires only that the analyst observe what the students actually did. The second step is conceptually more difficult since the analyst must determine what the students would do under different conditions. This comparison situation cannot be observed; it must be estimated on the basis of factors that can be observed. To estimate the effects of a special education program an analyst must determine what the students actually did and what they would have done in the comparison situation.

There are several ways to estimate what a group of students would have done under alternative conditions. In general, they involve studying the activities of a comparison group of students -- that is, a similar group of students who were not offered the program services being evaluated. This similar group can be identified using the methods of a classic experiment or through the use of various matching techniques. No matter which method is used, the essential goal is to find a group that is identical to the group enrolled in the program with the exception of receiving special services. When this goal is achieved, the differences that emerge between the two groups can reasonably be attributed to the effects of the program under study.

The methods of classical experiments will generally provide the most accurate and statistically valid means of identifying a comparison group. These methods randomly assign program applicants to two groups. One group is offered the services that are being evaluated, the other group is offered only the services available under the comparison situation. If the assignment to these two groups is random, the two groups should be identical in all regards except the receipt of the services being studied.[7] On average, the two groups should initially exhibit the same measurable characteristics (for example, age, gender, ethnicity, previous schooling, and residential situation), as well as the same unmeasurable characteristics (for example, motivation, work attitudes, and general opportunities).

The advantage of an experimental design is that if the number of students assigned is reasonably large, the analyst can be reasonably sure of the comparability of the two

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[7] Technically speaking, there is the exception that the two groups will be identical. However, as with all random events, a chance exists that the two groups will differ in some respect. The probability of this chance will diminish as the sample of persons who are randomized becomes larger.

groups. In particular, the comparability of the groups in terms of unmeasurable characteristics is important since it is very difficult to control for the influence of such characteristics using statistical methods. Furthermore, experience has shown that results based on data generated from an experimental design tend to be stable with respect to changes in the specific details of the estimation process. Thus, this design can produce results in which a relatively high degree of confidence can be placed.

While experimental designs have been used for many social programs (see Greenberg & Robins, 1986, for a review of many of these efforts), they are not always feasible. For example, it may not be possible to conduct random assignment in an entitlement program. Such programs guarantee services to all members of a specific target group and so it would be infeasible to assign some applicants to a control group. However, if all applicants cannot be served or if the intervention is a new one where there is still doubt about its effectiveness, then random assignment can be a fair way of deciding who should get the program services, in addition to being a great aid in the analysis.

When it is infeasible to use an experimental design there are other means of identifying a comparison group. Such a comparison group should resemble the group under study and conform with the specified comparison situation. For example, if the comparison situation is a specific alternative program, the analyst would look for a group of students who was being served by that alternative program. Such a group might occur within the same district or in a different district. Other comparison groups that have been used by researchers include persons who were offered program services but who did not actually enroll and persons in similar circumstances in other districts where the special service is unavailable.

The problem with these types of approaches is that the treatment group (the students who get the special services) and the comparison group may differ in ways that confound the analyst's ability to isolate the effects of the intervention. For example, differences in individual characteristics, economic and social opportunities, parental support, ability, or motivation, if correlated with participation in the program under study, may create differences between the treatment and comparison groups that have nothing to do with program impacts. Analysts often use statistical methods, such as regression analysis, to control for these differences between the comparison and treatment groups. However, this approach is problematic because the analyst never really knows whether all factors that potentially influence the outcomes have been accounted for appropriately, and, therefore, whether the estimated impacts of the program are reliable. Such problems arise because of difficulties in (1) identifying precise or accurate measures of the specific characteristics that the analyst wants to control for; (2) including all relevant factors in the statistical model; and (3) understanding and specifying the appropriate relationship among factors and the outcomes of interest. All of these problems, if not handled appropriately, can create biases in the statistical estimates of impacts.

A third approach to identifying a comparison group is to use conjecture. That is, the analyst may estimate what would have happened to participants had they not enrolled in the program by relying on a general knowledge about the average outcomes of nonparticipants or on a knowledge of pre-enrollment status. Some researchers of supported-work programs (Hill, Hill, Wehman, & Banks, 1985), for example, have estimated impacts under the assumption that had participants not enrolled in the program, they would have continued in the activities they had prior to enrollment. These methods

clearly represent very crude estimation procedures and, ultimately, are not likely to withstand rigorous analytical criticism.

This third approach, however, can be useful in assessing the potential of special education programs to generate benefits that will outweigh costs, particularly when the likely pattern of student activities in the absence of the intervention is well know. For example, the approach might work well for evaluating programs that teach children with profound disabilities. In this case, recent history indicates that such children have faced a very narrow range of employment, social, and residential options. Thus, an analyst might have a reasonable degree of success in specifying an appropriate comparison situation for a program that serves such students.

However, this approach is likely to be misleading for student groups that have a wider range of options. Kerachsky et al. (1985) investigated this issue when they examined the activities of a randomly-assigned control group in the STETS demonstration, a project that tested a transitional employment program for young adults with mental retardation, whose measured IQ scores were between 40 and 80. They found that the percentage of control-group members who held regular jobs rose over the observation period, so that 20% of them held such jobs as the end of the study (22 months after persons were randomized into the control group). Thus, had the study been limited to using the difference between the preprogram and postprogram behavior of the participant group to estimate the impacts, it would have estimated substantially larger net program impacts than actually occurred.

The choice among these three approaches for estimating impacts -- (1) experimental design with randomized treatment and control groups, (2) comparison group, and (3) conjecture -- will depend on the degree of certainty needed by policy makers. In general, the experimental design will produce the most accurate estimates, and it should be used whenever feasible. In those cases where it is impractical to use an experimental design, the comparison group method often provides a reasonable alternative, if it includes rigorous statistical controls for intergroup differences that might influence the outcomes of interest. The conjectural approach should be used only when the primary interest is to develop hypotheses about the potential performance of a program; estimates based on this approach are unlikely to provide an accurate test of whether a program generates benefits that exceeded its costs.

Regardless of the design adopted, the data collection process will be a major issue to resolve. Here, again, a substantial literature exists on the appropriate sources of data and the best technique for collecting these data (e.g., see Lansing & Morgan, 1971 or the series of papers published by Sage Publications in the series Quantitative Application to the Social Sciences). Data sources include the students, their parents, teachers, school records, and the records from other agencies that might be affected by the intervention (for example, state vocational rehabilitation or developmental disabilities departments, the Social Security Administration, and State Unemployment Insurance systems). The collection procedures include interviews (either in-person, telephone, or mail), extracts from service providers, or existing data systems.

In assessing alternative data sources and procedures, the following six criteria are helpful:

1. Accessibility. The ability or willingness of a data source to provide the necessary data.

2. Completeness. The extent to which data can be obtained for all sample members (sample completeness) and the extent to which a data source provides all the data necessary for the evaluation (data completeness).

3. Accuracy. How well the data reflect actual events or characteristics.

4. Timeliness. Whether the data pertain to the specific time periods of interest, and whether the data can be obtained without excessive delays after the occurrence of events under study.

5. Flexibility. The facility with which a data-collection strategy can accommodate changes in research goals, budgets, or the general program environment.

6. Cost. The amount of money necessary to implement a particular strategy and the level of certainty with which cost projection can be made.

It is also essential that all data sets be consistent with each other, since the accounting framework necessitates that benefits and costs be measured for the same set of individuals. In particular, it is essential that the costs that are included in the accounting framework be those that produced the outcomes that are included in the framework. Thus, the analyst must ensure that the program costs that are included in the analysis accurately represent those that were actually incurred to serve the treatment group. To do so, the analyst usually follows a single group of individuals over time and monitors the costs of serving them and then their subsequent activities. If costs and impacts are estimated based on the experience of different groups, them it is incumbent upon the analyst to document whether the two groups are essentially identical.

Valuing the Impacts of the Program

Once the impacts of a program have been measured, the analyst must determine the value of these effects. Two general methods are used to assign dollar values; the applicability of these methods depends on what the effects are and how they are measured. The first and simplest method is to use dollar-denominated outcome measures. The other method is to estimate the value of the effects based on estimated prices (termed shadow prices) that reflect the estimated value per unit of change in behavior or outcomes.

Using dollar-denominated outcome measures. The simplest method for estimating the value of an impact is to use, if available and appropriate, outcomes that can be denominated in dollar terms. In a benefit-cost analysis, a number of impacts can often be (or, by definition, must be) measured directly in terms of dollars. For instance, in the example of the vocational education program for students with disabilities, a researcher can attempt to measure the impacts of the program on earnings, transfer payment receipts, tax payments, and Medicare/Medicaid benefits. For such variables, the key issue is whether the data sources, data collection procedures, and estimation techniques will produce accurate estimates. It is also necessary to ensure that the dollar values have been adjusted for inflation, an issue we consider in the next section.

Using shadow prices to estimate the value of program outcomes. Shadow prices are essentially prices that are not determined by markets. Instead, they are estimated by the analyst to reflect the average resource value of specific activities or goods. These

shadow prices are used in the analysis in a manner similar to how unit prices are used in regular markets -- the change in outcome is multiplied by the appropriate shadow price in order to estimate the total value of the change.

Shadow prices are a major source of uncertainty in benefit-cost analysis. In part, such uncertainty reflects the concern that since these prices are not determined by the workings of a competitive market they may fail to capture the true resource cost of changes in the outcomes of interest. It also reflects problems associated with making the estimates, which range from conceptual problems about correctly defining a shadow price for an outcome to estimation problems caused by inadequate data. Analysts should recognize this uncertainty and examine its implications by documenting the shadow price estimates to enable readers to form their own judgments about their appropriateness. They should also conduct sensitivity tests that indicate how the final net present value estimate would change in response to variations in estimates of key shadow prices. Such tests can indicate the degree to which uncertainty about a specific shadow price tempers the overall benefit-cost conclusions.

An example of the use of shadow prices can be shown by estimating changes in students' tax payments. It is anticipated that increases in earnings will lead to increased tax payments by participants. Without shadow prices, a researcher would have to collect data on changes in payroll taxes, local, state, and federal income taxes, and sales and excise taxes -- a complex and expensive process. Alternatively, changes in tax payments can be estimated more easily by multiplying available estimates of effective tax rates by estimates of changes in income derived from the impact analysis. Pechman (1985) has estimated these effective tax rates (including all types of taxes) on total income for various income classes. Table 4-2 summarizes his findings.

A similar shadow pricing effort is necessary for estimating impacts on fringe benefits, which must be included as part of total compensation when valuing employment effects. Fringe benefits include workers' compensation taxes, medical insurance contributions, pension and retirement contributions, and unemployment insurance.[8] In this case, estimates of fringe-benefit rates can be multiplied by the estimated effects on earnings to estimate the effect on fringe benefits.

Estimates of fringe-benefit rates can be obtained from several different sources. For example, the U.S. Department of Labor (1980) examined average compensation levels for low-wage workers (that is, workers who earned less than $3.00 of total compensation per hour in 1977, which would be approximately equal to $5.50 an hour in 1986 dollars) in the private nonfarm economy. They found that in 1977, wages and salaries for these workers accounted for 85% of total compensation. The remaining 15% of employer payments went for various fringe benefits. These figures indicate that fringe benefits would represent, on average, almost 18% of total wages and salaries (i.e., 0.15 divided by 0.85).

This figure is useful for estimating fringe benefits for the target population of many social programs since it covers a wide range of jobs and reflects the position of low-wage workers who are often the target of such programs. However, it is based on

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[8] Paid vacation and sick leave are also fringe-benefits, but these are best measured by simply including vacation time or sick-leave time in the estimates of total time employed and total earnings.

Table 4-2

Effective Tax Rates by Adjusted Family Income (1980) Under Alternative Incidence Assumptions[a]

Adjusted Family Income (thousands of dollars)[b]	Taxes as a Percent of Total Income	
	Most Progressive Incidence Assumptions[c]	Least Progressive Incidence Assumptions[d]
0-5	32.5	57.7
5-10	20.3	26.7
10-15	20.5	24.9
15-20	21.5	25.0
20-25	22.7	25.6
25-30	23.2	25.9
30-50	24.5	26.6
50-100	26.5	26.9
100-500	27.3	24.1
500-1,000	27.0	19.8
1,000 and more	31.0	20.7
All Classes	25.2	26.3

Source: Joseph A. Peckman, Who Paid the Taxes, 1966-85. Washington, DC: The Brookings Institutions 1985. Table 4-3.

[a]Effective tax rates are paid as a percentage of income. Taxes accounted for here include federal, state, and local income, corporate profits, excise, sales, and property taxes.

[b]Family income includes employer compensation, earnings on investments (e.g., net rental income, dividends, capital gains), transfer payments, and nonmoney income (i.e., value of food stamps, medicare and medicaid, net imputed rent on owner-occupied dwellings, and unrealized gains).

[c]The most progressive incidence assumptions assume: (1) that both employee and employer payroll taxes are borne by employees in proportion to their level of earnings and (2) that corporate income and property taxes are distributed in proportion to reported property income taxes.

[d]The least progressive incidence assumptions are that half of payroll taxes on employers and half of corporate income taxes are shifted to consumers.

relatively old data and may fail to capture recent changes in such mandated fringe benefits such as Social Security taxes, Workers' Compensation, and unemployment insurance.

The Bureau of Labor Statistics no longer collects the data that were used to estimate this fringe-benefit rate. Other sources are available, but are somewhat limited by the types of firms that they study and the range of high and low paying jobs that are included. However, they generally indicate fringe-benefit rates similar to those from the earlier Labor Department study. For example, Jones (1986) examined data from the 1984 Survey of Current Business and estimated that average fringe benefits (excluding those for time not worked, such as vacation and sick-leave) were 21%. Also, the U.S. Chamber of Commerce (1986) recently analyzed data from 1,000 firms and estimated that fringe-benefit rates averaged 25% (again, excluding payments for time not worked).

In practice, it is probably best to select an estimate from this range and then test the importance of that selection by conducting sensitivity tests. Rates in the lower part of this range (that is, those close to 18%) should be used when participants in the program being evaluated will work predominately in low-wage jobs. In any event, the results of benefit-cost analysis of social programs are unlikely to depend crucially on the estimated fringe-benefit rate, and so the use of any specific rate from this range is likely to be acceptable.

Shadow prices can also be estimated for special education programs. Lewis, Bruininks, and Thurlow (see Chapter 3) estimated the average annual costs per student with a disabling condition for 12 program service areas (e.g., occupational therapy, adapted physical education, hearing impaired), for an early intervention program, and in total for the students in special education served during the 1983-84 school year in one school district in Minnesota. A study by the Rand Corporation (Kakalik et al., 1981) estimated the annual nationwide costs per student of special education programs by the type of educational placement, type of instruction, age, and type of disability during the 1977-78 school year.

These studies indicate that program costs vary considerably by type of service, client, handicapping condition, education placement, and type of instruction. In addition, local variations in prices or costs for services and goods will influence cost estimates. Thus, cost estimates made for one program or one time period may be inappropriate for other programs and time periods.

Such variation, which affects virtually all shadow-price efforts, implies that analysts should examine program definitions carefully to ensure that appropriate shadow prices are used. This is particularly true when the shadow prices are used to estimate costs that play a central role in the evaluation, as would be the case for the costs of the intervention being studied.

