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ABSTRACT

This document contains the first of five volumes reporting the activities and results of a career education evaluation project conducted to accomplish the following two objectives: (1) to improve the quality of evaluations by career education projects funded by the United States Office of Career Education (OCE) through the provision of technical assistance to fifteen of these projects; and (2) to identify, as a result of this technical assistance effort, a field tested model which can be used by other career education projects funded by OCE in future evaluation efforts. This volume contains highlights of the design and results and is divided into five chapters. Chapter 1 presents an introduction which provides background information and explains career education concepts and principles. Chapter 2 provides an overview of the evaluation methodology, and chapter 3 explains the implementation and process of career education. Chapter 4 describes the outcomes of career education, which were determined by three complementary evaluation models. Finally, chapter 5 provides a summary of the analysis of key policy issues and recommendations. A glossary and bibliography are appended. (BM)

JUNE 1978

TECHNICAL ASSISTANCE IN EVALUATING CAREER EDUCATION PROJECTS

Contract 300760312

FINAL REPORT
VOLUME I
SUMMARY VOLUME

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Ernest W. Strang
Robert F. Baker

Submitted to:
DHEW/US Office of Education
Office of Career Education

NTS RESEARCH CORPORATION

PREFACE

This report has been prepared pursuant to the requirements of DHEW/USOE Contract Number 300760312, *Technical Assistance in Evaluating Career Education Projects*, for the Office of Career Education (OCE). This contract was awarded to NTS Research Corporation (NTS) on June 21, 1976, to accomplish the following two objectives:

1. To improve the quality of evaluations conducted by OCE-funded career education projects through the provision of technical assistance to fifteen of these projects.

2. To identify, as a result of this technical assistance effort, a field tested model which could be used by other career education projects funded by OCE in future evaluation efforts.

Contractors are encouraged to provide objective, independent evaluations; therefore, none of the results or positions presented in this report necessarily reflect official Office of Career Education policy.

This is Volume I of the five volumes comprising the common Career Education Evaluation Final Report. The volumes include the following:

Volume I: *Summary Volume*. This volume contains highlights of the study design and results.

Volume II: *The Career Education Evaluation Final Report*. This, the main body of the report, contains detailed information about the background of the evaluation, the evaluation design, and the results of the evaluation. Three appendices are included, as well: (1) summaries of the fifteen local evaluations; (2) a summary of the technical assistance provided by NTS; and (3) all instruments used in the study.

Volume III: *The Career Education Instrumentation Substudy*. This volume contains the rationale, procedures, and results of the outcome and process instrument validation and construct definition activities undertaken by NTS under this contract.

Volume IV: *Turnkey Manual for Evaluating Local Career Education Projects*. The Turnkey Manual was prepared for distribution to participating projects and contains the necessary information for longitudinal continuation of this evaluation at the project level.

Volume V: *The Career Choice Substudy*. This volume contains the design and results of a study of the relationships of career education to secondary students' career choices.

In addition to these five common report volumes, NTS prepared unique local evaluation reports for each of the fifteen participating projects.

This material in this publication was prepared pursuant to a grant or contract from the Office of Education, U. S. Department of Health, Education, and Welfare. However, points of view or opinions expressed do not necessarily represent policies or positions of the Office of Education.

DISCRIMINATION PROHIBITED

Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title IX of the Education Amendments of 1972, Public Law 92-318, states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Therefore, career education projects supported under Sections 402 and 406 of the Education Amendments of 1974, like every program or activity receiving financial assistance from the U. S. Department of Health, Education, and Welfare, must be operated in compliance with these laws.

ACKNOWLEDGEMENTS

Completing this evaluation was not easy, even though we received the help of many people who gave much of their scarce time and abundant knowledge. This evaluation had to traverse much previously uncharted territory; without the help of numerous guides, guards, and bearers the evaluation team might never have reached its goal.

We owe special thanks to the local project staffs. Hard-pressed by their own tasks they still put up with our problems, showed forebearance over delays, and were always ready to provide assistance and information when necessary. Even though we are prevented by concerns of preserving project anonymity from thanking all these people by name, the assistance they offered is worth many extra tips of the hat.

Equally important are the thousands of students, teachers, counselors, and principals who provided the substance for this evaluation. These are the nameless, unsung heroes to whom any evaluator owes special gratitude. We owe more than most; the burden imposed was heavy, yet the response was satisfyingly high.

Our thanks go not only to those at the local level but also to those in the Federal government who, with more direct knowledge of our efforts, still provided encouragement and assistance, along with gentle prods and remonstrances when necessary. Our OCE project officer, Terry Newell, deserves to be singled out for praise. Despite an already loaded schedule, he was always available when needed. His assistance took many forms; he was involved extensively in evaluation design development, instrument selection and preparation, selection of analysis strategies and techniques, and reviewing draft reports. His aid in completing the process instruments and shepherding them through OMB went far beyond that required by his role. Kenneth B. Hoyt, Director of the Office of Career Education, not only provided general support for our efforts but also gave direct and useful assistance in preparation of process instrumentation. Gloria Butler and Prentice Echols, monitors of the projects in this study, helped keep the projects and the evaluation team moving toward the same point.

Norman Audi, Peggy Saunders, and Bob Rothenberger of the OE contracts office, without whom the evaluation would not have been completed, deserve our thanks as well.

Alice Scates from OPBE, Robert Wise, Lois-ellin Datta, Carlyle Maw, Ron Bucknam from NIE, and Jerry Walker of the Ohio State Center for Vocational Education provided continued assistance in all stages of this evaluation and attended a number of project conferences. They offered us many useful ideas and served as a valuable sounding board for some of ours. Lana Muraskin of NIE assisted in the conceptualization and analysis of the career choice data presented in Volume V of this report.

Preparation of the process forms was assisted by Don Phillips of the National Assessment of Educational Progress and by Jay Davis of the Research Triangle Institute's National Longitudinal Study of the High School Class of 1972. Dale Holden of the Richlands II School District of South Carolina graciously allowed us to pilot our Student Information Form in his district.

Finally, of course, we offer our sincere appreciation to those at NTS who participated in the various stages of this project. Special thanks go to Helmuts Feifs, Dick Rohlf and Joan Troy for their timely and valuable help in writing this report. Steve Davis, Blyth Gabriel, Keith McNeil, Jack Bailey, Carol Hill, and Bernie Schmidt all offered professional assistance when needed. Former NTS staffers Robert Pinnell, Darrell Myrick, Bill Katzenmeyer, Henri Belfon, and John Goode made important early contributions. Wayne Parks and Lynn Cowell kept us within budget.

This was a data-rich evaluation. The tables in this and the other volumes give but a hint of the time and effort needed to produce them. To Frances Pendergrass and Steve Rihner, who supervised

and performed much of the data reduction and analysis, we owe many thanks. To those who assisted them, Dana Hardwick, Jeff Forrest, Steve Lesh, Bob Fritz, and Norm Friberg we offer our gratitude as well. Elizabeth Goodrich provided valuable assistance on unique project data. An efficient team of data editors included Gloria Ripperton, Victoria Brighton, Betty Hill, Florence Dickerson, and Mary Cook.

Preparing the five volumes of this report, as well as unique reports for each of the participating projects, was the responsibility of Pauline Matson, NTS's Director of Support Services. She was ably assisted by Dianne Gupton, Barbara Leonard, Deborah Parker, Mary Dickens, Ray Alderson, Eleanor Johnson, Judy Smith and, during earlier drafts, Phyllis Thomas, Linda Conly, and Brenda Scarborough. Debbie Ward and Bill Roycroft had the unenviable task of making copies of all these reports. Skip Anderson did most of the design work.

To all of those named above and, especially, to those we could not name, we offer a most sincere, "Thank You."

A. Jackson Stenner
Robert F. Baker
Ernest W. Strang

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CHAPTER I
INTRODUCTION

In June of 1976, the Office of Education contracted with NTS Research Corporation to provide technical assistance in evaluation to fifteen of their funded K-12 incremental improvement projects. In addition to a need to provide each project with a unique evaluation report, the Office of Career Education (OCE) requested that NTS also prepare a common evaluation report. This common report was to address the processes and outcomes of career education as they are manifested within these fifteen projects; this study was not conceived as a national evaluation of career education. The present volume is a summary of the common report and includes an analysis of selected policy issues.

HISTORICAL PERSPECTIVE

The antecedents of career education, as it is practiced today, can be traced to the early decades of this century. Addressing a joint meeting of the National Society for the Promotion of Industrial Education and National Vocational Guidance Association in 1914, John Dewey said that a democratic education required no "separation of vocational training from academic training." His keynote address called for a refocusing of education to provide each learner with a "conception of his industrial obligations and opportunities." Edwin L. Herr's synthesis of the evolution of career education traces the early impetus for the career education concept to Dewey's seminal remarks.

More recent landmarks include passage of the Manpower Development and Training Act of 1962, which explicitly recognized a need for retraining adults as technology and our economy change. With passage of the 1963 and 1968 vocational education legislation, emphasis shifted from the needs of the labor market to the employment needs of individuals. Current federal initiatives and local interest in career education began in 1971, soon after Sidney P. Marland, Jr., then Commissioner of Education, presented career education as a high priority means for educational reform. Marland saw career education as a reform effort embracing vocational educational as one significant element but also emphasizing "occupational aspects of human development to all levels of learning and all relevant parts of academic instruction" (Marland, 1974, p. 8).