Estimates of the average benefit payments and average administrative costs of the various income transfer programs, as well as estimates of the average costs of various types of employment, education, counseling, recreational, housing, or transportation programs, may be used as shadow prices to represent the value of the resources used in

these programs for a given unit of time.[9] Estimates of average costs can be derived from many sources. Table 4-3 provides a set of estimated shadow prices for various types of alternative programs.

Intangible benefits or costs. We have noted that many programs' effects often cannot be valued monetarily, but can be incorporated by the analyst into the benefit-cost framework by including measures of intangible outcomes. For example, self-sufficiency may be assessed by examining the presence of personal benefactors or caretakers, the ability to handle money or travel independently, or moves to less supportive housing environments. Preferences for work may be examined by an individual's level of satisfaction with his/her employment, absenteeism rate, and performance rating. Quality of life will be reflected in part by estimated changes in earnings and any changes in an individual's living situation. It may also be assessed by examining such other factors as the number of social events attended, social contacts, and individuals' own reported assessments of the quality of their lives.

The key to including measures of these intangible components is to identify indicators of the relevant concepts. While no explicit monetary value will be assigned to changes in these indicators, they can be used as evidence of whether the program had the desired effect on intangible outcomes. They can also be used to interpret the measured net present value. For example, if measured costs outweighed benefits, then the measured net present value could be thought of as the price of producing the observed change in the indicators of intangible benefits.

This was the approach adopted in a recent evaluation of a demonstration that evaluated the benefits and costs of a community-based system of long-term care for elderly persons (Thornton & Dunstan, 1986). In that study, it was estimated that provision of these services had several positive effects on the elderly persons who received them. While no explicit value was made of these effects, the evaluation noted that participants had fewer unmet needs, were more confident about their ability to get needed services, and generally expressed greater satisfaction with their lives. Thus, the final conclusion was that total benefits would exceed costs if society valued the increase in well-being (indicated by the various measures) by at least the amount by which measured costs exceeded measured benefits.

Aggregating the Valued Benefits and Costs

The final step in producing a net present value estimate is to determine the appropriate aggregation methods and assumptions. This step entails more than simply summing the estimated value of benefits and costs, because benefits and costs for almost all programs will occur at different points in time.

It is not only the magnitude of benefits and costs, but also the timing of their occurrence, that is relevant to the benefit-cost assessment. To aggregate benefits and costs that occur at different points in time, the analyst must consider three issues -- inflation, discounting, and extrapolation.

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[9] Ideally, marginal costs (i.e., the change in total program costs covered by the addition or subtraction of one participant) should be used. Average costs are typically used because they are easier to measure accurately and, under plausible assumptions, should be quite close to long-run marginal costs.

Table 4-3

Estimated Average Monthly Costs for Training, School, Residential, and Income Support Systems

Program	Units	Average Cost Per Month	Data Source
Sheltered Workshop	per client	550	U.S. Department of Labor (1977)
Secondary-Level Classroom Classroom Education	per student	580	Kakalik, et al. (1981) Table 2.5
Other School Programs	per student	320	Kakalik, et al. (1981), Dearman and Plisko (1982), Grant and Eiden (1982)
Work Study Program	per trainee	130	Kakalik, et al. (1981) Table 2.5
Residential Institution or Center	per resident	2,300	Hauber, et al. (1984) Table 21
Group Home	per resident	1,400	Hauber, et al. (1984) Table 21
Foster Care	per resident	550	Hauber, et al. (1984) Table 21
Semi-Independent Living Program	per resident	930	Hauber, et al. (1984) Table 21
Social Security Disability Insurance	per recipient	470	Social Security Administration (1986) p. 4
Supplemental Security Income	per recipient	260	Social Security Administration (1986) Table 176
Medicare (persons with disabilities)	per enrollee per claimant	170 290	Social Security Administration (1985) Table 137
Medicaid (persons with disabilities)	per recipient	340	Social Security Administration (1985) Tables 153 and 155
Food Stamps	per recipient	43	Social Security Administration (1985) Table 197
Aid to Families with Dependent Children	per recipient per family	110 310	Social Security Administration (1985) Table 195

NOTES: Estimates are expressed in 1985 dollars, with the exception of those for Social Security Disability Insurance and Supplemental Security Income (December 1984), Medicare (FY 1982), Medicaid and Food Stamps (FY 1984), and AFDC (1983). All numbers are general averages (rounded to two significant digits) for the U.S. as a whole. Costs in specific localities may vary considerably from those presented here. In addition, costs may vary for specific types of services. For example, the costs of many types of post high school programs have been aggregated in the category of other school programs. These include college costs of $411 per month and post-secondary vocational education costs of $182 per month. As a result, the estimates here should be regarded as indicating the general order of magnitude for costs rather than as precise estimates of actual costs.

Inflation. To adjust for the effects of inflation, the analyst should denominate all values in dollars from a specified base period. This can be done by valuing benefits and costs based on shadow prices or on cost data that represent market values in the specified base period. It can also be done by adjusting dollar-denominated impact estimates using a price index. One such index is the implicit price deflator for the gross national product, which is reported each quarter by the U.S. Council of Economic Advisors (1986). Using a single index, such as the implicit price deflator, has expositional and computational advantages. In addition, a broad-based index such as the GNP implicit price deflator can more accurately reflect price changes in the wide range of commodities that are likely to be affected by social programs.

Discounting. All benefits and costs must be calculated in equivalent values by discounting those that occur in later years by a factor that reflects the return that these resources could have earned in the interim between the base period and the time of occurrence. This adjustment is needed because a benefit or cost achieved in a current year is worth more than an identical one achieved later. For example, a monetary benefit that is earned, say, this year could be reinvested and would rate a return over time; consequently, the sum of this benefit and the return on investment would be greater than an equivalent initial benefit achieved later.

Streams of values that have been discounted are termed "present values." For example, estimate the present value (PV) of a $1,000 benefit that is expected to occur 10 years from now, the calculation would be as follows, assuming that the rate of return that could have been earned (net of inflation) on an investment during those 10 years is 5 percent per year:

$$PV(1 + .05)^{10} = 1{,}000.$$

Dividing both sides of the equation by $(1+.05)^{10}$ yields a present value of $614. In other words, a $1,000 benefit earned 10 years from now is worth $614 today given a discount rate of 5%. By using present values, benefits and costs earned in different years are converted into comparable base-period dollars.[10]

The appropriate discount rate to be applied in evaluations of social programs is always somewhat in dispute. While the choice of a discount rate is very important for the evaluation and is well established theoretically, there has never been a completely satisfactory way to estimate discount rates. The fact is that the choice of discount rate is typically made arbitrarily. Most studies of social programs have used rates between 3% and 10%. (The 10% rate is mandated by the U.S. Office of Budget and Management, 1972, for evaluating government investments. One possible procedure is to assume a middle value, 5%, and then to test the sensitivity of the results to this assumption by using 3% and 10% discount rates.)

A lower discount rate will increase the present value of benefits or costs that accrue later in time; a higher discount rate will produce a lower present value. Consequently, because the majority of the costs of social programs are incurred during the in-program period (typically the base period to which other benefits and costs are

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[10] Values are typically discounted to the same base period used in the inflation adjustments - usually the period during which participants were in the program (and during which most costs were incurred).

discounted) and because benefits typically accrue later in time, the social net present value will usually change in the opposite direction from the change in the discount rate. That is, if a higher discount rate is used, the present value of future benefits will fall and, because costs that accrue near the base period will not be affected very much by the discounting procedure, estimated net value will decline.

Extrapolation. Often the benefits of a program are expected to continue after the observation period, the period during which the impacts of the program are measured. This is particularly true of educational programs, which may produce changes throughout an individual's lifetime. To account for these impacts, the analyst must decide which benefits (or costs) will persist over time, how long they will continue, and at what rate they will persist. For example, if a program is expected to increase the output of a student in special education over what it would have been in the comparison situation, the analyst must decide how long this difference in postprogram output will persist (for example, throughout the individual's work force participation?). The analyst must also consider whether the magnitude of the initially observed effect will remain at the same level, decline over time, or increase.

To ignore unobserved impacts is clearly inappropriate; however, the lack of direct observations makes it difficult to estimate the magnitude and value of impacts with confidence. Due to the great amount of uncertainty surrounding each of these questions, we recommend that extrapolations be made on the basis of fairly straightforward methods and relatively simple assumptions that draw on available evidence about long-term effects, and that can easily be tested to assess the effects of alternative extrapolation assumptions.

Interpretation and Presentation

Given that much of the value of a benefit-cost analysis stems from the process of organizing and aggregating the data, the presentation of any findings must capture as much of this process as possible. To do so requires that the analyst report more than just the final net present value. It is also necessary to indicate the level of certainty that can be attributed to the analysis and to indicate those benefits and costs that have been omitted from the quantitative estimates.

The basis for this discussion is Table 4-1. Presenting the estimated values of benefits and costs in this format provides readers with all the key information in one place. This summary table is dense, giving both a quick overview of the results and much of the detailed information necessary for assessing the degree to which individual benefits and costs contribute to those overall results. It also summarizes the general impact of the program on the distribution of resources between students and the rest of society.

The discussion surrounding this table must reference any nonvalued impacts that might influence the overall conclusions. Self-esteem, quality of life, health status, and the provision of equal opportunity can be important outcomes of special education programs. While they are generally difficult to value in dollar terms, they cannot be ignored in making the final benefit-cost assessments.

These impacts can be included in many ways. One way is to include them as additional rows in the summary table and to include pluses or minuses (depending on whether the nonmeasured item is expected to be a benefit or cost) where the dollar

estimates would have gone. This is the approach used in Long, Mallar, and Thornton (1981) and in Kemper, Long and Thornton (1981).

Another approach is to include in the summary table a brief paragraph outlining the available evidence on these impacts. As mentioned, Thornton and Dunstan (1986) did so for a program that examined long-term-care options for elderly persons with impairments. Their summary table included two panels. One presented the estimated dollar values for those impacts for which dollar estimates could be derived (for example, changes in the costs for hospitals, community services, and nursing homes). The other panel described the estimated impacts on death rates, community residence, the sample members' reports of unmet needs and their satisfaction with life, and the reports of informal caregivers (typically, the spouses and children of the elderly sample members) about their satisfaction with service arrangements. The final conclusions were then based on comparisons of the measured net costs and the intangible benefits.

The discussion of the summary table must also examine how the overall results would be altered by changes in the assumptions and estimates used to derive them. Such sensitivity tests provide a way to understand the level of confidence that can be placed in the findings and indicate the specific aspects of the program and its evaluation that are most important for producing the overall benefit-cost conclusion.

Some of the types of assumptions or estimates that the analyst may want to test have been mentioned previously. These and others may include (1) the specific shadow prices used; (2) extrapolation factors (e.g., assumptions about how long the impacts will persist in the future and at what rates the magnitude of effects will decline or increase over time); and (3) discount rates. They may also include examinations of those estimated effects that appear to be particularly uncertain. For example, if postprogram output is expected to be a major benefit, the analyst may want to test the sensitivity of the findings to different assumptions about indirect labor market effects or to alternative methods for estimating the program effect on this output.

The sensitivity tests should be presented in a second summary table. This table would include the initial estimates based on the assumptions that the analyst feels are most accurate. It would then include the alternative estimates of the net present value derived in the sensitivity tests.

The analyst may learn that some underlying estimates and assumptions have relatively little impact on whether the estimated net present value is positive or negative and, thus, have minor implications for the overall benefit-cost assessment. Other assumptions may be found to affect the final net present value substantially. Such a finding would suggest that the overall estimates should be interpreted carefully in light of their sensitivity to changes in these assumptions. It may also suggest that, if possible, the analyst should investigate in greater depth the phenomenon underlying any assumptions or estimate to which the results are so sensitive.

In the final presentation, the findings of the benefit-cost analysis should include (1) a benchmark net present value estimate and (2) a set of alternative estimates based on the sensitivity tests. All of these estimates would then be compared with the available information on the impacts that could not be valued. The findings of the benefit-cost analysis should then be based on all of these estimates.

In the end, benefit-cost analysis must be seen as a process for organizing information. It is not an inflexible rule that can be used to make decisions. Rather, it helps an analyst to sort through a wide variety of data and to aggregate them so that decisions can be made more easily. In particular, it provides a convenient summary measure for those impacts that can be measured and valued in dollars -- net present value. It also provides a framework for assessing the potential importance of impacts that could not be valued and the uncertainty surrounding the various impacts that could be valued. The policy maker must still make the decision based on the available evidence and his or her value judgment. However, it is hoped that, by making systematic comparisons of a benefit-cost analysis, better decisions can be made more easily.

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CHAPTER 5

Empirically Testing the Use of Benefit-Cost Analysis in Special Education

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Are the outcomes produced by public school special education worth their costs? Increasingly in the public policy forums and literature the question is being raised as to whether we are "getting our money's worth" from special education programs in our public schools. This issue has been addressed through the application of benefit-cost analysis in many other social service programs for the regular population (Ashenfelter, 1978; Psacharopoulos & Woodhall, 1985; Thornton, 1984) and even in a few recent public service employment programs for adults with disabilities (Hill, Hill, Wehman & Banks, 1985; Kerachsky, Thornton, Bloomenthal, Maynard & Stephens, 1985; Martin, Schneider, Rusch & Geske, 1982). With the increasing application of benefit-cost analysis to social service programs, the public has come to expect similar economic analysis of special education.

The "need" for special education is well established in the literature and political arenas based upon concerns regarding the value of providing children and youth with handicapping conditions access to social and learning opportunities similar to those afforded their cohorts without handicaps. Most analyses on the merits of special education services thus focus upon issues of access, equal opportunity, features of program models, and evaluation of program effects. The socioeconomic efficiency and productivity of special education or transitional employment services has received only minimal attention by policy makers, researchers or practitioners. To date, only a few efforts have systematically examined special education services from a program efficiency or benefit-cost perspective (Conley, 1973; Cronin & Cuvo, 1979; Hill et al., 1985; Hill & Wehman, 1983; Kerachsky et al., 1985; Schneider, Rusch, Henderson & Geske, 1981; Thornton, 1984), although some recent attention has been directed at examining the costs of special education (Decision Resources Corporation, 1983; Hartman, 1981; Kakalik, Furry, Thomas & Carney, 1981; Raphael, Singer & Walker, 1985). Beyond employment statistics, little other information of a systematic nature has been collected on the economic benefits of special education programs. The evaluation of special education services for children and youth with handicaps is admittedly complex and should be focused upon the broadest form of analysis. Nevertheless, one useful, but by no means complete, strategy of special education evaluation involves the development of program outcome information in economic terms and systematic benefit-cost or cost-effectiveness assessments.

The evaluation of special education program activities has been justified for a number of reasons. The most frequently expressed rationale is the need for "improving program effectiveness," which focuses on how well the program is meeting its stated goals and on what changes can be made to enhance the desirable outcomes. A second evaluation perspective focuses upon a values orientation that examines whether special education programs provide appropriate opportunities for children and youth with disabilities. This approach, for example, might assess the appropriateness of services in terms of opportunities for integrated learning, or the extent of parental involvement in important educational decisions. A third perspective focuses on the need for "fiscal accountability" to either the school district or external agencies, and assesses whether funds have been allocated and used for their intended purposes. A fourth concern is the need to determine whether the program itself is "worth its cost," and whether the

program generates outcomes for individuals with disabilities that justify the costs of producing them. Obviously, all evaluation perspectives are necessary to assess the value and results of special education services. This report deals primarily with only one of these evaluation perspectives, that is, to assess whether the economic benefits exceed the economic costs of special education services for a particular sample of students with disabilities. Unfortunately, this question has been largely ignored in the special education evaluation literature.

In most basic terms, benefit-cost analysis is concerned with assessing the economic efficiency of programs by comparing the benefits against the costs of services. Thornton (1984) succinctly describes the primary aspects of this analytic approach:

> The basic technique. . . . is to assign dollar values to all estimated effects and costs. These values are then summed together to yield an estimate of the programs net present value (i.e., the difference between the benefits and costs where all dollar values are adjusted to reflect their value in a specific base period). This process is called "discounting" and is used to adjust the value of benefits or costs that accrue over several time periods to reflect their value at a specified base period. . . . A positive net present value indicates that resources are being used efficiently. A negative net present value indicates that (at least at its current scale) the program's resources could be used more efficiently elsewhere. (p. 226)

Several applications of benefit-cost analysis of social programs can be found in the literature (e.g., Kemper, Long, & Thornton, 1981; Levin, 1983; Long, Mallar & Thornton, 1981; Thompson, 1980; Warner & Luce, 1982; Weisbrod, 1981). In addition, Thornton and Will (see Chapter 4) as a part of this project have reviewed many of the processes, problems, and prospects in the use of this analytical technique with special education programs. Consequently, such review will not be repeated in this paper. [Those readers unfamiliar with the conceptual and technical features of benefit-cost analysis would be well served by reviewing any of the above sources.]

The application of benefit-cost analysis to social and educational programs has been a subject of controversy, due in large part to difficulties in assigning dollar values to program effects. This controversy has been particularly acute in the field of special education where traditionally most benefits have been assumed to be based upon achieving important social and educational values and, therefore, largely unmeasurable in monetary or economic terms. This paper attempts to resolve some of these difficulties by examining a specific special education program area with preliminary empirical data. Specifically, this paper (a) identifies a conceptual framework wherein special education costs and benefits can be comprehensively described and valued for analytic purposes, (b) develops a typology for linking the costs and perceived benefits of special education in a specific program area, (c) presents empirical data from a large suburban school district case study relative to services for youth with mild mental retardation, and (d) examines a number of alternative benefit-cost assumptions for estimating probable program results. The design and data for this paper are drawn from the larger study dealing with the costs and follow-up benefits of special education programs in a large suburban school district.

Method

In this chapter an attempt is made to employ benefit-cost analysis in the assessment of a specific public school special education program serving students with mild mental retardation. Although other evaluation designs and techniques are being employed to assess this program (see Chapters 2 and 3), this chapter reports only the formal benefit-cost analysis results. The strengths and limitations of this approach will be discussed in later sections.

Drawing from data collected in the larger study, certain special education costs and benefits were identified and valued for a sample of former students with mild retardation in a suburban school district. The design and data collection methods for the larger study are described in Chapters 2 and 3 and will not be reported here. Nevertheless, it is important to note that the data reported in this paper have been derived from a comprehensive follow-up study of students who graduated or would have graduated between the years 1977 and 1984 from two high schools in a large suburban school district in Minnesota. Information from school records and outcome information was collected from a sample of 311 students in special education and 698 in regular education. The entire population of students in special education was surveyed, while random sampling techniques were used for the regular student population. The final special education sample with complete follow-up data included 220 students with learning disabilities, 54 with mild mental retardation, 22 with speech impairments, 14 with emotional disabilities, and 4 with visual impairments. All students in special education in the sample had received at least one year of special education services sometime during grades 10-12. The entire sample of students with mild retardation in the larger study was selected as the original sample for this paper. However, all 11 1984 school completers were excluded from the final sample because of their limited time in the community; and 15 other respondents were excluded because their intelligence scores were greater than 80. Thus, the final subsample included all respondents with mild mental retardation with intelligence scores below 81 who completed school between 1977 and 1983, and totaled 28 young adults.

School record information was obtained from students' cumulative and special education files. Information obtained from cumulative files included graduation status, attendance, grade point average, class rank, and results of group-administered aptitude and achievement tests. Information obtained from special education files included individually administered aptitude and achievement tests, referral reason and source, and detailed service provision information from each year special education services were received during a student's complete school career (see Chapter 2).

Outcome information was obtained during the spring and summer using a mail questionnaire and/or phone interview procedure. Follow-up response rates for outcome information were 66% of all students in special education and 68% of the students in regular education. Follow-up items elicited information in eight general areas: (a) leisure activities, (b) limitations on activities, (c) education, (d) employment and earnings, (e) financial independence, (f) school experiences, (g) special training, and (h) friendships (see Chapter 2).

Cost data were obtained from school and state records. The specific data collection procedures and results are described and analyzed in Chapter 3.

Results

Summary of Data

Table 5-1 is a summary of relevant school record and follow-up outcome information specific to the sample of 28 students with mild mental retardation who are included in this study. The data in this table profile some interesting characteristics of the sample. Of the 64 students in the initial sample for the years 1977 to 1983, 67% responded to the follow-up questionnaire. Excluding school designated students with mild mental retardation having intelligence scores greater than 80, the final subsample included 28 young adults with mild mental retardation. Rates of employment for the respondent subsample were quite high (82%); only 18% were unemployed. The average annual earned income for employed individuals was $6,475, and most of the sample lived with family members (60%) or independently (25%).

Assessment of whether special education is worth its cost in monetary terms can be addressed in at least two ways. The first is to estimate the average cost of a unit of special education and directly compare this figure with the earnings that might be generated in the subsequent employment of program participants. The second method is to use a standard benefit-cost analysis with a comparison group for determining net effects in monetary terms. Both of these techniques are described and results are estimated in this paper.

Use of Human Capital Theory and Earnings Functions

Although educational production and earnings functions have not been employed to assess the effects of special education, this form of analysis has been used successfully in other areas of education and in the human capital literature (Hanushek, 1986; Levin, 1970). If it is known, for example, what an hour of special education might cost and, in turn, what this hour of instructional service might contribute to the future earnings of participants, it should be feasible to estimate if and when special education might pay for itself in monetary terms. Data resulting from this study provide useful representations for testing this human capital theory and earnings function approach.

Special education costs. The costs per hour of instruction are taken from earlier cost estimates based on actual resources employed in providing special education services to the sample used in this study (see Chapter 3). From the earlier analysis it was estimated that the average per student hourly cost of special education services to students with mild mental retardation, over the course of their entire elementary and secondary school experiences, was approximately $9 in 1984 dollars. This figure represents a weighted average based on actual hours of service and their respective costs. (Average hourly per pupil elementary and secondary special education service costs for the sample of students with mild mental retardation were $14 and $7, respectively, while average per pupil hours of service were twice as great at the secondary level.) Although other special education services also were provided to the students with mild mental retardation in this sample, the hours of these other services were relatively minor and their hourly costs were within the same range as services for students with mental retardation. From the earlier study (see Chapter 3) it also was estimated that the average per pupil hourly cost of special education services to all students within the district was $14 in 198- dollars. Adjusting for the fact that average per pupil hours of service were twice as great at the secondary level and using a 6% interest rate, the end of secondary school present value of special education hourly

Table 5-1

Summary of School Record and Follow-Up Outcome Data for Sample Students with Mild Mental Retardation in Study

I. School and Sample Information:	
Total Graduates or completers with mild mental retardation between 1977-83	63 students
Number of respondents with complete follow-up data	43 young adults
Response rate for school sample with mild mental retardation	67%
Males	51%
Females	49%
Subsample of all respondents with I.Q. scores below 81	28 young adults
Males	41%
Females	59%
School Variables:	
Graduated	81%
Not Graduated	19%
Mean I.Q. Score	72.6 (SD = 5.31)
Students with work program in school	72%
Students with vocational program in school	91%
II. Follow-Up Post-School Information:	
Employment Status:	
Competitive paid employment	82%
Unemployed and seeking work	11%
Unemployed and not seeking work	7%
Total	100%
Income/Job Characteristics:	
Average earned income for total sample	$5,319
Average earned income for those employed	$6,475
Average hourly earned income for employed	$5.55
Average hours of work per week for employed	27
Average number of different jobs since school	3.59
Receiving special training since school	36%
Financial Independence:	
Respondents receiving SSI (Average SSI received per month: $201)	15%
Respondents receiving medicaid	7%
Respondents receiving food stamps	7%
Respondents with checking account	44%
Respondents with credit card	40%
Respondents with vacation in 1984	52%
Respondents with driver's license	58%
Community Living Arrangements:	
With family	60%
Institutionalization	2%
Group or Foster Home	13%
Independent (or with spouse or friends)	25%
Total	100%

Source: Primary and other data from Chapter 2 and Hagstrum (1987).

costs was estimated to be approximately $11 for the students with mild mental retardation and almost $18 for all students within the district.

Special education earnings. It is possible to estimate the contribution of special education to earnings by formulating an earnings function for the sample. This was accomplished by drawing on data from a follow-up study with these same students after they left school and entered society and the labor force, and by employing multiple linear regression techniques. The design, methodology and results of the larger follow-up study are reported in Chapter 2.

Optimally, it would be desirable to develop an annual earnings function for the subsample of 28 students with mild mental retardation who were provided special education services within the school district during their educational careers and who subsequently responded with follow-up information. Unfortunately, the regression results from the sample were not statistically reliable due to the small sample size. On the other hand, when the sample of students with mild mental retardation was combined with the total sample the results became significant. Both the equation and individual coefficients reported in Table 5-2 are significant. [It is important to note that although some of the individual coefficients for the smaller sample of students with mild mental retardation were not statistically significant, all signs of the coefficients were identical to those in the larger sample and the relative sizes of the coefficients were similar.] The larger sample includes 455 students in regular education, some of whom had special education services prior to high school, and 163 students in special education -- including the 28 students with mild mental retardation, all of whom had documented individual educational plans (IEPs) during their senior high school years (grades 10-12) between 1977 and 1984.

Table 5-2 presents the annual dollar return from earned income for specific characteristics of the total sample of post-school respondents. Although Table 5-2 represents only a linear function for the total sample, results are available for nonlinear forms of the equation and by sex of the individuals analyzed separately. Results are also available for other students in special and regular education subsample populations. For illustrative purposes in this paper, however, this single equation for the total sample is being used for the analysis.

Among this sample of 618 individuals, about $69 of competitively earned annual income was associated with each additional point on the student's standardized intelligence score; males were receiving approximately $2383 more annually than females; and each additional year of post-school experience was worth about $2320 of yearly income.

Of particular interest is the observation that approximately $1.30 of competitively earned income was associated with each additional hour of special education services provided by the public schools during their student school careers. Combining these estimates with the results from the previous cost analysis, one can now estimate that it costs society approximately $9 to provide special education services for the students with mild mental retardation to generate approximately $1.30 in annual earnings. Alternatively, one can estimate that it takes approximately 7 years for society to recapture the resources used to provide these special education services.

When these annual earning estimates of $1.30 are discounted at 6% over 30 years and expressed in 1984 present value and when the average hourly costs of $9 for special

Table 5-2

Estimation of Post-School Earnings Function for High School Completers

Student Characteristics	Slope Coefficient	Statistic
I.Q. Score	$ 69	6.84
Female	$ -2,383	-3.86
Years of Post-School Experience	$ 2,320	15.56
Hours of Special Education	$ 13	209
Mean Salary	$ 10,765	
Median Salary	$ 10,001	
Adjusted Squared Multiple R	$ .68	
Sample Size	$ 618	

NOTE: Annual Earnings from 1984 for suburban high school completers between the years 1977-1984.

education are compounded at 6% over an average span of six years and similarly expressed in present value, life-time earnings per hour of special education averaged approximately $18 as compared to costs of between $11 and $18 for one hour of special education services. The resulting present value benefit-cost ratios (equal to or greater than one) indicate to society the economic efficiency of special education programs for students with mild mental retardation. It should be noted, however, that while society as a whole benefits, taxpayers may face a net cost since most of the measured benefits (earnings) in this type of analysis accrue to the individual students.

Assuming that it costs, on average, $14 for each hour of special education for the entire student population in the school district, one could also estimate that it would take approximately 11 years for society to recover its expended resources if it placed the entire burden on market productivity and earnings. Moreover, when expressed in present values the resulting benefit-cost ratio of at least 1.0 for the total special education sample is still indicative of economic efficiency and rational use of society's resources (i.e., net present value equals zero when the present value of life-time earnings is approximately $20 and the present value of costs is $20).

It is important to note that these estimates are based on equations that are subject to several types of uncertainty and should be used with caution. First, there is the issue of whether all the factors that determine post-school earnings are appropriately captured by the variables in the equation. If they are not, then it is uncertain whether the estimate of the impact of special education (i.e., the coefficient on the variable "hours of special education") measures the effect of special education or is also measuring other factors such as motivation, parental support, the availability of alternative education and employment opportunities, or another characteristic that might be related to both the number of hours a student completes in a special education program and the annual post-school earnings of that student. Another type of uncertainty stems from whether the sample of persons included in our sample is representative of all students in special education with mild mental retardation. In our study, the sample may be unrepresentative because not all school completers from the time period we examined responded to the follow-up surveys (68% responded) and some students in special education may have dropped out of school and failed to be identified for the survey sample. If the persons who were respondents in our study differ systematically from those who were missed, then our results will not apply to all students with mild mental retardation who received special education services.

There are other problems with this level and type of economic analysis. For example, since data on only one to seven years of experience are used and the data ignore the long-term cumulative effect of increasing years of experience on earnings (Mincer, 1974), the result is clearly an underestimate of monetary benefits. Moreover, the data included some students who were still in training or post-secondary education; the data do not differentiate outcomes by sex and many of the young women declared themselves as homemakers without outside earnings income; the data include many youth who were unemployed and, as pointed out by Conley (1973), most young people have poor employment histories and youth with mental retardation are no exception. The data also ignore all other monetary benefits that might result from competitive employment (e.g., the reduced use of community support services). However, the important point to note is that most of the specification errors at this level of analysis tend to underestimate future earnings and ignore other forms of benefits. Even at this level of analysis one can estimate that special education pays for itself at some point in time with this

sample--even if one should underestimate its total effects and only measure some of its monetary outcomes.

Uses of a Benefit-Cost Framework

A larger issue to examine is whether formal benefit-cost analysis can allow us to determine whether the outcomes of special education services for school-age children and youth with mild mental retardation are worth resource costs. In attempting to answer this economic question, the focus is upon measuring in monetary terms as many of the outcomes as possible, and in addressing the weaknesses of the preceding earnings function analysis.

As in all benefit-cost analyses, the analyst must first specify the program being evaluated and the comparison against which it will be judged. Second, it is essential to identify all costs and benefits in an appropriate accounting framework. Third, the analyst must value (or measure as best as possible) all costs and benefits for subsequent analysis. Since benefit-cost analysis attempts to assess all alternatives in terms of monetary cost and benefit values, pecuniary measurement becomes an obvious and very challenging hurdle in this form of analysis. This is undoubtedly why few evaluators of special education services have attempted to use this technique

The first major problem arises in developing an alternative for comparing the costs and benefits resulting from current special education services. As with most special education services, both law and ethics preclude controlled experimental designs to compare treatment and non-treatment alternatives. In reality, and in most other similar special education situations, only one program is in place, and there are no observable alternatives available for comparison purposes. Consequently, it is necessary to employ a post hoc non-experimental comparison design with hypothetical rather than actual treatment alternatives.