Many factors have contributed to the current interest in career education as a vehicle for changing the direction of American education. These factors include social unrest, variations in the composition of the work force, dissatisfaction with school performance, and a popular desire for schools to equip young people for entry-level positions in the world of work. Hoyt (1975) noted that career education has emerged as a weapon to attack some of these conditions calling for educational reform:

> Career education represents a response to a call for educational reform. This call has arisen from a variety of sources, each of which has voiced dissatisfaction with American education as it currently exists. Such sources include students, parents, the business-industry-labor community, out-of-school youth and adults, minorities, the disadvantaged, and the general public. While their specific concerns vary, all seem to agree that American education is in need of major reform at all levels. Career education is properly viewed as *one* of several possible responses that could be given to this call (1975, p. 1).

With increasing social pressures come demands that our schools be responsive to society's needs. A Gallup survey of attitudes toward the public schools revealed overwhelming agreement that schools should give more emphasis to the "study of trades, professions, and businesses to help students decide on their careers" (Kappan, 1973). A similar survey by the American College Testing Program in 1973 found that more than three-fourths of high school juniors expressed a need for additional help with their career planning. In fact, career planning headed the list of preferences on the "need for help" portion of the survey (Marland, 1974). It is toward these ends that career education is addressed.

As a move toward consensus on the definition of career education, Hoyt submitted the following definition in *An Introduction to Career Education: A Policy Paper of the U. S. Office of Education:*

'Career education' is the totality of experiences through which one learns about and prepares to engage in work as part of her or his way of living. 'Career,' as defined here, is a developmental concept beginning in the very early years and continuing well into the retirement years. 'Education,' as defined here, obviously includes more than the formal education system. Thus, this generic definition is purposely intended to be of a very broad and encompassing nature. At the same time, it is intended to be less than all of life or one's reasons for living (1975, pp. 2-3).

As an evolving concept, career education has not gone without detractors. Some individuals claim that career education is little more than an affectively charged term, providing an undemanding focus for educators' energies. Other criticisms are that the term lacks conceptual boundaries; it means many different things to some people, and, apparently, means nothing to some. There are people who would argue that the concept comes precariously close to losing its identity in the larger ideological entity of vocational education, or, perhaps, that there is no identity to lose, and that career education is what good educators have been doing for some time.

CAREER EDUCATION CONCEPTS AND PRINCIPLES

Hoyt (1975) stated that one of the key objectives of education should be the preparation for successful working careers of all individuals. In order to achieve this goal, classroom teachers have the responsibility of relating the material they teach in course work to the world of work. Students must be given the skills which will enable them to put into practice the information they absorb in abstract terms. Moreover, education should not be kept so separate from the working world that a person entering into a new career is ill-prepared to handle the human relations and unique orientation involved in working.

Preparation for lifetime careers cannot be provided totally within the classroom environment. As with all learning experiences, a person is exposed to a variety of working roles through family members, community, and peers during his or her entire life. Education should not be viewed as a "begin and end" phase of one's experience; learning does not begin at six and end at twenty-one. Also, ideally, a person should be free to enter and leave an educational experience as needs and interests change. The life-long conceptual framework for the individual's career education may support a variety of goals. Depending on the given program, goals for career education have originated from state school superintendents' offices, local community task forces, professional educators, and a number of other sources.

Goals for the elementary level (K-6) stress awareness of the many careers available, the development of wholesome attitudes of respect and appreciation for the dignity of workers, and an awareness of self in relation to occupational roles. A more concentrated exploration of the knowledge, skills, technical requirements, working conditions, and responsibilities of various career fields comprises most goal statements for the middle school. These goals evolve into more specific career planning and preparation activities in grades 9-12.

Program developers and practitioners have formulated several levels of goals for career education: general goals for all career education programs, more specific goals for individual state and school district efforts, and operational goals for student outcomes. In *An Introduction to Career Education. A Policy Paper of the U. S. Office of Education.* Hoyt presented nine learner outcomes (see Exhibit 1), which have shaped the instructional emphases in most career education projects including the fifteen examined in this evaluation. Although NTS recognizes that this list has been superseded, these outcomes were operative for the projects in this study. (The most recent formulation can be found in Hoyt, Kenneth B. *A Primer for Career Education.* U. S. Government Printing Office, 1977, p. 35).

The 1975 learner outcomes were followed by this important clarification:

> It is important to note that these learner goals are intended to apply to persons leaving the formal educational *system* for the world of work. They are *not* intended to be applicable

whenever the person leaves a particular *school*. For some persons, then, these goals become applicable when they leave the secondary school. For others, it will be when they have left post-high school occupational education programs. For still others, the goals need not be applied, *in toto*, until they have left a college or university setting. Thus, the applicability of these learner outcome goals will vary from individual to individual as well as from one level of education to another. This is consistent with the developmental nature, and the basic assumption of individual differences inherent in the concept of career education (1975, p. 11).

Exhibit 1*

Office of Career Education Learner Outcomes

Career education seeks to produce individuals who, when they leave school (at any age or at any level), are:

1. Competent in the basic academic skills required for adaptability in our rapidly changing society.
2. Equipped with good work habits.
3. Capable of choosing and who have chosen a personally meaningful set of work values that foster in them a desire to work.
4. Equipped with career decisionmaking skills, job-hunting skills, and job-getting skills.
5. Equipped with vocational personal skills at a level that will allow them to gain entry into and attain a degree of success in the occupational society.
6. Equipped with career decisions based on the widest possible set of data concerning themselves and their educational-vocational opportunities.
7. Aware of means available to them for continuing and recurrent education once they have left the formal system of schooling.
8. Successful in being placed in a paid occupation, in further education, or in a vocation consistent with their current career education.
9. Successful in incorporating work values into their total personal value structure in such a way that they are able to choose what, for them, is a desirable lifestyle.

*Hoyt, Kenneth B. *An Introduction to Career Education: A Policy Paper of the U. S. Office of Education.* Washington, D. C.: 1976.

Hoyt based his definitions and concepts about career education upon the following assumptions. First, to ensure human happiness, a person must enjoy a feeling of self-worth in work. This feeling of worth is not limited to the sense one has about his skills in performing work well, but is involved in all attitudes, values, and general abilities associated with productivity in our society. Second, a person develops a sense of self-worth from what is observed of the character and achievement of others. When an individual feels committed to work, and accompanying this commitment has a positive feeling toward self, the entire society of which that person is a part is directly affected. Third, the traditional value of the Protestant work ethic in America may not be as powerful a motivation for work as has previously been the case.

CHAPTER II
OVERVIEW OF EVALUATION METHODOLOGY

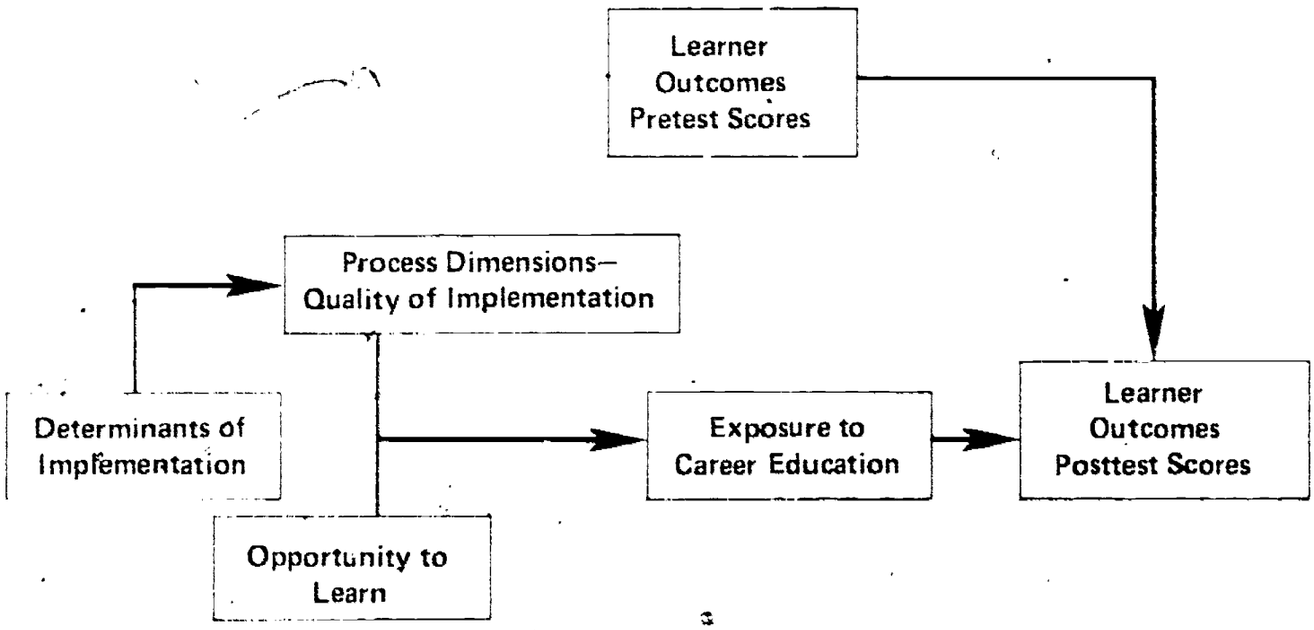
For the purposes of this study, evaluation was defined as "the process of clarifying a set of information needs, and collecting, analyzing, and reporting information to alleviate those needs" (Stenner, 1973). Through a series of design conferences involving local project personnel and Office of Career Education and NTS personnel, the evaluation team identified the information desired by various information users, particularly OCE. These information needs were expressed in the form of evaluation questions grouped around six major policy queries. The evaluation questions were subsequently "mapped," and the data elements required to answer each one, as well as the necessary analysis techniques, were specified. Finally, a comprehensive design document was prepared that set forth a detailed methodology for the evaluation. This chapter presents an overview of the evaluation design, including sections on the conceptual framework and policy evaluation questions, methodological perspectives, instrumentation, and sampling.