A conceptual framework for benefit and cost comparisons of special education for former students with mild mental retardation can be constructed if it is assumed that appropriate costs and benefits can be measured and valued for a similar hypothetical sample that received no special education services. Such an alternative is incorporated within the framework of Table 5-3.

The benefit-cost accounting framework presented in Table 5-3 draws heavily upon the framework outlined by Thornton and Will (see Chapter 4). The framework compares a school-based special education program for individuals with mild mental retardation with a hypothetical situation such as prevailed in an earlier part of this century. At that time institutional care was the primary alternative to independent or family living for adults with mental retardation. This approach identifies the analytical perspectives of interest to the students and society (see Thornton & Will for discussion on the importance and use of such analytical perspectives), and lists the expected program benefits and costs relative to the no program alternative. The actual measurement and net valuation of each of the framework components are identified under varying hypotheses in the following sections of this paper.

At this point, it is important to note that this model provides insight not only into those benefits and costs that can be monetized, but also into those effects that cannot

Table 5-3

Benefits and Costs of Special Education for Former Students with Mild Mental Retardation

Impacts	Analytical Perspective: Social	=	Student	+	Rest of Society
BENEFITS					
(1) INCREASED OUTPUT					
Increased Earnings	+		+		0
Increased Fringe Benefits	+		+		0
Increased Taxes	0		-		+
Work Preferences	+		+		+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS					
Institutional Care Costs	+		0		+
Community Support Services	+		0		+
(3) REDUCED USE OF TRANSFER PAYMENTS					
Reduced Benefit Payments	0		-		+
Reduced Administrative Costs	+		0		+
(4) OTHER BENEFITS					
Increased Self-Sufficiency	+		+		+
Increased Self-Esteem	+		+		+
Improved Quality of Life	+		+		+
TOTAL BENEFITS	?		?		?
COSTS					
(1) PROGRAM COSTS					
Special Education Costs	-		0		-
(2) INCREASED USE OF RELATED SERVICES					
Transitional Job Related Training	-		0		-
Community Support Services	-		0		-
(3) INCREASED USE OF TRANSFER PROGRAMS					
Increased Benefit Payments	0		+		-
Increased Administrative Costs	-		0		-
TOTAL COSTS	?		?		?
NET BENEFITS	?		?		?

NOTE: The individual components are characterised from the three perspectives as being a net benefit (+), a net cost (-), or neither (0). Values entered for question marks (?) in Total Benefits, Total Costs, and Net Benefits vary under different hypotheses. Adapted from Thornton and Will (1986).

be valued monetarily. It notes, for example, other important benefits such as preferences for work and prospects for increased self-sufficiency, self-esteem and quality of life.

The Economics of Alternative Assumptions

A number of alternative hypothetical comparison groups can be constructed for purposes of the current benefit-cost analysis. These hypothetical comparison groups are constructed largely through developing historical and current data to meet different assumptions. In the most extreme case, for example, one could assume that the "eugenics movement" during the early part of this century was successful in requiring life-time institutionalization for many individuals with mental retardation. As a second alternative, one could assume that due to technological and occupational changes, many of these individuals require the benefits specific to special education to be employable in today's competitive labor markets. Or third, one could assume that without the extraordinary attention and assistance through special education services, most individuals with mental retardation would drop out of school prior to graduation. Differing costs and benefits would derive, of course, from each of these hypothetical alternatives. For purposes of illustration, each of these alternatives is described briefly in Tables 5-4 through 5-10.

Table 5-4 summarizes the sources and estimates for cost and benefit data relative to the various assumptions of the three hypothetical alternatives. Estimates are drawn from these data to examine each of the alternative assumptions in benefit-cost frameworks.

Economics of the Eugenics/Institutionalization Movement

As noted above for purposes of analysis, one could assume the hypothetical alternative of offering no special education services in the schools and the required institutionalization of all individuals with mental retardation at approximately 14 years of age. This hypothetical situation has some reality when one reflects on the status of special education for students with mental retardation in the United States at the turn of the century. During the early 1900s, decisions concerning these citizens were most often made on philosophical and political grounds, as opposed to empirically based research or economic considerations (Goldstein, 1964). Based on the prevailing notion that moral and mental defectiveness were linked, Craig and McCarver (1984) point out in their historical perspective on deinstitutionalization that in the early 1900s, citizens with mental retardation were regarded as a menace to society. It was believed that persons with mental retardation should be isolated from the community in institutions. In a paper delivered in 1912 by a leading professional to the American Association for the Study of the Feebleminded, it was stated that these individuals were "a parasitic and predatory class nev capable of supporting themselves or of managing their own affairs . . . a menace and danger to the community . . . a potential criminal" (Fernald, 1912, p. 88). Given that over 85% to 90% of persons with mental retardation have either mild or moderate retardation (Grossman, 1983; Stevens & Hebers, 1964), it is safe to assume that many such individuals in our schools today would have been targeted for such beliefs and subsequent institutionalization during this earlier period.

After more than 50 years of increasing institutionalization, a peak period was reached in 1965 (Lakin, Hill, Street, & Bruininks, 1986). Current policy has dramatically shifted to one of deinstitutionalization; that is, to reduce institutional placement, to create community-based services and to reduce the numbers of persons with retardation in institutional environments. Current deinstitutionalization efforts have resulted in substantial changes in residential living patterns and community services (Lakin, Hill &

Table 5-4

Sources and Estimates for Cost and Benefit Data

I. Alternatives and Sources for Estimating Benefits:

Earnings: Earnings data were collected from follow-up mail and telephone surveys to a subsample of 28 high school completers with mild mental retardation. Subsequent interviews were also conducted with the respondents. Average annual earned income for all employed respondents in 1984 was $6,475. When extrapolated over an expected future worklife of approximately 35 years and discounted at 6%, per capita lifetime earnings were estimated to be $93,875 in 1984 present values for each respondent. Average annual earned income for all respondents (employed and unemployed) was $5,319. Lifetime earnings were estimated to be $77,115 for all respondents in 1984 present values.

Employment: Eighty-two percent of all the respondents with mild mental retardation in the subsample were receiving earnings under paid employment within one to seven years after completing high school. Of those employed, 17% held part-time jobs. Eighteen percent of the respondents declared themselves as either homemakers or unemployed. Eleven percent of all respondents declared themselves to be unemployed and looking for work.

These employment results from the Minnesota sample are more positive, but generally consistent with similar high school follow-up students of young adults with mild mental retardation in other states. Schalock, Wolzen, Ross, Elliott, Werbel, and Peterson (1986) found an employment rate of 58% for a similar aged group of young adults with mental retardation in their follow-up study of school completers for the period between 1979 and 1983. Hasasi, Gordon and Roe (1985) found that an almost identical group of youth with disabilities who had exited from high school in the period between 1979 and 1983 held employment rates at the 55% level with approximately 20% unemployed and looking for work. Fardig, Algozzine, Schwartz, Hensel, and Westling (1985) also found 51% of a similar group employed with 18% unemployed. Similar employment results with youth with mental retardation were also found by Mithaug, Horiuchi, and Fanning (1985) and for learning disabled graduates by Zigmond and Thornton (1985).

Mortality: Numerous studies have verified that individuals with mental retardation have a shorter life expectancy, with those with more severe retardation having significantly shorter life spans (Carter & Jancar, 1983; Forssman & Akesson, 1970; Miller & Eyman, 1977). Therefore, any extrapolations about future costs and benefits relative to this population must make appropriate adjustments for these circumstances. Forssman and Akesson (1970), for example, estimate that individuals with mild mental retardation suffer a mortality rate 1.7 times that of the general population. Balakrishnan and Wolf (1976) estimate that 20-year-old persons with mild mental retardation can expect to live only 38 more years (to age 58 on average) compared to almost 52 more years for the regular education population at the same age. Moreover, Miller and Eyman (1977) found that community-based and institution-based mortality rates were comparable if age, I.Q., and ambulation were considered. Their study suggested that mortality reflects the health condition of individuals who are retarded rather than placement per se. Consequently, similar mortality yield a conservative estimate of longevity for the sample in this study since most available mortality statistics for persons with mental retardation are based largely upon institutionalised samples or samples in supervised living arrangements. The current sample could be expected to have longer life expectancies than those for these more severely impaired samples.

Community Residential Care: Thirteen percent of the respondents with mild mental retardation in the sample reported living within a group or foster home. Sixty percent reported living with their family; 25% reported living alone or with spouse or friends; and 2% reported institutionalisation for medical reasons.

Emphasis on the deinstitutionalisation of people with mental retardation in the past two decades has resulted in major changes in the approach toward residential care and in the entire service delivery system, including the role of schools and special education. Since the mid-1960s, considerable effort has been directed toward the development and use of alternative residential placements in the community and toward the development and use of alternative training and educational services in the public schools.

In 1982 the median annual per capita cost of care in 36 Minnesota private residential homes for populations with mental retardation was $20,082 (adapted from primary data in Greenberg, Lakin, Hill, Bruininks, & Hauber, 1985). These costs do not include training or the cost of capital facilities. When expressed in 1984 dollars, these per capita costs approximate $22,030.

A recent study by Burchard, Hasasi, Gordon, Rosen, Yoe, Toro, Dietzel, Payton, and Simoneau (1986) indicated that there are not significant differences in average income, or type or extent of employment among individuals with mental retardation within different types of community residences.

Institutional Care: Average annual per capita costs of care in Minnesota state-operated residential facilities for people with mental retardation were reported as being $44,986 in 1984 by Lakin, et al. (1986, p. 29). Braddock, Hemp and Howes (1986) reported a similar national average of $42,457 for 1984. These costs do not include capital costs of facilities and thus are underestimated. When these costs were projected over an expected life span of 44 years and discounted at 6%, per capita institutionalization care costs were estimated to be $691,885 in 1984 present values.

It is important to note that when an institutionalization is prevented, the state saves the total amount that would have been spent on that person in the institution. However, the costs of board, room, and any other basic care must now be paid by someone else within the community, usually the person or their family.

Average annual costs in family home care for children were estimated to be $2,346 in 1984 dollars by the U.S. Department of Commerce (1985). Although families with children with mental retardation may have additional costs

Table 5-4 (continued)

Because of behavioral and health problems, data indicate that such children come disproportionately from lower SES families and their costs would accordingly be less. However, lacking other empirical cost data a reasonable assumption would be to assume the same costs as for regular children. These costs are assumed to be reasonable shadow prices and costs for board, room, and other basic care for individuals living independently, either alone or with family, within the community.

The costs of care provided in state-operated residential facilities for people with mental retardation have increased dramatically since 1950, when the annual per capita cost of care for state-operated facility residents was about $750. A number of factors have contributed to the increasing costs of residential care in such institutions. One factor has been the increasingly disabled population of persons served in these facilities. For example, in 1940 about 65% of all residents of state-operated facilities for people with mental retardation had borderline, mild, or moderate retardation. By 1985, only 20% of all residents had such conditions. Associated with these changes has been increased intensity and specialization of professional staff and the relatively lower reliance on residents in operating and maintaining facilities. Other important contributions to increasing costs have come from legislative and judicial efforts to upgrade the quality of living and habilitation provided within such public institutions (Lakin et al., 1986).

Since the peak year of 1965, the national placement rate of persons with mental retardation in all state-operated residential facilities has decreased from 115.8 per 100,000 of the general population to 49.3 in 1984, or a decline of over 57% (Lakin et al., 1986). From these substantial changes and the current U.S. population, one could assume that over 157,000 individuals with mental retardation today would have been previously in these facilities if the 1965 rate had prevailed.

The incidence of mental retardation in the western world has been estimated between one percent (Baird & Sadovnick, 1985) and 3.3% (Zigler, Balla & Hodapp, 1984) or 3.3% (Penrose, 1972). Current incidence estimates of mental retardation in the U.S. are between 3 and 9 million persons. Baroff (1982) estimates that at least one million of these individuals have moderate or profound mental retardation. If one assumes an incidence of approximately two percent for mental retardation within the general population, then it can be estimated that approximately 6% of those with mental retardation were institutionalized in 1965, a ratio of one in 17 from the population of individuals with mental retardation. On the other hand, in 1984 the rate of institutionalization had dropped so that only one in 40 were being institutionalized. Stated differently, one could assume that in 1965 at least two individuals from a sample of 34 would have been previously institutionalized. Today, at least one of these individuals would be living within the community. It is obvious from current statistics (Lakin, et al., 1985) that many formerly institutionalized persons now live increasingly in small private residential facilities. This trend, however, primarily affects people with more substantial disabilities rather than those with more mild disabilities, such as those in the present sample.

Fringe Benefits: The U.S. Department of Labor (1980) estimates that approximately 15% of gross wages for low wage earners are paid in fringe benefit compensation.

Taxes: Pechman (1985) estimates the tax rate for low wage earners to be 23% of gross income.

Community Support Services: Participation in community support services for each of the respondents was identified from the follow-up survey and interviews.

Supplemental Security Income (SSI): Supplemental income from SSI for each employed respondent was determined through the follow-up survey and interviews with the mildly retarded sample population. Only 15% of all respondents received SSI, with an average of $201 per month. The average for all 28 respondents was only $30 per month. The 1984 SSI guidelines determined that individuals lost one dollar for every two dollars earned. If a respondent lived within a group or family home in 1984 the base rate was only two-thirds of the full entitlement rate of $320 per month. It was assumed that the survey data for the respondents adequately accounted for these adjustments in SSI. Almost all of the unemployed respondents were living within either a group or family home. Average annual SSI for all respondents was estimated to be $362. When these data were extrapolated over an expected worklife of 35 years and discounted at 6%, per capita SSI was estimated to be $5,248 in 1984 present value.

Medicaid Assistance: Follow-up interview data indicated that 7% of the respondents received medicaid. It was assumed that those individuals who were gainfully employed would not receive medicaid assistance but would purchase private insurance. In Minnesota during 1984, average annual costs for private group health insurance were estimated to be $834 for a single participant. These costs were based on Blue-Cross/Blue Shield monthly rates of $69.50. It was assumed that health benefits from private insurance were comparable to public insurance. Average annual medicaid assistance for all respondents was estimated to be $65. When these transfer payments were extrapolated over an expected worklife of 35 years and discounted at 6%, per capita medicaid assistance was estimated to be $942 in 1984 present value.

II. Alternatives and Sources for Estimating Costs:

Special Education Program Costs: Special education costs for each respondent were determined from actual school expenditure and student records (See Chapter 3). The student records reflected actual hourly use of special education services over 16 service areas on an annual basis over the entire 12 or 13 year school history of the student. Expenditure data similarly were estimated on a per student hourly cost basis over the 16 special education service areas. In 1984 dollars per student average annual special education costs for the students with mental retardation in this study were estimated to be $3,652. When these data were compounded over a 12-year schooling period at 6%, 1984 present values were estimated to be $61,609 in total costs for each student.

Regular Education Costs: Regular education costs for the respondents were determined from actual school expenditure records and were reported in 1984 dollars as averaging $3,418 annually per student (See Chapter 3). When these cost data were compounded at 6% over a 12-year schooling career, 1984 present values were estimated to be $57,658 for each student. When these cost data were compounded at 6% over a four-year secondary schooling period, 1984 present values were estimated to be $14,950 per student.

Bruininks, 1985). In many states, such as Minnesota, it is very nearly an accomplished fact.

If institutionalization with its attendant and exceedingly high costs is viewed as the hypothetical comparison, the resulting benefit-cost analysis would clearly favor special education in the schools and deinstitutionalization **even if post-school competitive earnings were zero.** In Minnesota, the 1984 average annual per capita institutional care costs for persons with mental retardation was $44,986. As noted in Table 5-5, when these costs with their attendant assumptions of total institutionalization in adulthood were factored into the accounting framework, the net per capita monetary benefit to society for school-based special education was conservatively estimated to be $667,927 in present value.

In Table 5-5 we are assuming a hypothetical comparison group of individuals with mental retardation who received no special education and who would likely have been institutionalized at approximately age 14 with no lifetime earnings. Prior to age 14 it is assumed that they would have participated in regular school instruction. This is obviously the most extreme comparison for evaluating the possible benefits of special education services. This hypothetical alternative assumes the most pessimistic political and social outcome for youth with mental retardation who are without special education services. The model presumes that the availability of local special education services would operate to prevent possible institutionalization and that the sample would live with family members and be relatively independent. However, historical evidence on persons in institutional settings shows reasonably high rates for individuals with mild and moderate retardation (Lakin, 1979; Lakin, et al., 1986; Scheerenberger, 1983). With these conditions, data for the algorithm have been derived and computed from the assumptions and sources as identified in the benefit-cost framework in Table 5-4. All data are estimated and reported as average per capita data expressed in 1984 present values.

With respect to the estimated impact on benefits, **increased earnings** represent average annual earnings of all respondents with mental retardation in the sample, including employed and unemployed ($5,319). An assumption of no earnings is made for those institutionalized. When extrapolated over a work-life of 35 years and discounted at 6%, earnings totaled $77,115 in 1984 present value for each respondent. **Increased fringe benefits** represent annual gross earnings multiplied by a factor of 15%. **Increased taxes** represent annual gross earnings multiplied by a factor of 23%. **Work preferences** are expressed as unmeasured, but clearly represent a positive outcome of most individual and public opinion. **Institutional care costs** represent average annual per-capita costs of care in Minnesota state-operated residential facilities for individuals with mental retardation ($44,986). When extrapolated over a life-span of 44 years beyond the age of 4 and totaled in 1984 present values, these costs were estimated to be $691,885 for each individual. When an institutionalization is prevented, the state (i.e., taxpayers) saves the money that would have been spent on that person in the institution (measured by the average daily cost of care in that setting). However, the costs of basic board, room and care for that individual must now be paid by someone else within the community, usually the person or their family. As noted in Table 5-4, these basic home care costs have been estimated to be $2,346 per year. When projected over a life-span of 44 years and discounted at 6%, these costs were estimated to be $36,081 for each individual or their family. **Reduced use of transfer programs** is assumed to have been already accounted for in institutional care costs given that the alternative comparison in this case is institutionalization. **Other benefits** are expressed as unmeasured in this monetary

Table 5-5

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Hypothetical Condition of No Special Education with Only Regular Instruction Until Age 14 and then Dropout with Lifetime Institutionalization

Impacts	Analytical Perspective: Social	=	Student	+	Rest of Society
BENEFITS					
(1) INCREASED OUTPUT					
Increased Earnings	$ 77,115		$ 77,115		0
Increased Fringe Benefits	11,567		11,567		0
Increased Taxes	0		(17,736)		$ 17,736
Work Preferences	+		+		+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS					
Institutional Care Costs	655,804		(36,081)		691,885
(3) OTHER BENEFITS					
Increased Self-Sufficiency	+		+		+
Increased Self-Esteem	+		+		+
Improved Quality of Life	+		+		+
TOTAL BENEFITS	$744,486		$ 34,865		$709,621
COSTS					
(1) PROGRAM COSTS					
Special Education Costs	($61,609)		0		($61,609)
Regular Education Costs	($14,950)		0		($14,950)
(2) INCREASED USE OF SOCIAL SERVICES					
Job or Work Related Training	-		0		-
Community Support Services	-		0		-
(3) INCREASED USE OF TRAINING PAYMENTS					
Increased SSI/Medicaid Payments	0		6,190		(6,190)
Increased Administrative Costs	-		0		-
TOTAL COSTS	($76,559)		$ 6,190		($82,749)
NET BENEFITS	$667,927		$ 41,055		$626,872

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

algorithm, but represent current research findings and professional consensus relative to the benefits of community residency and employment of persons with mental retardation.

With respect to estimated costs, special education costs represent actual average annual costs of $3,652 for special education services for students with mental retardation (see Chapter 3). When these data were compounded over 12 years at 6%, 1984 present value was estimated to be $61,609 for each student. All of the students with mild mental retardation in the sample who received special education services also were mainstreamed within the regular school curriculum. **Regular instruction costs** represent the added costs of secondary education for the students in special education in our sample who remained in school past 14 years of age. From school records, these costs were estimated as $3418 per student per year. When these data were compounded at 6%, 1984 present value was estimated to be $14,950 for each student over four years of secondary schooling. **Use of social services** is unmeasured in this framework because many of the survey responses were ambiguous on these questions and the resulting small sample did not produce reliable results. Undoubtedly there are some resource costs, but it was not possible to estimate their amounts from the available data. **Use of transfer programs** represent the use of medicaid and SSI when individuals with mental retardation live within the community. The average annual SSI payment for all respondents was estimated to be $362. When extrapolated over a 35 year work-life and discounted at 6%, 1984 present value was estimated to be $5,248. Average annual **Medicaid** for all respondents was estimated to be only $65. When discounted at 6% over a 35 year period and expressed in present values, medicaid assistance was estimated to be $942 per person. When medicaid and SSI were combined the total **transfer payments** over time were $6,190 per individual. It was not possible to estimate the monetary impact on the likely increased administrative costs of these transfer payments.

In Table 5-6 the assumptions are modified regarding the possible rate of institutionalization for this sample. It is assumed that the hypothetical comparison group again received no special education in this school district; however, it is also assumed that the comparison group of youth with mental retardation were not completely institutionalized, but rather were institutionalized only at the peak 1965 rate after completing school. It is further assumed that the comparison group (a) received no special education, (b) did not drop out of school but completed all 12 years solely in mainstreamed regular instruction, (c) had the same employment and earning prospects as those in special education, and (d) had no other additional need or access to social services in the community.

In Table 5-6 it is assumed that at least one of the 28 respondents in the sample and living in the community today would have been previously institutionalized. This assumption is based on the 1965 rate of institutionalization of one out of 17 (see historical rates of institutionalization in Table 5-4), as compared to the current rate of institutionalization of one out of 40. With 82% of the current sample gainfully employed, one can also estimate that this institutionalized individual would have been employed. Given these assumptions, one can re-estimate the net benefits in monetary terms. Implementation of these assumptions for a hypothetical comparison group of 28 individuals with mental retardation indicates that the hypothetical group without access to special education services is favored on a per capita basis by $35,020 (See Table 5-6).

In Table 5-6, **increased earnings, increased fringe benefits, and increased taxes** all represent the additional earnings and benefits prorated across the 28 respondents of the one employed respondent who likely would have been previously institutionalized. The

Table 5-6

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Hypothetical Condition of No Special Education with Only Regular Instruction and Institutionalization at 1965 Rate of One Per 17

Impacts	Analytical Perspective: Social =	Student +	Rest of Society
BENEFITS			
(1) INCREASED OUTPUT			
Increased Earnings	$ 2,754	$ 2,754	0
Increased Fringe Benefits	$ 413	$ 413	0
Increased Taxes	0	(633)	$ 633
Work Preferences	+	+	+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS			
Institutional Care Costs	23,422	(1,288)	24,710
(3) OTHER BENEFITS			
Increased Self-Sufficiency	+	+	+
Increased Self-Esteem	+	+	+
Improved Quality of Life	+	+	+
TOTAL BENEFITS	$ 26,589	$ 1,246	$ 25,343
COSTS			
(1) PROGRAM COSTS			
Special Education Costs	($61,609)	0	($61,609)
Regular Education Costs	($14,950)	0	($14,950)
(2) INCREASED USE OF SOCIAL SERVICES			
Job or Work Related Training	-	0	-
Community Support Services	-	0	-
(3) INCREASED USE OF TRAINING PAYMENTS			
Increased SSI/Medicaid Payments	0	221	(221)
Increased Administrative Costs	-	0	-
TOTAL COSTS	($61,609)	$ 221	($61,830)
NET BENEFITS	($35,020)	$ 1,467	($36,487)

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

institutional care costs represent the saved resources from the individual who would have been previously institutionalized, again prorated across the 28 respondents. **Special education costs** estimate the additional resources employed per student for the 28 respondents who did participate in special education throughout their school careers. The **increased use of transfer payments** represents the resources used for SSI and Medicaid for the respondent who would have been previously institutionalized. Thus the net benefits in this model rest upon the one person being employed, the costs of institutionalization for the hypothetical individual, and assigning all costs of special education services to the entire sample of 28 persons.

These results point out the exceedingly high costs of institutionalization for persons with mental retardation. Assuming that special education services can prevent institutionalization, the results also point out the exceedingly high economic and social efficiency effect gained from the provision of special education services and deinstitutionalization. When the assumptions of Table 5-6 are changed, from these data one can now estimate that if only two more (for a total of three) of the hypothetical cohort group of 28 had been prevented from being institutionalized (as represented in Table 5-7), the per student net monetary benefits to society would become positive by **$18,157, even if the sample cohort still bore all of the special education program costs.** It is not unreasonable to assume that special education has had some influence on those factors that lead society to make decisions regarding institutionalization for this population. From these results one can estimate that if special education prevents at least three individuals from the hypothetical cohort of 28 (i.e., one in 10) from becoming institutionalized, it is highly **cost-beneficial** in monetary terms alone.

There are obvious limitations to these types of hypothetical analyses. Nevertheless, despite the limitations noted earlier, it does seem reasonable to argue that more extensive provision of special education services can act as a deterrent to forms of social control that insure dependency for people with mental retardation. Historically, large numbers and proportions of individuals with mild retardation were placed in institutional facilities (Lakin, 1979; Scheerenberger, 1983). Without sufficient community support, it is reasonable to assume that many of the individuals in this sample would have faced a similar fate.

It is important to remember that the estimates in Table 5-7 are based on the very conservative assumptions that without special education for persons with mild mental retardation, there would still not have been significant school dropouts and that all members of this counterfactual group would have had the same employment and earning prospects as those in the original sample of respondents. As noted in the following section, these are likely to be unrealistic assumptions. The results of subsequent analyses indicate even higher net benefit estimates resulting from special education services in the schools.

Economics of Special Education Dropouts and Technological Unemployment.

In reality, the occupational picture for persons with mental retardation is far from encouraging even with provision of special education services. Occupational categories once occupied by significant proportions of persons with retardation have been decreasing markedly over the past half-century. Experts predict that this trend will persist, although probably at a reduced rate (Rumberger, 1984). Much of the disappearance of jobs for these persons can be attributed to technological changes brought on by automation and mechanization in almost all occupational categories, including the service

Table 5-7

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Hypothetical Condition of No Special Education with Only Regular Instruction and Subsequent Institutionalization at Rate of One Per Ten

Impacts	Analytical Perspective: Social =	Student +	Rest of Society
BENEFITS			
(1) INCREASED OUTPUT			
Increased Earnings	$ 8,262	$ 8,262	0
Increased Fringe Benefits	$ 1,239	$ 1,239	0
Increased Taxes	0	(1,899)	$ 1,899
Work Preferences	+	+	+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS			
Institutional Care Costs	70,265	(3,865)	74,130
(3) OTHER BENEFITS			
Increased Self-Sufficiency	+	+	+
Increased Self-Esteem	+	+	+
Improved Quality of Life	+	+	+
TOTAL BENEFITS	$ 79,766	$ 3,737	$ 76,029
COSTS			
(1) PROGRAM COSTS			
Special Education Costs	($61,609)	0	($61,609)
Regular Education Costs	($14,950)	0	($14,950)
(2) INCRESED USE OF SOCIAL SERVICES			
Job or Work Related Training	-	0	-
Community Support Services	-	0	-
(3) INCREASED USE OF TRAINING PAYMENTS			
Increased SSI/Medicaid Payments	0	$ 663	(663)
Increased Administrative Costs	-	0	-
TOTAL COSTS	($61,609)	$ 663	($62,272)
NET BENEFITS	($18,157)	$ 4,400	($13,757)

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

industries. Traditional employment on farms and in homes for individuals with mental retardation has almost completely disappeared. Although there has been a recent proliferation of low wage employment in the United States economy, there also has been a decline in the occupational categories that have historically employed people with mental retardation (Rumberger, 1984). With the growing underclass in our society resulting from high school dropouts, it has been estimated that competition for these fewer jobs will become even more keen in the future (Bluestone & Harrison, 1986).

Until recently, special education programs beyond the elementary level for people with mental retardation were limited and "most dropped out of school at an early age" (Conley, 1973, p. 289). Four decades ago, Kennedy (1948) reported that fewer than 9% of her sample of persons with mild mental retardation went beyond the eighth grade. As a consequence of these conditions, it is plausible to assume that without special education most individuals with mental retardation would drop out of school before normal completion. Therefore, it is possible to construct employment and earnings records of a hypothetical dropout group for comparison purposes.

Table 5-8 presents another hypothetical comparison group without special education. The model in Table 5-8 further assumes that all students with mild mental retardation in the sample attend regular instruction in the schools until approximately age 14, but then drop out of school with reduced prospects for employment and earnings and increased needs for community services. Data from other studies indicate that the unemployment rates of underclass school dropouts have been as high as 50% to 80% (Rumberger, 1984; Wolman, 1987). Earnings for these groups have been found to be as low as 30% of the regular population earnings rate. If, for example, the rates of employment and earnings for dropouts were only 50% of those with special education and high school completion, and at least four of the dropouts required increased use of group homes or other supervised living arrangements, then the accounting framework of Table 5-8 estimates positive per capita net benefits of $10,075 in 1984 present values for special education. [In Table 5-8, life-time per capita group home costs were estimated to be $331,331 in present value based upon available statistics (Greenberg et al., 1985). These group home care costs for four dropouts were then prorated across the sample of 28 for per capita estimates of $47,333. Similar present value and proration adjustments were made for the estimated basic board and care costs which are only saved by the individual.]

Recent U.S. census data (O'Neill & Sepielli, 1985) indicate that for members of the regular population the ratio of income for high school completers relative to high school dropouts for 25 to 34 year old males, was 1.47 in 1983, and that this ratio has been growing over time. Assuming a similar earnings disadvantage for people with a mild mental retardation without special education and with high secondary school dropout rates, one can modify Table 5-8 and again estimate the likely benefit-cost effects (see Wolman, 1987, for a review of studies showing lower earnings for dropouts from special education services). With such high dropout rates, it is also highly probable that at least 20% (or 6) more individuals would need increased use of social services (e.g., supervised living arrangements). In Table 5-9 these altered assumptions are presented, with estimated per capita positive net benefits of approximately $14,402 for special education services.