CONCEPTUAL FRAMEWORK AND POLICY EVALUATION QUESTIONS

In this section we present a conceptual framework for viewing the implementation/process of career education and its effects on students. The framework, illustrated in Exhibit 2, represents a synthesis of several theoretical models (Bloom, 1976; Fullan and Pomfret, 1977; Carroll, 1963; and Cooley and Lohnes, 1976). Implicit in the proposed conceptual framework is an attempt to represent the casual factors which determine how students perform on the learner outcome measures.

EXHIBIT 2

CONCEPTUAL FRAMEWORK FOR EVALUATING FIFTEEN CAREER EDUCATION PROJECTS



Student variation in learner outcome posttest scores is seen as emanating from two sources: variation in pretest scores and variation in exposure to career education concepts and activities. Pretest scores serve as a proxy measure for an individual learner's fund of past experiences. In a review of the importance of entry-level performance (i.e., pretest scores) for later learning, Bloom (1976) estimates that, depending upon the length of the treatment interval, as much as one-half of achievement variance (i.e., posttest performance) is attributable to prior experiences as manifested in pretest scores. Recognizing that the present evaluation study deals with an eight-month treatment interval, it is apparent that pretest scores present a potentially powerful determiner of posttest scores. The second source of learner outcome posttest scores, suggested by our conceptual framework, is "exposure to career education" or, more specifically, the level to which a student is exposed to career education concepts and activities. Variation in exposure to career education is itself a product of two influences: quality of implementation of career education and opportunity to learn. The level of exposure to career education exhibited by an individual student is determined partially by the level of teaching staff involvement in career education; teacher, counselor, and principal attitudes toward career education; types and frequency of career education activities engaged in by teachers, counselors, and principals; and other indicants of quality of implementation. The other source of variation in student exposure is opportunity to learn, which, at its most simplistic level, could be viewed as a complex of factors including motivation, attendance, and attitude toward school. Opportunity to learn was included to ensure conceptual completeness; cost considerations, however, precluded operationalizing it in this study.

Finally, we attempt to explain observed variation in quality of implementation by employing a set of determinants of implementation. These determinants, including, for example, the school district's experience with innovation, adoption strategies (e.g., type and frequency of inservice), and organizational capacity for change, operate to facilitate or impede the implementation of career education. The results should help us explain why some school districts or schools are better able to implement career education than others.

Thus, the conceptual framework posits a set of determinants which explains variation in the quality of implementation of career education. The quality of implementation interacts with opportunity to learn to determine the level of exposure to career education enjoyed by a particular student. Level of exposure to career education combined with a student's readiness, as measured by pretest scores, explains observed variation in posttest score performance.

The conceptual framework suggested six policy-level evaluation questions, which formed the nucleus for this evaluation. These are:

(1) What factors determine the quality of implementation of career education?

(2) Do students who have been exposed to career education achieve more on the outcome constructs than students who have not been exposed to career education?

(3) In what ways are the educational experiences of career education students different (both within and outside the classroom) from the educational experiences of noncareer education students?

(4) If career education students do, in fact, learn more in the defined outcome domains than noncareer education students, and, if the educational experiences of career education students are different, then in what ways are these experiences related to gains on the outcome constructs?

(5) How do differences in student characteristics affect the educational experiences found in career education programs?

(6) Are there differential effects of career education which interact with student characteristics?

To fully answer any one policy question, we must first answer a family of primary evaluation questions. Just as policy-making involves differentially weighing and synthesizing diverse alternatives into a single perspective, answering policy evaluation questions requires a synthesis of answers to primary evaluation questions.

METHODOLOGICAL PERSPECTIVES

In this section we discuss six methodological issues which played major roles in shaping the course of the evaluation. The issues are: (1) operationalizing learner outcomes, (2) implementation/process measurement, (3) inapplicability of a true experimental design, (4) grouping items and variables, (5) selecting a unit of analysis, and (6) approaches to estimating treatment effect.

Operationalizing Learner Outcomes

In planning for this evaluation, it quickly became apparent that available career education instrumentation was inadequate. A thorough review revealed a paucity of well-constructed, structurally defined, standardized, nationally normed instruments. At least five of the nine OE learner outcomes (see Exhibit 1) encompassed constructs for which only limited instrumentation was available. The absence of well-defined outcome measures required NTS to perform a major construct definition study. Employing several hundred items purporting to measure one or more of the outcome domains, a large-scale factor analysis and test validation substudy was completed. (The results of this substudy are described in Volume III). The construct definition study resulted in a set of outcome constructs, keyed to the OE learner outcomes, which possessed somewhat satisfactory psychometric properties.

Implementation/Process Measurement

A major focus of this evaluation was the implementation/process of career education. Conceptualization and measurement of the complex career education process are difficult tasks. The difficulties were compounded by resource limitations which precluded any expensive, on-site observations of classrooms and students. As a consequence, our approach to assessing the quality of implementation relied exclusively on teacher, counselor, and principal reports regarding their respective levels of career education knowledge and understanding, involvement in career education activities, and attitudes concerning career education's role and presumed benefits. Similarly, students reported on their frequency of "exposure" to a variety of career education activities. These activities were suggested by local project personnel, OCE, and reviews of the literature and past evaluations of career education projects conducted by NTS.

We recognize that it would have been methodologically more sound to supplement our questionnaires with classroom observation rather than rely on practitioners' reports, but the large number of teachers, counselors, and principals rendered this option infeasible. Another alternative to cross-validation was to compare each student's responses directly with his or her teacher's response so that reported implementation, averaged across all of a student's teachers, could be directly compared with student reported exposure. At the fifth grade level, this approach to cross-checking divergent perspectives on the implementation/process proved feasible, but we felt that matching eighth and eleventh grade students with their respective sets of teachers across two semesters would overburden both participating schools and NTS data processing staff. We finally compromised as follows: by employing the project as the unit of aggregation it became possible to examine similarities among teacher, counselor, and principal reported levels of implementation and student reported exposure. Similarly, student reported exposure can be aggregated to the classroom level for fifth graders for correlation with teacher reported implementation. These approaches present some unit of analysis problems (see later discussion on this topic) but represent cost-effective options for measuring the implementation/process of career education, while, at the same time, permitting some cross-checking of perspectives.

Inapplicability of a True Experimental Design

A major methodological issue revolved around the inapplicability of a true experimental design, since students were not randomly assigned to treatment and control conditions. The approach finally selected, which has been termed "the method of controlled correlation" (Cooley and Lohnes, 1976), highlights the role of the correlation coefficient as the primary index of strength of relation and explanation. Numerous sets of variables are manipulated through the method of controlled correlation to answer a comprehensive list of evaluation questions. Of particular interest is the proportion of criterion variance that can be uniquely assigned to treatment group and different sets of determinants of implementation and implementation/process variables and the proportion of variance that is confounded among various combinations of these variable sets. This approach to partitioning the criterion variance, termed regression/commonality analysis, is used repeatedly throughout the report. (A more complete discussion of the method appears in Volume II.)

Grouping Items and Variables

This study requires the manipulation of large numbers of variables. In order to do this efficiently, the variables need to be grouped. In this study the grouping takes place at two levels: (1) components of the conceptual framework and (2) within each component. As it is a straightforward procedure, given a conceptual framework, to classify variables into the various components, this discussion will focus on grouping variables within components.

The reasoning behind grouping items and variables *within* a component, prior to intra and interdomain relationships, is a bit more subtle. The intercorrelations among knowledge and attitude items lead to inferences about the existence of organizing influences, which are believed to determine interitem correlations. Upon examination of these correlations, we typically make a decision to group highly correlated items, thus forming a scale. Weighted or unweighted combinations of item scores produce scale scores. It might seem logical that this same approach should be followed in grouping determinant and implementation/process variables. We offer the following argument for why such an approach, while appropriate for grouping most outcome variables, is clearly inappropriate for grouping most independent or control variables.

The fact that certain teacher characteristics are correlated with certain student characteristics, i.e., certain types of students are consistently taught by certain types of teachers, is generally a result of implicit or explicit policy decisions. Such a relationship could be easily manipulated by simply changing the policy governing assignment of teachers to schools. The interrelationships among attitude or knowledge items, on the other hand, are not so easily manipulated. It is much more difficult to dictate changes in the structure of individuals' mental processes than it is to alter organizational patterns or coincidence of staff behaviors. Thus, we conclude that the empirically observed correlations among knowledge and attitude items should determine how such items are grouped; however, implementation/process variables should be grouped logically so that "resource packages" can be most easily configured and delivered. For example, a finding that the frequency with which counselors engage in career education activities is positively correlated with the frequency with which teachers engage in such activities should not lead us to group these two types of activities into a "staff activities" cluster. A resource package designed to increase teacher involvement in career education activities would likely be quite different from one designed for counselors; thus, it is appropriate to distinguish between such groups of process variables when examining process-outcome relationships. Another example involves the division of student activities into three categories: classroom activities, linkage activities, and extra-school activities.* If one set of activities is highly related to an outcome,

*See page 21 for a further discussion of these activity variable sets. Briefly, "classroom activities" are those comprising part of classroom-based instruction; "linkage activities" take place outside the classroom but are part of formal education; and "extra-school activities" take place outside the school and are not part of the formal curriculum.

then the implication is that an appropriate change in the frequency of these activities will favorably affect the outcome scores. It follows that if the implementation/process variables are grouped logically, prior to correlating them with outcomes, their implications for program development and policy will be more immediately discernible.