A recent study by Burchard et al. (1986) in Vermont provides a real sample comparison group for this analysis. They reported data from a sample of 109 adults with mental retardation (both men and women between the ages of 23 and 55) living in the community, with 75% residing in group homes or supervised apartments. It is important

Table 5-8

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Hypothetical Condition of No Special Education with Only Regular Instruction and High School Dropouts with Lower Employability, Community Adaptability, and Earnings

Impacts	Analytical Perspective: Social =	Student +	Rest of Society
BENEFITS			
(1) INCREASED OUTPUT			
Increased Earnings	$ 38,558	$ 38,558	0
Increased Fringe Benefits	5,784	5,784	0
Increased Taxes	0	(8,868)	$ 8,868
Work Preferences	+	+	+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS			
Institutional Care Costs	0	0	0
Community Support Services	42,292	(5,041)	47,333
(3) REDUCED USE OF TRANSFER PROGRAMS	0	884	884
(4) OTHER BENEFITS			
Increased Self-Sufficiency	+	+	+
Increased Self-Esteem	+	+	+
Improved Quality of Life	+	+	+
TOTAL BENEFITS	$ 86,634	$ 29,549	$ 57,085
COSTS			
(1) PROGRAM COSTS			
Special Education Costs	($61,609)	0	($61,609)
Regular Education Costs	($14,950)	0	($14,950)
(2) INCREASED USE OF SOCIAL SERVICES			
Job or Work Related Training	-	0	-
TOTAL COSTS	($76,559)	$ 0	($76,559)
NET BENEFITS	($10,075)	$ 29,549	($19,474)

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

Table 5-9

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Hypothetical Condition of No Special Education with Only Regular Instruction and High School Dropouts with Lower Earnings Comparable to Regular Population

Impacts	Analytical Perspective: Social =	Student +	Rest of Society
BENEFITS			
(1) INCREASED OUTPUT			
Increased Earnings	$ 23,932	$ 23,932	$ 0
Increased Fringe Benefits	3,590	3,590	0
Increased Taxes	0	(5,504)	5,504
Work Preferences	+	+	+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS			
Community Support Services	63,439	(7,561)	71,000
(3) REDUCED USE OF TRANSFER PROGRAMS	0	(1,326)	(1,326)
(4) OTHER BENEFITS			
Increased Self-Sufficiency	+	+	+
Increased Self-Esteem	+	+	+
Improved Quality of Life	+	+	+
TOTAL BENEFITS	$ 90,961	$ 13,131	$ 77,830
COSTS			
(1) PROGRAM COSTS			
Special Education Costs	($61,609)	0	($61,609)
Regular Instruction Costs	($14,950)	0	($14,950)
(2) INCREASED USE OF SOCIAL SERVICES			
Job or Work Related Training	-	0	-
Community Support Services	-	0	-
TOTAL COSTS	($76,559)	$ 13,131	($ 1,271)
NET BENEFITS	($14,402)	$ 13,131	($ 1,271)

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

to note that 30% of their sample was represented by adults with moderate retardation, whereas the sample used in the present study did not include any individuals with moderate mental retardation. Their total sample reported an average annual income of $4,665 in 1984 dollars. With average employment rates of only 26% reported for this adult population, it is assumed that these annual incomes included SSI and other payments as well as earned income. Because most of these adults were in school more than 20 to 30 years ago, it is also reasonable to assume that many of these individuals had received, at best, only limited special education services. In Table 5-10 the results from this group are compared with those from the Minnesota sample.

Drawing on data from the Vermont sample, the analysis in Table 5-10 assumes (a) no special education costs for this comparison group, (b) all Vermont respondents completed high school, (c) the competitively employed in Vermont received no extra income from SSI while the unemployed received their full entitlement, (d) the employed Vermont respondents received the same level of average earnings as the Minnesota sample ($6,475) to adjust for possible differences in economic activities between the two states, and (e) community support services were the same for both groups. Because 30% of the Vermont sample was represented by individuals with moderate mental retardation, adjustments were made in both earnings and community living arrangements for the exclusion of these individuals. For purposes of adjustments in the data, it was assumed that the full cohort of individuals with moderate mental retardation in Vermont was living in supervised facilities and was not employed. As a result the Vermont employment rates were adjusted upward to 36% and family living arrangements were adjusted upward to 26% when the individuals with moderate mental retardation were excluded from the sample. With respect to the estimated impact on benefits, **increased earnings** represent the difference between the two samples in average annual earnings for all respondents. If one assumes that the employed Vermont respondents (adjusted 36% of sample) made the same average annual earnings ($6,475) as those employed in Minnesota (32% of sample), the Vermont earnings would average $2,331 for all respondents. The difference between the Vermont total sample average ($2,331) and the Minnesota sample average ($5,319) was estimated to be $2,988. When extrapolated over a work-life of 35 years and discounted at 6%, these earnings totaled $43,296 in 1984 present value for each respondent. **SSI** was similarly adjusted for the differences in employment rates and earnings with an estimated present value of $2,834 for these differences. **Reduced use of supervised living facilities** was estimated to be 59%, with 16 individuals no longer using group or supervised apartments. This alone resulted in average life-time cost savings of $189,332 in 1984 present value to taxpayers and $169,170 in savings to society.

As a result of these assumptions and adjustments, estimated results from Table 5-11 indicate that those who received special education during the past 12 to 15 years in Minnesota had average per capita net benefits of $157,351 in 1984 present value. It is important to note that in this comparison model, if no adjustments or cost saving estimates had been made for different community living arrangements as a result of special education, the net benefits still would be negative by only $11,819. On the other hand, if special education assists only one individual from the sample into moving into independent living arrangements, it is estimated that the cost savings would be approximately $12,000 in present value and result in positive net benefits for individuals represented by the model in Table 5-10.

It is obvious that use of the Vermont sample, even with adjustment for the presence of persons with moderate mental retardation, is not without methodological problems. The Vermont sample, even with this adjustment, could still be more

Table 5-10

Benefits and Costs of Special Education for Students with Mental Retardation
Comparison Group: Current Program vs. Vermont Sample of Mentally Retarded Adults with Limited Special Education and Lower Employment Rates and Earnings

Impacts	Analytical Perspective: Social	=	Student	+	Rest of Society
BENEFITS					
(1) INCREASED OUTPUT					
Increased Earnings	$ 43,296		$ 43,296		0
Increased Fringe Benefits	6,494		6,494		0
Increased Taxes	0		(9,958)		$ 9,958
Work Preferences	+		+		+
(2) REDUCED USE OF ALTERNATIVE PROGRAMS					
Community Support Services	0		0		0
Community Residential Homes	169,170		(20,162)		189,332
(3) REDUCED USE OF TRANSFER PROGRAMS	0		(2,834)		2,834
(4) OTHER BENEFITS					
Increased Self-Sufficiency	+		+		+
Increased Self-Esteem	+		+		+
Improved Quality of Life	+		+		+
TOTAL BENEFITS	$218,960		$ 16,836		$202,124
COSTS					
(1) PROGRAM COSTS					
Special Education Costs	($61,609)		0		($61,609)
Regular Education Costs	0		0		0
(2) INCREASED USE OF SOCIAL SERVICES					
Job or Work Related Training	-		0		-
Community Support Services	-		0		-
TOTAL COSTS	($61,609)		$ 0		($61,609)
NET BENEFITS	($157,351)		$ 16,836		($140,515)

NOTES: (1) All data are reported in per student 1984 present values; (2) All data are from suburban school district follow-up study or sources as noted in Table 5-4.

handicapped in employment and community living skills. Moreover, the per capita income and employment rates in the two states may differ. On the other hand, the older age of the Vermont cohort provided more time for enhancing their employment status which is a primary consideration in improving adult employment rates and earnings (Mincer, 1974). The value of the comparison rests upon illustrating the potential of special education services to increase school retention, reduce dependency on supervised living, and enhance prospects for community living and competitive employment. These positive outcomes, in turn, yield reduced use of public resources and increased productivity.

Discussion

This paper has focused on the application of a benefit-cost model for special education services and on the use of this conceptual framework in estimating the benefit-costs of a public school special education program for persons with mild mental retardation. In the context of this model, along with data collected from a local school district and from subsequent follow-up surveys and interviews, the basic question examined was whether special education was worth its cost using an earnings function analysis and hypothetical comparison groups presumed to be without the benefit of special education services. In the context of this question a number of observations can be made.

The lifetime earnings of this sample of adults with mental retardation clearly exceed the costs of providing special education for them. At the level of analysis employing earnings functions, it was estimated that it costs society approximately $9 in special education services for young adults with mild mental retardation to generate $1.30 in annual earnings. The resulting present value of special education benefits was almost twice as great as its costs.

With appropriately identified, measured, and valued costs and benefits, it is possible to employ a formal benefit-cost framework to assess the efficiency of special education services. Such a model provides insight not only into those benefits and costs that can be monetized, but also into many effects that cannot be valued monetarily. It notes, for example, important other benefits such as work preferences and prospects for increased self-sufficiency, self-esteem, and quality of life.

In this study it was estimated that special education services for persons with mild mental retardation was cost-beneficial when compared with a number of alternatives. When historical data were used for hypothetical counterfactual comparison groups, it was possible to examine a number of alternative hypotheses concerning the likely post-school effects for individuals without special education services. Various rates of institutionalization, school dropout, and unemployment were examined as hypothetical comparisons to provision of special education services for a sample of youth with mild mental retardation. The resulting benefit-cost estimates almost universally indicated the economic efficiency of special education for these persons.

When institutionalization was viewed as the hypothetical comparison, with its attendant and exceedingly high costs, the resulting benefit-cost analysis clearly favored special education in the schools and deinstitutionalization, even if post-school competitive earnings were zero. It was noted that if special education in the schools prevented at least one of 10 persons with mild mental retardation from becoming institutionalized, special education was cost-beneficial in monetary terms alone.

Based upon a number of earlier studies, relatively large numbers of persons with mild or borderline levels of mental retardation were placed in institutional settings. This counterfactual comparison, therefore, provides plausible evidence of economic benefits to society from special education services and a likely corresponding decrease in out-of-home placement in supervised residential services of youth and young adults with mental retardation (Channing, 1932; Coakley, 1945; Hegge, 1944; Lakin, 1979; Lakin, Hill, Hauber, & Bruininks, 1982; Reynolds & Stunkard, 1960).

It also was estimated that if special education for students with mild mental retardation was successful in preventing school dropouts, there were likely to be significant economic net benefits to society. When comparing a group of youth with mental retardation who were provided special education to an older adult group with presumably more limited school-based services in another state, special education was again estimated to be economically beneficial to society. Consistent with the early work by Conley (1973), which employed different methodology, it was found that "educational services provided to the (mentally) retarded can be justified on the basis of earnings alone" (p. 297).

Based on the methodology and data in this study, special education for children and youth with mental retardation appears to be "worth its cost," even if we include only those post-school effects that can be valued in monetary terms.

Implications For Research

Generalizations from this study are limited somewhat by the absence of a randomly constituted control group design. On the other hand, this approach to research, while more elegant, is neither feasible nor desirable for populations in special education. Our society has decided that special education services for children and youth with handicaps is an entitlement and not an option. Despite the difficulty of constituting viable control groups, this paper has argued the merits of applying benefit-cost analysis for examining questions of efficiency in special education.

The methodology of this study used hypothetical comparison groups to examine questions of efficiency regarding special education services. This approach involves construction of plausible scenarios in the absence of comparisons with actual and controlled specified service programs. Modeling of scenarios, including assessing their possible outcomes and costs, is an effective strategic planning procedure for implementing and evaluating policies (Bardach, 1977). Using existing statistical data on the conditions of people and service programs, it is feasible to model and assess the possible costs and benefits of different service options designed to change existing conditions. Clearly, more efforts of this type are needed to expand the evaluation perspectives of services for persons with disabilities.

Through this project, several research procedures were applied to compile the costs of special education and the benefits of post-school outcomes of former students in special education. The analyses in this report relied ostensibly upon application of historical statistical indicators. Unfortunately, research and evaluation of special education and other service programs are seriously limited by the lack of uniform information over time and settings on the demographic and functional characteristics of students, on the characteristics of services, on important quality of life indicators for assessing outcomes and adjustment of former students, and on the specific costs of service programs. Development of essential statistical indicators to permit comparison

with standard census and employment statistics would greatly aid researchers and managers interested in assessing the outcomes of special education services and other programs.

Application of economic evaluation research strategies in special education is relatively new, but it may offer promising avenues for improving the productivity of current service programs. Much more research using these procedures is needed to assess the comparative "cost-effectiveness" of alternative service strategies. Unfortunately, these methodologies are seldom applied in the research or evaluation of practice in special education programs. Consequently, choice of strategy or intervention in special education all too often rests upon longstanding conventional wisdoms and traditions rather than upon choices from among carefully evaluated alternatives.

The progress of special education is evident in statistics on the numbers of children and youth in service programs, the decline in institutionalization of children and youth since the passage of Public Law 94-142 (Lakin et al., 1982), and in increased expenditures at local, state, and federal levels. Sustaining and enhancing these gains in special education will require increased attention to assessing the appropriateness and consistency of results with regard to the efficiency of its service programs. This report argues for the increased application of research techniques that assess questions of efficiency in combination with other essential and useful forms of inquiry as a means of improving the effectiveness of special education services for children and youth with handicaps.

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CHAPTER 6

Benefit-Cost Feasibility and the Future

The purpose of this chapter is threefold. First, it will provide a review of the major findings and conclusions derived from each chapter. These are used as the basis for addressing feasibility and other issues in addressing cost and benefit-cost analysis of special education programs. Second, the chapter will provide a discussion of several methodological considerations related to the feasibility of local school programs adopting procedures similar to those employed in the cost analysis, the follow-up study, and the integration of cost and outcome data in a benefit-cost analysis framework. Finally, this chapter will provide an overview of several policy issues and their relationship to the future for benefit-cost analysis procedures in special education programs.

Conclusions from the Assessment of Outcomes, Costs, and Benefits

Assessment of Outcomes

In the comprehensive follow-up study described in this monograph, school record information and outcome information were collected for students who graduated or would have graduated from a special education program between the years 1977 and 1984. In addition, similar information was collected for samples of students in vocational and college programs in the same high schools in a suburban midwestern school district.

School record information was collected on 466 special education, 519 vocational, and 519 college students. Students in special education for whom school record information was collected included 327 students with learning disabilities, 75 with mild mental retardation, 35 with speech impairments, 25 with emotional disabilities, and 4 with visual impairments. Outcome information was obtained from 311 students in special education (66%), 330 in vocational (64%), and 368 in college (71%) programs. Students in special education in the respondent group included 220 with learning disabilities, 53 with mild mental retardation, 22 with speech impairments, 14 with emotional disabilities, and 4 with visual impairments.

Results indicated significant differences both among students in the three main groups (vocational, college, special education) and among students with different handicapping conditions (mild mental retardation, learning disabilities, emotional disabilities, speech impairments). Major findings are summarized in the following paragraphs.