Selecting a Unit of Analysis

Selecting an appropriate unit of analysis is one of the most important considerations in planning and executing an evaluation. The purpose of this evaluation, as reflected in the policy evaluation questions, is to assess the effects of career education on students. For most analyses, the individual student, teacher, counselor, or principal will be the unit of analysis. D. R. Cox (1958) notes that the unit of analysis should be "the smallest division of the experimental material such that any two units may receive different treatments in the actual experiment" (p. 2). In other words, the unit of analysis should be the lowest level of aggregation at which units (e.g., students) are exposed to differential treatment.

For the purposes of the present study, we wish to argue that the career education process exerts a differential effect on each individual student; there is no classroom instructional package being delivered which has identical effects on any two students within a classroom. Most career education projects claim that the career education process is implemented throughout target schools. However, the level of implementation by teachers, and subsequent student reported exposure, varies widely. Thus, both reported implementation and student exposure to career education can be expected to vary from individual to individual. In short, we argue that for most analyses the individual student, teacher, counselor, or principal is the appropriate unit of analysis.

For certain questions, however, the individual student need not be the only level at which the results are examined. Even though students can differ in their level of exposure within a classroom, all students in a given classroom could receive more, or less, exposure to all or a subset of the career education activities than students in other classes. Teachers, as the source of much of the career education treatment are not, therefore, removed from the system. It is possible to aggregate fifth grade students within their classrooms; fifth, eighth, and eleventh grade students' results can be examined at the building level.

Approaches to Estimating Treatment Effect

Three complementary approaches were used to determine the impact of career education processes on a range of outcome constructs. The first approach employs a comparison group to estimate what students would have achieved had there been no career education program. The treatment effect is equal to the difference between target and nontarget* posttest means adjusted for differences on the pretest. Another way of expressing the treatment effect is as the square of the partial correlation between group membership (target vs. nontarget) and posttest scores. In the former case the treatment effect is expressed as a difference in group means, whereas in the latter the effect is represented by treatment condition over and above that explained by pretest variation. The F statistic obtained in the two cases is identical, confirming that the two approaches are statistically, as well as conceptually, equivalent.

The second model tests the assumption that there is a relationship between exposure to career education and subsequent performance on the outcome constructs. If the career education program is having an effect, then students with high exposure to career education concepts and activities will ob-

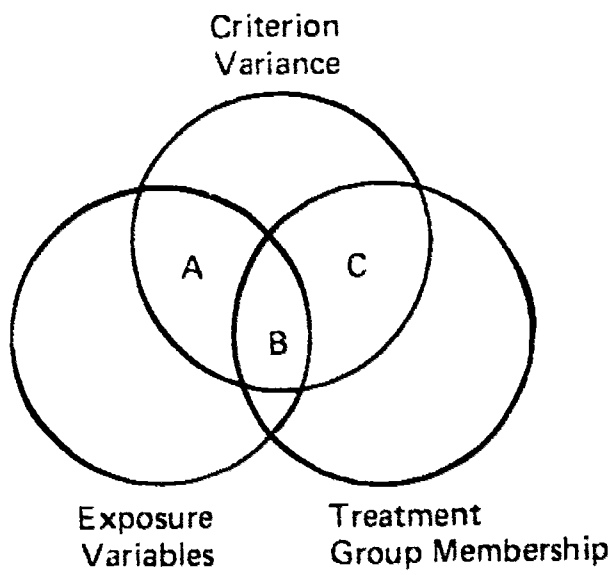
*The definition and selection of target and nontarget respondents are discussed on pages 25 and 26.

tain higher posttest scores (adjusted for pretest differences) than students with low exposure. As in the comparison group model, there are at least two alternatives for expressing the treatment: (1) students could be divided into high and low exposure groups, and their respective adjusted group means on the outcome constr ts could be examined for differences; or (2) the exposure scores could be correlated with posttest scores adjusted for pretest contribution. To the extent that exposure scores are able to explain outcome variation beyond that explained by pretest, we infer a treatment effect.

The third model consolidates the above two models into one analysis (see Exhibit 3). In this model both group membership and exposure are correlated with criterion scores. To the extent that the *unique* contribution of group membership (segment C) to explaining criterion variation (after removing pretest) is large, we infer that there was some treatment effect registered on the criterion, but our exposure variables failed to specify the relevant aspects of the process. If, on the other hand, the *unique* contribution of exposure variables (segment A) to explaining criterion variation is large, we infer that (1) the program did little to affect relevant process dimensions, and (2) some of the important process dimensions can be specified, which might be addressed by future career education programs interested in maximizing a particular outcome. The unique contributions of both group membership and exposure variables may be small, relative to their confounded or joint contribution (segment B). In this case not only has the program succeeded in generating a treatment effect, but the evaluation team has succeeded in specifying the particular process dimensions potentially responsible for that effect.

EXHIBIT 3

BALANTINE EXPRESSING THE RELATIONSHIPS FOR THE JOINT EFFECTS MODEL



INSTRUMENTATION

The complex nature of this evaluation reflected the program's complexities and was reflected, in turn, by the wide variety of instruments used. The present summary of instrumentation draws heavily on Volume III, *The Career Education Instrumentation Substudy*. The discussion of instrumentation is organized around three respondent groups: local project staff, practitioners (teachers, counselors, and principals), and students.

Local Project Staff

Three instruments were developed by NTS to collect information about Local Education Agency (LEA) characteristics, program characteristics, and the extent to which career education was implemented in the projects. A fourth instrument was developed and used in-house by NTS staff to record appropriate census data for each project community. Table 2.1 presents summary information describing each of these instruments. Instrument development was guided by a concern to avoid placing an excessive burden on local project staff while still meeting the requirements of the contract to gather background information about each project. Project level implementation/process data are summarized in the following chapter; more detailed statements about each project are included in Volume II, Chapter 3.

TABLE 2.1

INSTRUMENTS FOR COLLECTING DETERMINANTS INFORMATION

Instrument	Respondent Group	# of Items	Item Type	Typical Item(s)
LEA Characteristics Form	Local Project Staff	45	Open Ended	What has been the average number of new faculty each year over the past five years?
Project Characteristics Form	Local Project Staff	35	Open Ended	Note any significant changes in, or additions to, program objectives over the past several years.
Implementation/ Process Observation Form	Local Project Staff	35	Open Ended	Previous examples of incorporation of large scale innovation within last five years? Time for planning and orientation? What changes in role/behavior does the project director hope to see?
Community Census Data Checklist	NA	56	Open Ended	Mobility: % population born in state? % 1970 population living in same county in 1965? % workers working in county of residence?

Practitioners

Although NTS developed a unique survey form for teachers, counselors, and principals, similarities in content and structure permit discussing these separate instruments together. The practitioner survey forms were used to collect information on the determinants of implementation and implementation/process data from each respondent group. Determinants of implementation included: staff characteristics (demographics, education experiences, and non-education career experiences); teaching context, counseling context, or school context; organizational capacity (morale, perceived effectiveness); and adoption strategies (amount and kinds of inservice).

TABLE 2.2

CHARACTERISTICS OF TEACHER, COUNSELOR, AND PRINCIPAL SURVEY FORMS ORGANIZED BY COMPONENTS OF THE CONCEPTUAL FRAMEWORK

VARIABLE SET	Respondent Group	No. of Items	Type Item	Typical Item(s)
DETERMINANTS OF IMPLEMENTATION Staff Characteristics	Teachers Counselors	11 9	Closed Ended	• Degree currently working toward: Masters, Doctorate, None • For how many occupations other than in the field of education have you studied or prepared? None, one, two, three, four, or more?
Context Role	Teachers Counselors Principals	4 4 10	Open and Closed Ended	• How much planning time do you have during your regular school hours? • About how many students are assigned to you for counseling? • About what percentage of your students are Title I eligible?
Organizational Capacity	Teachers Counselors Principals	2 2 2	Open and Closed Ended	• How would you rate the general level of staff morale (or esprit de corps) of the professional staff in your school? a. very high morale among most of staff b. high morale among most of staff c. mixed—some high morale, some low morale d. low morale among most of staff e. very low morale among most of staff
Adoption Strategy	Teachers Counselors Principals	2 2 6	Open and Closed Ended	• How many hours, in total, have you participated in career education staff development activities since you began your involvement in career education? • How frequently do faculty meetings concerned with career education take place in your school?
PROCESS DIMENSIONS Knowledge and Understanding	Teachers Counselors Principals	5 4 4	Closed Ended	Which one of the following best describes how adequately you are prepared for the implementation of a career education program? a. adequately prepared b. moderately prepared c. slightly prepared
Role/Behavior Classroom Activities	Teachers Counselors Principals	13 13 0	Five-point Frequency of Participation	• Advise individual students about career possibilities. • Give career related interest and/or aptitude inventories to students. a. almost every day b. once a week c. once or twice a month d. less than once a month e. never f. does not apply to my role in this school
Linkage Activities	Teachers Counselors Principals	6 11 11	Five-point Frequency of Participation	• Help plan and coordinate a career education fair for students. • Team with career education project staff to present career oriented activities to students. • Conduct staff meetings to plan career education activities for the school. a. almost every day b. once a week c. once or twice a month d. less than once a month e. never f. does not apply to my role in this school
Extra-school Activities	Teachers Counselors Principals	10 12 8	Five-point Frequency of Participation	• Have students go on field trips to businesses and industries. • Use parents to present career related programs to the students. • Speak to parents and other community groups about the importance of career education. a. almost every day b. once a week c. once or twice a month d. less than once a month e. never f. does not apply to my role in this school
Value Internalization Perceived Benefits Perceived Burden Role of the School	Teachers Counselors Principals	40 40 40	Four-point Likert-type Opinion Items	• A career education program does not change the role of the counselor. • Career education fosters premature career decisions. a. strongly agree b. agree c. disagree d. strongly disagree