At the time students leave school, there are clear differences among those who have been identified as students in special education, those who have followed a vocational program, and those identified as college bound. These differences were evident in school measures, such as grade point averages, class percentile ranks, and graduation rates. The differences also were evident in indices of school participation (i.e., absenteeism) and use of auxiliary services, as well as in measures of cognitive ability and measures of achievement. The students in college and special education programs were at the extremes, with the students in vocational education somewhere in the middle. In all cases, each group was significantly different from the other two.

When students in special education leave school, there are some consistent differences among those who have been placed in different service categories; the most

obvious differences involve those with emotional disabilities. Categorical differences in school measures (e.g., graduation rates, grade point averages, class percentile ranks), in school participation (i.e., absenteeism), and in services received consistently involved students with emotional disabilities, who did more poorly on school measures, participated less in school, and received more extensive services than students with other handicapping conditions. They did not differ considerably from most other students with disabilities in terms of performance on aptitude and achievement measures. Some caution must be exercised in reaching these conclusions, however, because of the small number of subjects (N=14) with emotional disabilities.

The characteristics that uniquely discriminate among various handicapping conditions during school years are the original reason for referral and the intensity of special education services during high school. The original reason for referral generally was different for students with mild mental retardation ("low ability") and students with speech impairments ("oral language"). For students with learning or emotional disabilities, problems in academic areas were more commonly noted. "Behavior" referrals clearly fall within the condition of emotional disabilities. The amount of time that special education services were received is similar across categories at all grade levels, except high school, where students with emotional disabilities received significantly more direct service time than students with other handicapping conditions.

After leaving school, students in special education and vocational programs appear to be similar rather than different. Despite several differences in the characteristics of students in special education, vocational, and college programs when they were in school, many post-school outcome measures did not yet differentiate those students in vocational and special education programs. In fact, several measures generally considered important (e.g., percent in paid employment, hourly earnings) did not differentiate any of the three groups. There were nonsignificant differences, however, which appeared to vary as a function of time out of school, most notably for the college group. When differences did emerge between students in special education and vocational programs, they frequently were on financial integration measures, with former students in special education having fewer checking accounts or credit accounts.

When post-school outcomes are compared for students with different handicapping conditions in special education, those students with speech impairments or learning disabilities have the most positive outcomes while students with emotional disabilities have the poorest outcomes. The most striking differences in post-school outcomes always involved those with emotional disabilities. These students were less likely to be employed, and less likely to be involved in educational activities. These findings are more striking because of the findings related to their greater use of services and resources while in school.

The post-school outcomes that are reported here probably are slightly more positive than might be found if data had been obtained from all potential respondents. This conclusion is based on the findings from examining certain types of school record information for respondents and nonrespondents. In general, those who responded had performed somewhat better in school-related measures than their counterparts who did not respond. The true effect of this response bias is not clear, however, given the tendency for differences among groups to disappear even though their school record data had indicated that they were statistically different at the end of high school. This important issue has been invariably ignored in previously reported follow-up studies. There also is a potential bias in favor of students in the vocational and college groups

due to the way samples had to be selected for those groups (i.e., students had to be considered potential graduates to be included in the vocational and college groups).

Overall, post-school outcomes, including employment, earnings, financial skills, and social leisure activities, are quite positive in this study for those individuals who had been in special education. Even with a slight positive bias in the results, post-school outcomes for the students with mild disabilities were not as low as might be expected from the differences observed between them and other students during their school years. Possible factors contributing to the positive outcomes were location in an area with unemployment rates lower than the national average, reputedly strong special education services and strong parent-family support.

Comparisons of the results from this study with the results of other studies lead to four major conclusions. First, there is not yet good comparability in available data bases related to the post-school adjustment of individuals with disabilities. Second, environment variables play a large part in influencing outcomes, and thus deserve greater attention. Third, samples from study to study are variable, and often are not comparable. Fourth, many follow-up studies have procedural shortcomings, especially in describing the characteristics and origins of samples, in presenting response rates overall and by data items, and in failing to assess possible differences between respondents and nonrespondents.

Assessment of Costs

Questions concerning costs in special education increasingly have been raised at federal, state, and local levels. Such costs and resource use have been increasing in both absolute terms and relative to regular instruction. The issues have focused not so much on the "need" for special education, as on how the resources are expended and the amount of expenditures per person for special education in relationship to regular education costs. Greater expenditure accountability and questions of cost-effectiveness are at issue at all levels in education.

Recent efforts to address these expenditure issues in special education have even been mandated by Congress, wherein studies have been commissioned to survey nationally representative data on special education expenditures for comparative purposes. However, little systematic attention has been given to accurately assessing local district costs or assisting local school districts in their planning, budgeting and allocating of resources for special education.

With the questions increasingly being focused on issues of accountability, cost containment and program efficiency, it is clear that the primary locus of control for these matters lies within the local districts. District policy makers and administrators need reliable and complete cost information for assessing, initiating or replicating an educational program or service. They also need to know incremental (marginal) costs involved in alternative service programs or in relationship to regular education, in order to provide information and to make decisions about program and service area expansions and contractions. They need to know what it costs to provide a particular service or program for different students with differing needs. In short, while the programmatic management responsibilities and data are primarily at the district level, there has been little attention given to providing districts with the methods and benchmarks needed for making such decisions.

In the cost study described in this monograph, a generic school-based model was developed, wherein costs can be described accurately for local district planning, budgeting and allocating of resources to instructional program and service areas. This model then was adapted to the specific programmatic needs of special education. A case study from a large suburban school district shows both the feasibility and utility of the cost analysis model in special education and reports empirical data that can be used both for this district and others as a basing point for future comparative purposes in special education.

The cost study research questions revolve around three general concerns: What are the resources employed and the costs of these resources in the delivery of local school district special education programs and services? Who bears the burden of these costs? And, what are the factors that explain variations in these costs? In the context of these three general concerns, the cost model and data collection focus on the following specific questions: (a) What is the average per pupil expenditure (per year, per day, and per student hour of instruction) for each of the special education programs and service areas (grouped by age and grade levels) currently being provided to children with handicapping conditions? (b) What is the average per pupil expenditure for regular instruction currently being provided for students with handicaps? (c) What is the average per pupil expenditure (per year, per day and per student hour of instruction) for each of the special education programs and service areas currently being provided to students with handicaps by public and private agencies external to the district? (d) What are the total costs to the district for special education and for each of its constituent programs and service areas? (e) What are the total costs to society for special education in this district and for each of its constituent programs and service areas? (f) What are the relationships of costs in special education to those in regular instruction? (g) Who bears the financial burden of special education? (h) What are the factors that explain variations in costs for each of the special education programs and service areas?

The cost analysis technique was a resource components approach to costing out educational programs. This approach requires the listing of a comprehensive set of educational programs within a district, or a comprehensive set of service areas within a program; the determination and measurement of the specific resources that are employed within each of these programs or service areas; and the valuing of these resources to determine program or service area costs. On the basis of these standardized cost data and the number of pupils or instructional hours of service that the school district enrolls or provides per pupil in each program or service area, the overall cost of education can be determined along with various per pupil unit costs.

Most previous cost studies in special education, including the widely quoted and emulated National Education Finance Program study by Rossmiller and his colleagues in the 1970s (1970 and 1974), simply took their data directly from school district budget records according to reimbursement or summary budget categories, without regard to the actual allocation of resources employed or without regard to any imputed value for district or other social resources that might lie outside of the district cash budget. Moreover, most previous studies dealing with special education costs have attempted to examine only the program costs for individuals with a specific handicapping condition, without regard to multiple service to students with multiple conditions, to differences in services by grade levels, or to variations in actual student use of services within particular service areas.

Information and data on resources employed and their respective costs were collected through examination of school district budget and expenditure records, state and district reimbursement records, State Department of Education printed reports and guidelines, and discussions with key district personnel. Similarly, information and data on students and program service areas were collected through examination of special education program and student records and discussions with key district and program personnel. All data were from the 1983-84 fiscal period (the district school year) of a large Minnesota suburban school district.

The cost study results indicate that any systematic examination of instructional costs in special education must allow for variations in student use of such services. Second, the data indicate that special education materially understates the real costs of special education to both the district and society. Also, representations of current state reimbursement rates and contributions to special education costs are materially overstated. The results also suggest that cost savings to a school district frequently are gained whenever special education services are received from external agencies. Some costs in the delivery of special education services often are over-estimated (e.g., teacher salaries), while other costs often are under-estimated (e.g., transportation, fringe benefits, and the use of facilities). Finally, the results indicate that "mainstreaming" in the 1980s may be a cost-effective approach to education for students with handicaps, in addition to its personal social values.

Assessment of Relationships Between Benefits and Costs

There is a growing demand for benefit-cost analysis of special education programs. This demand is fueled by a need to identify programs that can make the most of the increasingly scarce government funds. It also reflects desires for program accountability as parents, teachers, and students seek to improve the quality of education services. Despite this growing demand, benefit-cost analysis has been adopted slowly in evaluations of education programs. This hesitancy is due to confusion about what benefit-cost analysis can and cannot do. Specifically, there appears to be substantial concern that benefit-cost analysis with its focus on dollars and cents will be unable to capture all of the effects of programs like special education. Administrators have also been slow to adopt benefit-cost analysis because of a lack of evaluation paradigms that they can use as guides.

A benefit-cost approach that has been used successfully to evaluate a number of social programs has several features that make it particularly appropriate for assessing alternative program options for special education. These include:

- Use of a comprehensive accounting framework that includes all major benefits and costs, regardless of whether they can be explicitly measured or valued.

- Emphasis on benefit-cost analysis as a process rather than a bottom line -- the knowledge gained by systematically assessing the available information about a program is generally more important than any single estimate of benefits and costs.

- The use of sensitivity tests to assess the relative importance and implications of the various assumptions and estimates used in the analysis.

- Multiple analytical perspectives that indicate how different groups in society will perceive a specific program and how the program will affect the distribution of social resources.

- A general approach to valuing program effects and incorporating unmeasured effects so that all essential effects can be taken into account when making decisions.

This type of benefit-cost methodology was used to examine a specific program area of special education with empirical data on service costs and post-school earnings for a sample of young adults with mental retardation. Specifically, this involved: (a) identifying a conceptual framework wherein special education costs and benefits can be described and valued for analysis purposes; (b) developing a typology for linking the costs and benefits of special education in a specific program area; (c) presenting empirical data, and (d) examining a number of alternative benefit-cost assumptions for estimating probable results of special education services.

Results indicated that the projected lifetime earnings of adults with mild retardation clearly exceed the costs of providing special education for this population. By employing multivariate earnings functions, it was estimated that it costs society approximately $9 in special education services for individuals with mild retardation to generate $1.30 in annual earnings. With these increased earnings expected to last over the worklife of the students, the resulting benefit-cost ratio expressed in present values indicated that special education benefits were almost twice as great as their costs. With appropriately identified, measured and valued costs and benefits, it is possible to employ a formal benefit-cost framework to assess the efficiency of special education services. Such a model provides insight into not only those benefits and costs that can be monetized, but also into many other effects that cannot be valued monetarily. It notes, for example, important other benefits such as work preferences and prospects for increased self-sufficiency, self-esteem and quality of life.

In this study it was estimated that special education for former students with mild retardation was cost-beneficial when compared to a number of alternatives. When historical data were used for hypothetical counterfactual comparison groups, it was possible to examine a number of alternative hypotheses concerning the likely post-school effects of special education. Various historical institutionalization, school dropout, and unemployment rates were examined as hypothetical comparisons to special education for a sample of youth with mild mental retardation. The resulting benefit-cost estimates almost universally indicated the economic efficiency of providing special education for students with mild mental retardation. Based on the methodology and data in this study, special education for students with mild mental retardation in 1984 appears to be "worth its cost," even if all of its post-school effects are measured solely in monetary terms.

Methodological Considerations of the Feasibility of Assessing Outcomes, Costs, and Benefits by Local School Programs

The application of benefit-cost analysis procedures to local school programs is not a simple task, nor is it an impossible task. With appropriate assessment of needed information and resources for getting it, a local school program can apply several aspects of the procedures included here. Our experiences in designing the methodology applied here has given us several insights that we believe would be beneficial to share with the field, particularly that segment interested in conducting benefit-cost analysis in their own

programs. These insights have been translated here into a set of methodological considerations within the areas of: (1) assessing costs, (2) assessing outcomes, and (3) integrating the two within a benefit-cost analysis framework.

Methodological Considerations in Assessing Costs

The assessment of costs is something that local school districts can do, and that will provide valuable information for guiding management and policy decisions within the context of important values and concepts for providing special education services to students with disabilities. The cost templates presented in Chapter 3 can be used to guide the collection of cost data. The templates represent the preferred **resource components approach** to costing out educational programs. Thus, the steps to cost analysis involve: (a) listing the educational programs within the district (or the service areas within a program), (b) determining and measuring the resources employed within each program (or service area), and (c) valuing the resources to determine program (or service area) costs. (Interested readers can request additional templates and further information from the authors.)

There are several methodological considerations relevant to undertaking an assessment of local costs in special education. First, it is important to note that an incomplete picture will be obtained if simple comparisons are made of average costs per student per year across service areas using more traditional line item budget categories. Costs in different program areas can vary by factors of 10 times or more, depending on a number of program characteristics (e.g., number of students served, duration of service, type of service, intensity of service). As suggested here, when assessing costs it is especially important to consider both the duration and intensity of service.

Another methodological consideration relates to the need to make adjustments in collected data in order to determine the real incidence of costs. Special education cost data must be added to the costs of regular instruction. State, federal, and other reimbursements to the school districts and to any contracted agency must be deducted from district data costs. However, taxes paid by school district residents for special levies, such as those for cooperative multi-district special education units, must be added back into district cost data.

A final methodological consideration is that it is possible to underestimate costs in several ways. For example, the exclusion of external service agency costs can significantly reduce the identified costs. Similarly, exclusion of information on the number of service areas and missing information on the benefit-cost analysis procedure can also significantly alter cost assessment findings.

Methodological Considerations in Assessing Outcomes

The process of collecting outcome data from former students of special education programs can be a significant undertaking. The extent to which it is a productive undertaking depends on several factors directly related to the methodology used in the evaluation effort. First, follow-up requires that students must be found after they have been out of the school system for some time. Schools generally have the last known family address for each student. This is helpful unless there is considerable mobility in the target population or the time interval is great between exit from school and follow-up. The influence of both of these factors can be reduced by a planful approach in which schools maintain contact with former students on a periodic basis. Yearly

intervals are recommended so that advantage can be taken of post office forwarding procedures. If it is not possible to do this, or if a follow-up is being undertaken for the first time without a tracking system in place, two relatively productive avenues to follow in case finding have been identified. First, it is helpful to talk to teachers of students who have not been located. Former students often stop back to see their former teachers. A second avenue is to go through the student-friend network. Students currently in school often know a student from one or two years back, who then knows other students. A key student helper can be critical in these pursuits. Substantial difficulty in finding former students will directly lower response rates and probably increase response biases.