Process dimensions were measured by three sets of variables: (1) knowledge and understanding of career education; (2) role/behavior-related to career education — including classroom or counseling activities, linkage activities, and extra-school activities; and (3) value internalization, as determined by factor analyzed responses to forty Likert-type career education opinion items. More complete descriptive information for the teacher, counselor, and principal survey forms is presented in Table 2.2.

Students

Data were needed from fifth, eighth, and eleventh grade students* in the determinants, exposure, and outcome components of the conceptual framework. All determinant and exposure information, as well as a small portion of the outcome data, were collected using the *Student Information Form* (SIF) developed by NTS. Commercially available instruments were used to gather the remaining outcome data. Demographic data and school experiences were considered to be the most relevant student level determinants of implementation for explaining exposure to career education. Exposure variables covered three areas: classroom activities (e.g., simulations, discussions about job values), linkage activities (e.g., career fairs, use of library), and extra school activities (e.g., shadowing experiences, work study programs). One outcome variable set, student plans and expectations, was included on the *Student Information Form*. Characteristics of the *Student Information Form* are presented in Table 2.3.

Other instruments were required to examine learner outcomes which would (1) be suitable for pre- and posttesting, (2) cover the OCE learner outcomes as comprehensively as possible, and (3) be usable across different grade levels. Reviews of commercially available instruments uncovered a number that purported to meet these requirements, though no single instrument was entirely satisfactory. As time and resource constraints prevented development of instruments specific to the learner outcomes, NTS project staff selected a battery of instruments which approximated complete coverage of the constructs. These instruments are described in Table 2.4. As reliability and validity data on the instruments were incomplete, NTS project staff determined that a complete validation study, to be based on pretest results, would be necessary. As validated instruments were available for the self-concept and basic skills outcomes, these instruments were not included in the validation study.

Table 2.5 summarizes the administration dates, respondent groups, approximate sample sizes, data collection methods, and data reduction methods for all of the instruments described in this section. The majority of instruments were machine scorable.

SAMPLING PLAN

The sample consists of fifteen projects selected from the universe of K-12 incremental improvement projects funded for one year by the Office of Career Education in the summer of 1976. Although the sample of fifteen projects was not intended to be representative of national career education projects, the selected projects do vary widely in their conceptualization, history, level of financial support, target audiences, and programmatic strategies. The sample seems to differ from a representative sample of the 1976 OCE projects in primarily two ways. First, more mature projects were given priority in the selection. Projects which had a two or three year history, funded through OCE or other sources, and projects with experienced staff were classified as mature. Second, only those projects which emphasized student learner outcomes in their proposals (as opposed to staff outcomes) were eligible for selection. All fifteen projects selected for the sample agreed to participate in the evaluation. Each selected LEA was assigned a pseudonym to protect its anonymity. In this report, only the pseudonym is used for project identification.

*See page 26 for an explanation of the choice of grades five, eight and eleven for this evaluation.

TABLE 2.3
CHARACTERISTICS OF THE STUDENT INFORMATION FORM

Variable Set	Respondent	No. of Items	Item Type	Typical Item(s)
DETERMINANTS Determinants of Student Exposure to Career Education ● Student demographic characteristics ● School experiences	All Student	10	Closed Choice	● Which one of the following best describes your grades so far in school? ● How many brothers and sisters do you have?
PROCESS Exposure to Career Education Activities ● Classroom	Grade 5	8	Five Choice—Frequency of Participation Items	● Use TV, tapes, filmstrips or radio to learn about jobs. ● Take tests to find about my job interests and skills. a. Almost every day b. Once a week c. Once or twice a month d. Less than once a month e. Never
	Grades 8 & 11	11		
● Linkage	Grade 5	4	Five Choice—Frequency of Participation Items	● Attend a career fair (a place where many different people come to talk about their jobs) ● Talk about the steps to take in making career decisions. a. Almost every day b. Once a week c. Once or twice a month d. Less than once a month e. Never
	Grade 8	8		
● Extra School	Grade 5	7	Five Choice—Frequency of Participation Items	● Go on field trips to business or industries to learn what people do in their jobs. ● Take part in a school supervised work experience or work-study program. a. Almost every day b. Once a week c. Once or twice a month d. less than one a month e. Never
	Grades 8 & 11	8		
OUTCOME ● Plans and Expectations	Grade 5	0	Closed Choice	● How often have you discussed your plans with the following people? ● Which one of the following best describes plans for the year after you leave high school?
	Grade 8	5		
	Grade 11	10		

TABLE 2.4
CHARACTERISTICS OF STUDENT LEARNER OUTCOME INSTRUMENTS

Instrument	Respondent Grades	No. of Items	Item Types	Typical Item(s)	Administration Time (minutes)	Publisher
SELF OBSERVATION SCALE (SOS)						
• Intermediate	5	60	yes/no	• I think most people want to help me. • I often volunteer in school.	30	NTS
• Junior	8	72	yes/no	• I worry quite a bit over possible troubles. • I do a lot of things very well.	30	NTS
• Senior	11	72	yes/no	• Other students look to me for leadership. • Compared to one year ago, I worry more.	30	NTS
PROGRAM OF EXPLORATION IN CAREER EDUCATION KNOWLEDGE TEST (PECE)	5, 8, 11	75	19 matching 27 T/F 29 multiple choice	• When choosing an occupation a person should be concerned for himself, as well as society as a whole (T/F) • The "employment outlook" for an occupation refers to: a. demand for workers b. where workers are located c. where workers are expected to be located in the future d. all of the above	40	Georgia State Department of Vocational Education
NEW MEXICO CAREER EDUCATION TEST SERIES						
• NM 5001	5, 8, 11	25	Four-point Likert Type Opinion Items	Some jobs allow people to use their creativity a. strongly agree b. agree c. disagree d. strongly disagree	15	Westinghouse Learning Corporation
• NM 5002	11	20	multiple choice	Suppose you wanted to become a member of the local police force. Which of the following would be the best source of information to find out about job requirements and duties? a. retired policeman b. the chief of police c. local employment agency d. mayor and town council	15	Westinghouse Learning Corporation
• NM 5006	8, 11	20	multiple choice	Which one of the following activities would **BEST** help you become a good librarian? a. library aide b. cheerleader c. English club member d. Library Club member	15	Westinghouse Learning Corporation
• NM 5007	11	20	multiple choice	When you are filling out an application blank, you should write "n/a" a. in blanks for which you don't know the answer b. in blanks for questions which don't apply to you c. in no blanks on the form d. in any blanks marked "for office use only"	15	Westinghouse Learning Corporation
• NM 5008	11	25	multiple choice	Toni is a policewoman. She would like to advance in her department. Which of the following is **LEAST** likely to help her advance? a. hope that she is lucky b. be punctual and cooperative on the job c. be pleasant to the people in her patrol area d. take police science courses after work	20	Westinghouse Learning Corporation
OHIO CAREER DEVELOPMENT TEST SERIES						
• Ohio 6	5	60	40 multiple choice 40 agree/ disagree	• A store manager a. makes things to sell b. sweeps the floor c. supervises employees d. belongs to the Chamber of Commerce • I like to hear about the work people do (A/D)	40	Policy Studies in Education
• Ohio 8	8	68	34 multiple choice 34 agree/ disagree	• When a car salesperson sells a car he or she is usually paid a. a salary b. a commission c. a wage d. a voucher • A career is the same thing as a job (A/D)	40	Policy Studies in Education
• Ohio 10	11	68	34 multiple choice 34 agree/ disagree	• A brief outline of your training and work experience is called a. a biography b. an application c. a resume d. a covering letter • High school business programs are only for women (A/D)	40	Policy Studies in Education

TABLE 2.5

SUMMARY OF DATA COLLECTION AND REDUCTION PROCEDURES

Instrument	Date(s) Administered	Respondent Group	Approximate Sample Size	Data Collection Method	Data Reduction Method
Community Census Data Form	Feb-March 1977	NTS Staff	NA	Census Data Review	Hand tabulation and summarization
LEA Characteristics Form	Feb-March, 1977	Project Staff	15	Mailed questionnaire with telephone followup	Hand coded and tabulated
Implementation/Process Observation Form	March-April, 1977 Sept, 1977	Project Staff	15	Semistructured on-site interview, with telephone followup	Hand coded and tabulated
Student Information Form	Spring, 1977	Students	16,000	Group administration by local test administrators; read to grade 5 students	Hand and machine edited; matched with learner outcome files
Counselor Survey Form	Spring, 1977	Counselors	186	Closed choice questionnaire; individual or group administration	Hand and machine edited; opinion items factor analyzed; aggregated to building level; merged with student files
Principal Survey Form	Spring, 1977	Building Administrators	193	Closed choice questionnaire, individual or group administration	Hand and machine edited; opinion items factor analyzed; aggregated to building level; merged with student files
Self Observation Scales	Fall, 1976 Spring, 1977	Students	15,000	Group administration by local test administrators, read to grade 5 students, machine readable forms	Hand and machine edited; first and second order factor analyzed, pre-post and student information form matched
Achievement Tests	Fall, 1976 Spring, 1977	Students	11,000	Procedures normally used in participating projects	Hand edited; machine edited; converted to standardized t scores; pre-post and student information form matched
Program in Exploration of Career Education (PECE)	Fall, 1976 Spring, 1977	Students	14,000	Group administration by local test administrators; read to grade 5 students; machine readable forms	Hand edited, machine edited, and scored; factor analyzed, converted to standardized t scores, pre-post and student information form matched
Ohio Career Development Test Series Ohio 6 Ohio 8 Ohio 11	Fall, 1976 Spring, 1977	Students Grade 5 Grade 8 Grade 11	13,000 4,000 5,000 4,000	Group administration by local test administrators; read to grade 5 students; machine readable forms	Hand edited, machine edited, and scored; factor analyzed, converted to standardized t scores, pre-post and student information form matched
New Mexico Education Test Series: NM 5001 NM 5002 NM 5006 NM 5007 NM 5008	Fall, 1976 Spring, 1977	Students Grades 5, 8 & 11 Grade 11 Grades 8 & 11 Grade 11 Grade 11	13,000 13,000 4,000 9,000 4,000 4,000	Group administration by local test administrators; read to grade 5 students; machine readable forms	Hand edited, machine edited, and scored; factor analyzed, converted to standardized t scores, pre-post and student information form matched

The extent to which the fifteen career education projects selected for this evaluation are representative of the types of activities being implemented across the nation under the banner of career education is difficult to determine. Several of the participating school districts have been cited, either by their respective State Education Agencies (SEAs) or the USOE, as model districts in their past career education efforts. Other projects are embarking on a first experience with career education. These differences suggest diversity of program approach and maturity, but do not enlighten us on the representativeness of program philosophy and strategies. An admittedly-subjective opinion is that these projects purport to implement activities which are representative of the types of activities generally subsumed under the concept of career education. However, *this study was not conceived as a national evaluation of career education and, consequently, little attempt was made to build representative variation in program philosophies or strategies into the evaluation.* Similarly, the universe of OCE-funded projects, from which the fifteen projects studied in this evaluation were selected, are themselves not a representative sample of national career education efforts. The fact that considerable diversity in programmatic approach exists across the fifteen projects is valuable for the study of process-outcome relationships, but does not necessarily further the cause of generalizability of evaluation findings. The fifteen participating projects incorporate a wide range of program activities generally labeled career education activities; however, the incidence of such activities nationally remains unknown, and thus the representativeness of the fifteen projects is indeterminate.

The fifteen LEAs included in the sample vary considerably with regard to size of enrollment (from around two thousand to eighty-six thousand students), per-pupil expenditures (from a low of just over seven hundred dollars to nearly eighteen hundred dollars), percentages of minority students (the range is from .02 percent to seventy percent), and other educationally significant variables. Four of the projects are located in predominately rural areas, four are in major cities, and the remaining seven projects were based in small cities and suburbs. Twelve states were represented by the sites; though only three projects were located west of the Mississippi, the rest were scattered throughout the Midwest, Southeast, and East.

Most projects attempted system wide implementation; only six targeted specific schools or grades within their districts. At the beginning of the 1976-1977 school year, three of the projects already had five or more years of career education experience, nine projects had from four to two years, two projects were starting their second year and only one was just beginning the implementation of career education. Three projects were members of their state's career education consortium. Although most projects embraced most of the OCE student learner outcomes in their proposals, they differed in their approaches fostering student outcomes. All projects utilized staff development, coupled, in a few cases, to curriculum revision. Most projects also focused on changes in student activities, including career-related field trips, simulations, and career fairs.

Following project selection, it was necessary to choose student samples. Students were selected from grades five, eight, and eleven for the "common" evaluation. To meet local evaluation needs, a variety of other grade levels were selected as well. Grades five, eight, and eleven were selected to reflect the progression from career awareness (elementary grades) to career exploration (middle grades) to career preparation (senior high school grades) evident in most projects.

Originally, site administrators believed that no control students would be available in that most of the projects were implemented district-wide. Closer examination of each project revealed that control or, more correctly, nontargeted students could be found in six of the fifteen sites. The projects identified these nontarget students as those who were enrolled in schools where there were no plans to inservice teachers or provide other project support. In a few cases, fifth grade students in target schools, but with nontargeted teachers, also were identified. Although the projects indicated that these nontarget students would not differ substantially from target students across important background characteristics, the data show that substantial differences were in fact present. Further, the exposure and outcome data revealed that these non-target students received some career education treatment and made gains on the learner outcome constructs, indicating at least some contamination. Although six sites offered nontarget students, only three sites provided substantial num-

bers of such students to the evaluation.

Teachers, counselors, and principals were designated as target or nontarget by the projects in a parallel manner. If located in schools not served by the project, or if not scheduled to be inserviced in career education by the project, the practitioners were defined as being nontarget. The evaluation team was assured that nontarget practitioners were not to be, or had not been, inserviced. The data, however, indicate that this was not always the case.

The sampling design was further complicated by constraints imposed by the unique evaluation designs developed as part of this effort for each of the participating projects. The sampling plan had to ensure that adequate samples were available *within* each project, as well as across projects. The result of this constraint was a larger overall sample size than would have been required had there been no interest in within-project analyses.

Fifth grade classrooms were randomly selected from designated target schools. In LEAs with large student populations, target schools were selected randomly; in small districts, usually all target schools were included. Eighth and eleventh grade homeroom classrooms were randomly selected from target junior and senior high schools. Similar selection procedures were used to draw the nontarget samples in the six districts in which nontarget students were available. Table 2.6 describes the student samples planned for each of the fifteen sites and the actual sizes of the "matched" student samples (i.e., those students for whom data were available from both pre- and posttesting and process testing).

Within each target and nontarget school, teachers*, counselors, and administrators were sampled. One of three sampling schemes were employed. Either all teachers in a school were included in the sample, a 33 percent random sample of teachers within a school was selected, or those teachers who spent most of their instructional time with the sample students were included. The latter choice was frequent at the high school level. Choice of sampling schemes was dictated by the project sites based upon administrative feasibility. All counselors in the sampled schools and an administrator from each school, usually the principal, were included in the sample.

As Table 2.6 illustrates, the matched student samples were substantially smaller than had been planned originally. Most of this drop-off resulted from one of three situations. The first of these, geographic mobility, frequently results in between fifteen and twenty percent of students tested in the fall not being in attendance in the spring. Second, inclusion in the matched sample required attendance on three separate testing dates; if a student missed any one of the three, he or she would have incomplete data. Delays in shipping process and posttest materials confounded the attendance problems; in a few cases necessary rescheduling was not possible. Thus, some students who had taken the pretest had no opportunity to take the spring tests. The third situation was confounded by the relatively heavy testing burden placed on students by the need to use a battery of instruments to cover the learner outcomes. In some projects, project staff or principals formally limited the spring administrations by cutting back on the sample sizes or, in a few cases, dropping the use of some instruments.

*At the secondary level the term "teacher", as used in this report, refers to teachers of English, mathematics, science, or social studies. Teachers of physical education, music, art, and other peripheral subjects were not sampled in this evaluation.

TABLE 2.6
PLANNED AND MATCHED* STUDENT SAMPLES BY PROJECT**

PROJECT	Target						Nontarget						Total	
	5		8		11		5		8		11			
	Planned	Match	Planned	Match	Planned	Match	Planned	Match	Planned	Match	Planned	Match	Planned	Match
Better Springs			210	405	210	126					210	145	630	676
Career City	360	291	360	459	360	229							1080	979
Cognitive Camp	210	136	390	251	360	6	210	121					1170	514
Fallstaff	450	328	360	547	300	120							1110	995
Jobland	450	522	300	567	300	461							1150	1550
Middlesex	210	81											210	81
Mt. Exploration	300	160	420	317	260	312							1080	789
Opportunity City	420	119	420	75	420	82							1260	276
Prepton	210	135	240	418	240	405	210	209	240	138	240	32	1380	1337
Awaresville					150	7					150	0	300	7
Studytown	300	256	300	257	300	161	300	339	300	245	300	145	1800	1403
Treksville	240	94	210	0	120	67	240	0	210	0			1020	161
Unique Domain	240	126	240	128	240	88	240	20	240	71			1200	433
Vocation Beach	180	143	180	97	180	124							540	364
Workville	450	285	390	263	390	207							1230	755
TOTALS	4020	2676	4020	3784	3930	2395	1200	689	990	454	900	322	15060	10320

*Matched samples include those for whom parallel data are available across each of the three testing periods.

**A blank indicates that no students were sampled at that particular grade level, usually as a result of the project's programmatic emphases. Often other grades were substituted for the unique evaluations; those other grades are not included in this table.