Response rates and methods used to increase response rates are a second methodological consideration when conducting outcome assessments. The response rate that is needed has received considerable attention in the survey research literature. While some have argued that a 75% return rate is desired (W. Welch, personal communication, February, 1987), this level is quite high, especially when it is not always possible to even locate subjects. It does seem reasonable, however, to require a 50% return rate. Achieving rates of 50% response to surveys is not necessarily an easy task. Former students, especially those young adults with mild disabilities may not wish to recall an association with special education services. It is important, therefore, to consider using various motivators to help increase the survey return rate. At a minimum, the former students should be provided with stamped return envelopes if a questionnaire format is used. Other motivators, of course, might be used. Among suggested possibilities are cash rewards and lottery-type drawings from among those who return follow-up instruments. For school districts, periodic contacts with former students makes it easier to enlist cooperation with follow-up studies.

Another methodological consideration is the degree to which there is response bias once returns have been obtained. One way to begin to measure this source of error is to compare a common set of information on those who returned and those who did not return or participate in the survey. For schools, a logical choice of data on which to make comparisons is school record data. Obvious choices include graduation rates, grade point averages, and absenteeism rates. If there are significant differences between respondents and nonrespondents on these variables, one might assume some degree of response bias. Finding some initial differences on such measures does not necessarily invalidate the study, but it may become desirable to statistically correct for initial differences or at least to evaluate findings in relationship to initial example characteristics.

A methodological consideration that is more under the control of the investigator is that of the reliability and validity of survey items. In other words, each item must produce the same information if repeated and must reflect what is intended to be measured. These are psychometric characteristics that must be merged with considerations about responding tendencies of subjects. For example, direct questions on amount earned per hour will produce the best and most usable information if it is answered. However, subjects are less likely to answer this kind of item than an item that requires them to mark a category encompassing their hourly incomes. The fine line of balance is critical in the successful collection of outcome information. Successful follow-up surveys require that such issues be assessed through carefully constructed follow-up studies. If former students are interviewed directly, the researcher should consult literature on interviewing procedures (see Sigleman et al., 1981 for a discussion of these issues in interviewing persons with mental retardation).

Methodological Considerations in Integrating Costs and Outcomes in a Benefit-Cost Framework

The integration of cost and outcome data in a benefit-cost framework is a difficult undertaking because of several methodological issues that arise. The benefit-cost methodology is based on an assumption that a comparison will be made between at least two alternatives using criteria of economic efficiency and equity. The basic technique used to determine economic efficiency is to identify all changes in resource use caused by the decision to fund a program, and then assign dollar values to those changes. The values of changes are summed together to yield estimates of the program's net present value, the difference between the benefits and costs where the dollar values of any benefits or costs that occur in future years are adjusted to reflect their value in the base year.

Three primary methodological considerations must be addressed when undertaking a benefit-cost analysis. First, it is necessary to specify not only the program being evaluated, but also the comparison against which it will be judged. Second, all costs and benefits must be identified within an appropriate accounting framework. Third, all costs and benefits must be assigned values.

The identification of a comparison against which the target program can be evaluated is a basic problem that makes the application of the benefit-cost methodology difficult. Because there generally is only one program in place in most special education situations, it is usually necessary to use a post hoc, non-experimental comparison, with hypothetical rather than actual treatment alternatives. This problem can be overcome, but typically requires extensive efforts in setting up the hypothetical comparison and generating cost and outcome data for it.

Other methodological problems encountered in the application of the benefit-cost methodology to an actual special education program were noted in Chapter 5. The reader is encouraged to thoroughly review Chapter 4, which provides information on procedures and associated difficulties, before undertaking a benefit-cost analysis.

Policy Issues and Future Benefit-Cost Analysis

The benefit-cost analysis reported here, and the associated outcome and cost analyses, have identified several pertinent policy issues that deserve consideration by special educators and that point to future uses of benefit-cost analysis procedures. For example, the study results point to the value of maintaining and improving present special education services. Options for improvement that are supported by the outcome results include greater emphasis on supporting transition from school to work and on expanding social-leisure activities. Results also point to the need to address absenteeism among students in special education, particularly those with emotional disabilities. Cost results confirm that before policy decisions can be made, it is necessary to look at program efficiency and resource use, not just at average costs per student. In the analysis conducted in this study, it was found, for example, that while services for students with emotional disabilities had the highest average costs, they had one of the lower costs when viewed in terms of average costs per student hour. Results also point to high costs associated with an "itinerant" mode of delivering special education services, and the cost savings associated with the provision of services by external agencies. However, significantly increased transportation costs must be considered along with

external rates when considering such services. Cost data also support the policy of "mainstreaming," from a policy perspective, independent of educational and social considerations.

These and other issues can be identified through the application of cost, outcome, and benefit-cost analyses. The effort involved in undertaking one or all of these analyses can be offset easily by the valuable information obtained, information that can feed directly back into the development of school programs for youth with handicaps in our schools.

Reviewing reliable cost information allows the administrator to assess the efficiency and organization of service programs. If certain programs are inordinately expensive (e.g., itinerant programs), the administrator can then begin to assess possible reasons for costly service options. Perhaps this analysis can lead to management decisions to increase efficiency without sacrificing educational access or quality. Similarly, development of cost information on services may also allow in some cases the evaluation of alternative services through application of cost effectiveness analysis (Levin, 1983).

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Appendix A
School Records Data Form 1

Student Name _____

_____ School

Address _____

_____ Class (Yr)

_____

_____ Group (S, V, C)

Birthdate ___ Sex ___

Program Information

_____ Graduated (Y, N)
_____ Entry Date (Mo, Yr)
_____ Gr 10 attendance (Days Abs/Days Poss)
_____ Gr 11 attendance (Days Abs/Days Poss)
_____ Gr 12 attendance (Days Abs/Days Poss)
_____ Total credits
_____ Class rank (x/x)

_____ Yr Graduated
_____ Transfer student (Y, N)

_____ Overall GPA
_____ Class % ile

Check non-special education alternatives provided:

_____ WECEP
_____ Summer School (SS)
_____ SS work program
_____ Remedial reading
_____ Sch within school
_____ Transition class
_____ Eng Sec Lang (ESL)

_____ Dir lrng ctrs
_____ Fine arts
_____ Vocational
_____ Tracking
_____ Mainstreamed
_____ Vo-Tech (916)
_____ Work program

_____ Chem Dep trt
_____ Psychiatric trt
_____ Ext psych eval
_____ Ext chem dep eval
_____ Ext neurol eval
_____ Incarceration
_____ Alternative Sch

Group Test Data

Aptitude Test (most recent)
Name _____
Date (Mo, Yr) _____ Gr ___

	Raw	Conv	% Rank
Verbal	_____	_____	_____
Math	_____	_____	_____
Total	_____	_____	_____

Gr 9 Achievement Test
Name _____
Date (Mo, Yr) _____

	Spec	Nat %
Composite	_____	___
Reading	_____	___
Lang Arts	_____	___
Math	_____	___

Most Recent Achievement Test
Name _____
Date (Mo, Yr) _____ Gr ___

	Spec	Nat %
Composite	_____	_____
Reading	_____	_____
Lang Arts	_____	_____
Math	_____	_____

Most Recent Gates-MacGinitie

Date (Mo, Yr) _____ Gr ___

	%	NC/Na
Vocab	_____	___
Comp	_____	___
Total	_____	___

Appendix B

School Records Data Form 2

_____ School
_____ Class (Year)

Student Name _____

Individual Test Data

Most Recent Individual IQ Test
Name _____
Date (Mo, Yr) _____ Gr___

	Raw	Standard	% ile
Verbal	____	_____	____
Perf	____	_____	____
Total	____	_____	____

Most Recent Individual General Ach Test
Name _____
Date (Mo, Yr) _____ Gr ____

	Raw	Standard	% ile	G.E.
Reading vocab/recog	____	_____	____	____
Reading comp	____	_____	____	____
Language	____	_____	____	____
Math	____	_____	____	____
Written Language	____	_____	____	____
Spelling	____	_____	____	____

Additional Reading Test
Name _____
Date (Mo, Yr) _____ Gr___

Additional Language Test
Name _____
Date (Mo, Yr) _____ Gr ____

Additional Achievement Test (most recent high school)

Name _____
Date (Mo, Yr) _____ Gr _____

Special Education Services (all - from elementary on)

Referred by: ____ Counselor ____ Teacher ____ Student ____ Parent
____ Other (specify) _____

Reason for Referral: _____ Math ___ Reading comprehension __ Reading Rate
____ Attention _____ Written Language
____ Other (specify) _____
____ Former service elsewhere (Y, N); If Y, what kind _____
_____

Minutes of Service (average per day to nearest 15 minutes for each grade)

Grade	1	2	3	4	5	6	7	8	9	10	11	12
	___	___	___	___	___	___	___	___	___	___	___	___

Appendix C

School Records Data Form 3

_____ School _____ Class (year) Student Name _____

_____ Service Year

Service site: ___ A ___ B ___ C ___ D ___ Other : _____

_____ Starting date _____ Grade _____ Ending Date (Mo/Yr) _____ Grade

_____ Outside evaluation (Yes or No); If YES, what kind: ___ Private ___ Public
what type: ___ Psychological ___ Neurological

Check primary category of service and give months in each:

	(mos)		(mos)		(mos)		(mos)
___ Adapted PE	_____	___ LD	_____	___ Sev Ed	_____	___ Sev Phy Hand	_____
___ Autism	_____	___ Multi Hand	_____	___ Sev HI	_____	___ Sev Retardation	_____
___ Ed	_____	___ OT	_____	___ Sev LD	_____	___ Sev VI	_____
___ GLD/EMR	_____	___ Speech	_____	___ Sev Mult Hand	_____	___ VI	_____
___ HI	_____						

Circle level(s) of service and give months of each: 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___

Check disabilities:

___ Reading ___ Attentional ___ Low Ach ___ Auditory Perceptual ___ Written Language

___ Math ___ Spelling ___ Vis Percep ___ Oral Language ___ Other (list)

Objectives

___ # of short-term acad obje in IEP ___ # of short-term acad obje met ___ Sp Ed teacher evaluation of overall success (-,o,+)

___ # of short-term behav obje in IEP ___ # of short-term behav obje met

Check ancillary (related) services. Give levels of service and hours per day for each.

	level	hrs/day		level	hrs/day		level	hrs/day
___ Adap PE	_____	_____	___ No Sub DAC	_____	_____	___ Vision	_____	_____
___ Autism	_____	_____	___ Oak Grove	_____	_____	___ VoTech Sp Ed	_____	_____
___ BehMgmt	_____	_____	___ OT	_____	_____	___ Welfare (AFDC)	_____	_____
___ Cambridge	_____	_____	___ Srv Eval-916	_____	_____	___ WEH	_____	_____
___ Centerville	_____	_____	___ Speech	_____	_____	___ 916	_____	_____
___ Hearing	_____	_____	___ StPaul/ Lexington	_____	_____	___ Other(specify)	_____	_____

Level 5 Placements (duration in months)

Chem trt ___ Group Home ___ Incarceration ___ Foster Parents ___ Homebound ___ Psych Trt ___ Welfare ___

_____ School _____ Class (Year) Student Name _____

_____ Service Year

Appendix D

I.D. #_____

HIGH SCHOOL FOLLOW-UP QUESTIONNAIRE

Please complete and return this form. Your answers are important and will help us plan better school programs for other students. All information will be kept confidential. Your name will not be used with any of this information.

1. During the past 7 days, which of the following have you done? (Mark an X by all that you have done)

( ) Went out to eat
( ) Went on a trip
( ) Worked as a volunteer
( ) Went shopping
( ) Worked on hobbies
( ) Went to a sports event
( ) Went to a movie, concert or play
( ) Participated in sports
( ) Attended a party or dance
( ) Went out on a date
( ) Visited a friend
( ) Went to a meeting of a club or organization
( ) Watched or listened to TV, radio, or records
( ) Spent time with a relative
( ) Attended a religious service
( ) Went to a park or on a walk
( ) Played cards, games, or with toys
( ) Sat around resting or doing nothing in particular
( ) Other: _____

2a. How much are your daily activities limited by your physical health?

(Mark one):
2a. ( ) not at all
( ) a little
( ) a great deal

2b. In what ways are your activities limited?

(List):
2b. _____
_____
_____

3a. During this past May, which of these education activities did you go to?

(Mark all that apply):
3a. ( ) Vocational School
( ) Community College
( ) College or University
( ) Apprenticeship
( ) Other Education
( ) None

3b. How many hours did you attend education classes each week during May?

(Mark one):
3b. ( ) None (not in an education program)
( ) 1 to 12 hours
( ) 13 to 18 hours
( ) 19 or more

3c. If you are currently going to school, what job do you plan to get after you complete your training? (Write UNDECIDED if you do not know)

3c. _____
_____
_____

4a. During the past week, which of these job activities did you do?

(Mark all that apply):
4a. ( ) Homemaker (full or part-time)
( ) Military (full-time)
( ) Unemployed and looking for work
( ) Unemployed and not looking for work
( ) Paid employment
( ) Other (what?) _____

4b. How did you find your job?

(Mark one):
4b. ( ) Not applicable/not employed
( ) Parents/relatives
( ) School
( ) Vocational Rehabilitation (DVR)
( ) Friends
( ) Newspaper ad/walk-in
( ) Employment service or training program
( ) Recruiting office
( ) Other (what?) _____

4c. If you now have a job, please fill in the following:

1. Job Title/Duties:	4c-1.	_____
2. Months on this job:	4c-2.	_____
3. Hours per week you work:	4c-3.	_____
4. Money earned per hour:	4c-4.	_____
5. Total earnings before 1984 taxes	4c-5.	_____

4d. If you now have a job, think about your job and mark how satisfied you are with:		Not Satisfied	Satisfied	Very Satisfied
1. The chance this job gives me to make use of my abilities.	4d-1.	1	2	3
2. The pay I receive and the amount of work I do.	4d-2.	1	2	3
3. The chance I have to get ahead on this job.	4d-3.	1	2	3

5. Please tell a little about yourself by answering the following questions:

a. Do you have a driver's licence?	( ) Yes	( ) No
b. Do you have your own checking account?	( ) Yes	( ) No
c. Do you have a credit card/charge account in your name?	( ) Yes	( ) No
d. Did you take a vacation in 1984?	( ) Yes	( ) No
e. Mark an "X" by those sources that you regularly receive money from, not including your job. Please write how much you get each month from each source.	( ) None (not receiving money other than from job) ( ) Family/Relative: $_____ ( ) Friend: $_____ ( ) County: $_____ ( ) State: $_____ ( ) Federal: $_____ ( ) Other (what source?) _____ $_____	

6. Think back to high school as you answer these next questions:

a. Did you have a part-time job during high school that was set up by the school?	( ) Yes	( ) No
b. Did you have a part-time job during high school that you got on your own?	( ) Yes	( ) No

How much do you agree with these next statements?

	Strongly Disagree	Disagree	Agree	Strongly Agree
c. I was prepared with enough job skills in high school to do what I am doing now.	1	2	3	4
d. Overall, I believe I received a good education.	1	2	3	4

7. Think about what has happened since you left school as you answer these next questions:

a. How many different employers, if any have you had since you left high school? _____

b. Have you had any special training since you left high school? ( ) Yes ( ) No

c. If you have had special training, what company or organization has provided the training? Please include how long the training lasted (1 week, 2 months, 4 years, etc.).

Company	Training Time
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8a. About how many close friends do you have? _____

8b. Of your close friends, how many did you know in high school? _____

8c. Of your close friends, how many are new friends since you left high school? _____