CHAPTER III
THE IMPLEMENTATION AND PROCESS OF CAREER EDUCATION

This chapter summarizes our findings on the implementation/process of career education for the fifteen selected projects. The chapter begins by presenting an implementation/process model which posits a set of determinants of implementation and traces the effects of those determinants on five process dimensions. These process dimensions include changes in tangible resources, intangible resources, knowledge and understanding, role/behavior, and value internalization (cf. Fullan and Pomfret, 1977). The five process dimensions serve to define the ways in which career education is manifested at the school and classroom levels. Finally, consideration is given to student exposure to career education activities. Exposure is seen as different from student to student, and is defined as a product term composed of implementation quality and opportunity to learn.

Much of our discussion on project-level determinants of implementation derives from observation of the fifteen projects, review of available project documentation and periodic interaction with local project directors and staff over a fifteen month period. Given that there were only fifteen projects, we avoided use of formal measures of association and relied on frequency counts and qualitatively based analyses of tendency and pattern. Measurement of the five process dimensions relied on questionnaires completed by teachers, administrators, and counselors and interviews with local project staff. Student exposure was operationalized through student self-reports regarding frequency of exposure to a broad range of career education type activities.

AN IMPLEMENTATION/PROCESS MODEL

A major focus of this study was the conceptualization of the implementation and process of career education as manifested in fifteen local projects. Conceptualizing and measuring the implementation/process were considered important for several reasons. First, we reasoned that unless the process of career education, as defined by practitioners, was carefully examined, we might unknowingly have ended up evaluating what Charters and Jones (1973) term a "nonevent." The fact that some critics of career education were claiming no difference between "good" education and career education simply reinforced the importance of documenting the purported process (e.g., changes in resources, teacher behaviors, and administrator attitudes, etc.) of career education.

Secondly, a review of the literature did not reveal anything like a blueprint of the career education process.* Although the theoretical foundation for career education was fashioned largely at the Federal level, local practitioners appeared to be creating and initiating alternative approaches to implementation. It quickly became apparent that a "fidelity" perspective on the implementation of career education was inappropriate. We could not hope to assess implementation by describing the discrepancies between a project's implementation level and some standard, since no standard existed. Rather, a "mutual adaptation" perspective (Berman and McLaughlin, 1975) was employed which recognized the evolving character of career education and the diversity in concepts and approaches.

Thirdly, previous research highlighted a number of forces which operated to facilitate or impede the introduction of innovations into school systems. Career education was viewed as a broad-ranging innovation which would likely be affected by some of the same facilitating and impeding forces (called

*The OCE Monograph, *A Primer for Career Education* (Hoyt, 1977) provides a more detailed guide than was present when this study began.

determinants) which have been the focus of earlier studies. We reasoned that if local projects were unsuccessful in delivering career education to students, fault might rest with project inattention to some of the generic determinants of implementation.

Lastly, we reasoned that projects are not themselves successful or unsuccessful; rather, components, strategies or activities are differentially functional or dysfunctional. Observing that target students outperform nontarget students on some outcome construct (e.g., career awareness) tells us nothing about why target students benefited or what can be done to improve the projects. Knowledge that some ill-defined process is responsible for a desired outcome breeds false satisfaction and confidence among the foolish, and frustration among the wise. Replication and exportation of a project require careful specification of process dimensions responsible for desired outcomes. Specifications of process-outcome relationships comprise the heart of a good evaluation, and only such specifications provide a sound foundation for policy action.

Exhibit 4 gives a schematic representation of the Implementation/Process Model. This model expands upon the Conceptual Framework presented in Exhibit 2 (see Chapter 2). The model includes four compoments, three of which are featured in this chapter. Student outcomes and the relationships between exposure to career education and these outcomes are treated in the next chapter. The Implementation/Process Model posits that a set of determinants operates to create variation in the way career education is implemented. Determinants are those factors which facilitate or impede any attempted educational innovation; these determinants may take on different forms depending upon specific characteristics of the innovation.

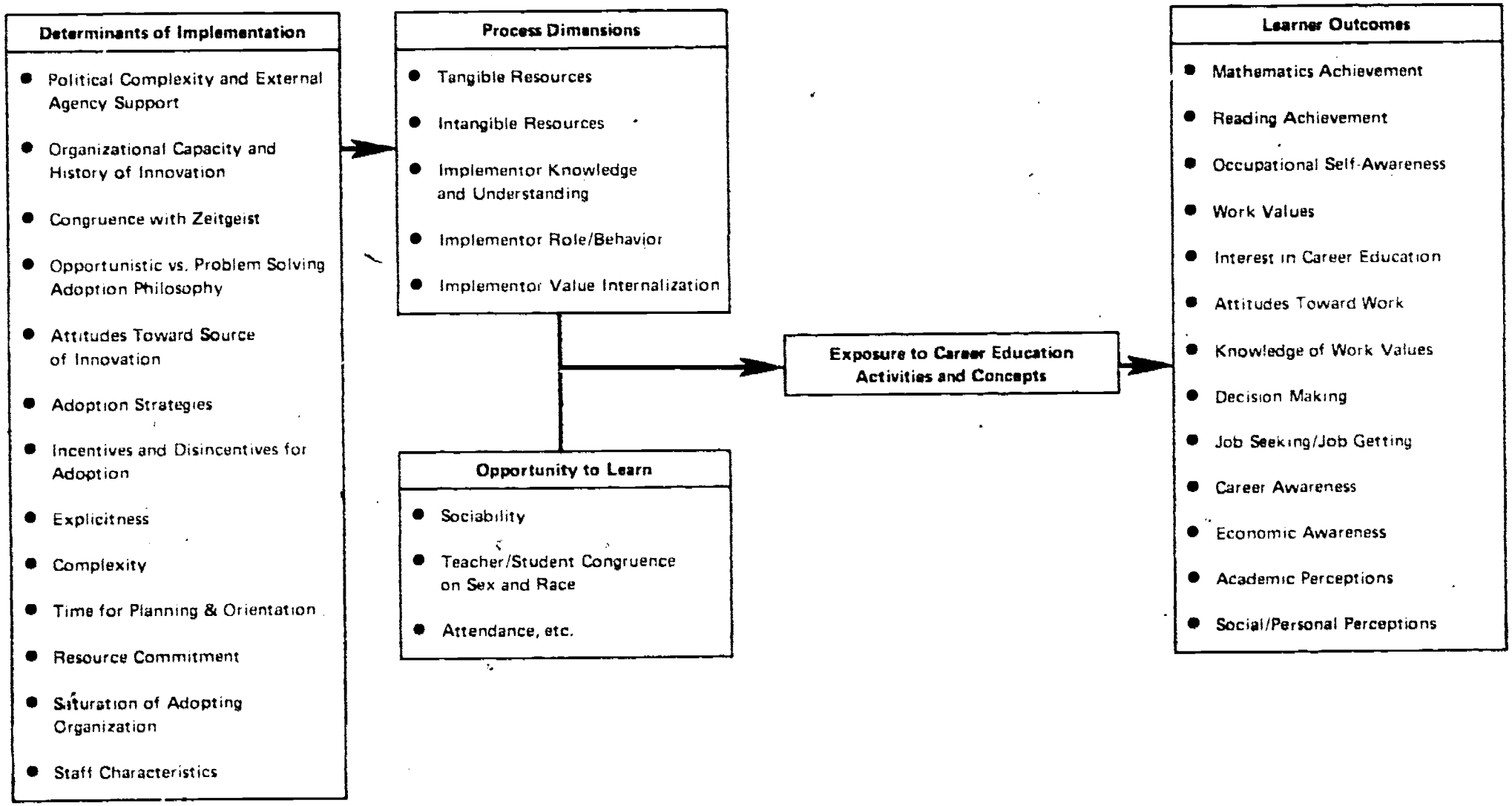
The process of career education manifests itself along essentially five dimensions: (1) changes in tangible resources (facilities, staff, equipment, materials), (2) changes in intangible resources (staffing patterns, organizational alignments, student groupings), (3) changes in knowledge and understanding on the part of implementors (teachers, counselors, and administrators, etc.), (4) changes in implementor role/behavior, and (5) value internalization (i.e., implementor commitment and attitudes toward the innovation). The level of change on these five dimensions is viewed as a product or outcome of the determinants.

The quality of implementation interacts with "opportunity to learn" to determine level of exposure to treatment (i.e., career education) for individual students. Unlike curriculum innovations, career education does not presume some classroom-based instructional package. Thus, students within a classroom are not expected necessarily to receive identical treatments. For any of a wide range of reasons, including extroversion, likeability, or attendance, students can receive different amounts of exposure to treatment, even when the quality of implementation is uniform within a classroom or building. Similarly, even if "opportunity to learn" could be manipulated so that all children received equal opportunity (e.g., all students would have identical attendance, at a simplistic level), we would still expect the quality of implementation to vary from teacher to teacher. Reliance on the individual students' level of exposure does not preclude the possibility that within-classroom variation may be smaller than between-classroom variation. The exposure concept presumes however, the possiblity of within-classroom variation.

It should be noted that the present study did not attempt to directly operationalize the construct "opportunity to learn," although it is included in the model for the sake of conceptual clarity and completeness. Due to the large samples of students involved in this study the costs involved in accurately measuring "opportunity to learn" were prohibitive. Thus, we simplified the model and assumed that the process dimensions directly determine students' "exposure to career education," which then contributes to determining learner outcome scores. We emphasize the absence of any measure of the "opportunity to learn" construct, primarily because it may account partially for observed lack of congruence between student reported exposure and teacher reported implementation.

EXHIBIT 4

A SCHEMATIC REPRESENTATION OF THE IMPLEMENTATION/PROCESS MODEL



A QUALITATIVE EXAMINATION OF THIRTEEN DETERMINANTS OF IMPLEMENTATION

This section brings together the results of onsite visits, extensive telephone discussions, and document reviews. The material to follow is more qualitative and impressionistic than that reported in the rest of the report. Although this information is not easily quantifiable, it is no less important for the reader to obtain a balanced view of the implementation/process of career education.

Determinants of Implementation

Many factors operated to facilitate or impede the implementation of career education in the fifteen projects studied in this evaluation. Although the comments that follow are, strictly speaking, only applicable to the fifteen projects under study, the evaluation team has considerable confidence (based upon experience in evaluating numerous other career education projects) that the observations reported below can be generalized beyond our sample. The following comments are organized around thirteen factors which operate to facilitate or impede implementation of career education projects.

> *Political Complexity and External Agency Support* — Extent to which different interest groups and governmental agencies must be involved in implementing an innovation and the extent to which cognizant Federal, state and local agencies and administrators express support and act in a supporting role. Also included is the status of relevant legislation, regulations, and policy pronouncements at all governmental levels.

OCE and other HEW units have demonstrated a high level of bureaucratic initiative in promoting career education. A complex of relationships and alliances have formed around career education, and predominantly positive attitudes exist between local projects and OCE. It is evident that local project staff feel a camaraderie with OCE. OCE has effectively employed face-to-face contacts between members of the bureaucracy and LEA, SEA, and community leaders, a technique which Litwak and Meyer (1966) suggest is a good indicant of high bureaucratic initiative. The Commissioner's National Conference on Career Education held in Houston in 1976, is another example of a bureaucratic initiative which had an observable, positive influence on the local projects.

Although Federal assistance was largely a facilitating factor in implementing career education in the local projects, State day-to-day involvement and support were absent in many cases, except those in which the project was a member of a statewide consortium. To what extent this low level of involvement was due to direct OCE funding and monitoring, low SEA initiative, or adversary-based LEA-SEA relationships, is difficult to determine. In at least some cases, project staff felt no requirement to interact with respective SEAs, and the copy of the grant application required to be sent to the State career education coordinator promoted little or no productive interaction. In other cases local personnel were much more enlightened regarding career education than were SEA personnel and, as a consequence, had little incentive to seek guidance or support. Overall, we must conclude that the LEA-SEA linkages were weak; nonetheless, perhaps because of the strong federal initiative, we observed no deleterious effects on implementation traceable to limited SEA involvement.

> *Organizational Capacity and History of Innovation* — Extent to which the adopting agency has capacity to change; staff morale and esprit de corps among implementors; open communications channels; high level support for the innovation; previous successful experience with innovations; previous experience incorporating pilot or special project efforts into its ongoing operation.

Most of the fifteen sites can be characterized as "early adopters" (cf. Rogers and Shoemaker, 1971). Four sites have had ongoing career education programs since 1972, and only three sites did not have some ongoing career education effort prior to the 1976-77 school year. Nine of the local superintendents showed strong support for career education through soliciting local funds for career education activities and actively participating in awareness campaigns. Surprisingly, there was little

relationship between size of LEA and level of superintendent support. The highest levels of support were found in one of the largest and one of the smallest LEA's. Perhaps the best indicator of superintendent support is that seven of the nine sites seeking local monies successfully negotiated local funding for the 1977-78 school year.

Consistent with the observation that many sites are "early adopters" was the favorable attitude toward innovation found in twelve sites. Only three sites were viewed as bearish on innovation, and, not so suprisingly, in two of these three sites superintendent support for career education was low to moderate. Four sites had major innovation efforts underway in addition to career education. Attempts were being made to institute a new reading program, a new special education program, more instructional centers, and further implementation of state standards. None of these efforts was coordinated with career education activities. In general the fifteen sites had climates supportive of innovation and superintendents who were highly supportive of career education.

Morale of the local project staffs was unusually high in eleven of the fifteen projects. Although special project staffs are customarily zealous, most of the career education staffs were particularly committed and had a high level of esprit de corps. An undoubtedly important contribution to observed high morale was the fact that six project directors reported directly to the superintendent, and seven others reported to highly supportive assistant superintendents. In at least three cases, the project director reported "out of line" to the superintendent, or assistant superintendent, giving the projects special recognition and blessing.

Congruence with Zeitgeist—Extent to which the innovation is consistent with prevailing attitudes and social movements of both a national and parochial character.

Bureaucratic initiatives which are congruent with prevailing attitudes and social processes are more easily implemented than are bureaucratic initiatives which oppose such forces. At least at philosophical and conceptual levels, career education is in accord with the reported needs and concerns program to promote full-scale implementation; demonstration, rather, was the primary objective. powerful social forces such as youth employment, the back to the basics movement, and nationwide reaffirmation of the importance of work. As presently configured, career education purports to embody a generalized strategy of attack on some persistent social problems. Thus, from a national perspective, career education appears to be congruent with the zeitgeist and has not, as yet, provoked focused opposition from any powerful constituencies.

Opportunistic vs. Problem Solving Philosophy—Extent to which the adopting agency is responding to the innovation from an opportunistic resource acquisition perspective or a problem solving perspective emanating from locally defined and articulated needs.

In seven sites the project director did not write the grant proposal, and in five of these cases much idea generation was conducted by external agencies or individuals. Although we might take this as evidence of an opportunistic resource acquisition perspective, such a conclusion is unwarranted, given that four of these five sites have made long term commitments and are continuing projects under either local or state support. Although few of the sites conducted formal needs assessment studies prior to proposal submission, there is considerable evidence of coordinated proposal planning and very limited evidence of opportunism.

Attitudes Toward Source of Innovation—Attitudes of implementors toward the initiating agency or organization; attitudes toward the role of the initiating agency as proselytizer and/or enforcer; congruence between adopting agency and initiating agency perceptions of respective roles.

With few exceptions the projects viewed OCE's role as simply provider of funds. Only two projects mentioned technical assistance as an OCE function, and only four projects mentioned OCE's monitoring responsibility. The fact that OCE was not considered as a source of technical assistance stems in part from the finding that only four projects were visited more than once by OCE staff. In

general, the attitudes of project staff toward OCE monitors were highly positive. The projects without prior career education experience wanted more OCE involvement, and it is our belief that implementation would have been facilitated in these newer projects had more technical assistance been forthcoming.

Only three sites were satisfied with the grants process and the funding cycle. Several project directors reported that the protracted grant negotiations resulted in delays in implementation and that the one year funding cycle interfered with long range planning. One project director commented upon the inconsistency between his intention to implement career education district-wide and the constraints imposed by year-to-year funding. It should be noted that Congress did not establish this program to promote full-scale implementation; demonstration, rather, was the primary objective.

> *Adoption Strategies*—Ways in which the implementors (e.g. teachers) are made aware of the innovation and instructed in its essential features; extent to which implementors are involved in redefining emphases of the innovation and making modifications to enhance local suitability and implementor sense of ownership; inservice training (kinds and amounts).

All projects employed teacher, counselor, and administrator inservice workshops as the primary adoption strategy. Projects varied considerably in frequency and duration of inservice sessions and in topics covered in such sessions. By far the strongest aspect of the general adoption strategy employed by the projects was the awareness component. A later section of this chapter will highlight the finding that most target teachers, counselors, and building administrators were aware of career education and were conversant with key themes.

A clear relationship was evident between the extent to which projects delivered inservice follow-up and subsequent quality of implementation. This relationship emerged from on site observation and was strongly confirmed by the process questionnaire data. The number of inservice hours was positively related to number and frequency of career education activities engaged in by teachers, counselors, and building administrators. The pacing and sequencing of inservice workshops throughout the year were important considerations in facilitating classroom-level implementation.

Most of the projects adopted a top-down adoption philosophy, which provided little opportunity for practitioner involvement in shaping the local conception of career education. One potential reason for this adherence to a top-down adoption approach was the finding that projects focused on maximizing "numbers of teachers inserviced" rather than maximizing intensity of inservice for individual teachers. Large numbers of teachers were inserviced, but fewer developed intensive relationships with project personnel. Intensity of inservice and instrumental assistance have been found in other studies to be important determinants of implementation or use (Louis, 1977). There was some evidence that project personnel were under pressures (whether internally or externally imposed) to inservice large numbers of teachers in keeping with a district-wide implementation philosophy. Limited resources necessarily meant that many teachers received limited inservice; this was considered better than having a few teachers receiving extensive assistance. We must conclude that this emphasis on quantity rather than quality of involvement adversely influenced implementation in a number of projects.

> *Incentives and Disincentives For Adoption*—Type and level of incentives and disincentives to adopting agency, adopting units, and implementors including: money, publicity, professional recognition, keeping up with the Joneses.

All fifteen projects enjoyed positive publicity, and, in most cases, project directors received professional recognition for their efforts. The political leverage that often comes with grant money was used effectively by a few project directors, but many more were unaware of how to convert their financial initiative into resources to gain wider awareness and higher quality implementation. For example, the leverage technique of using OCE money to obtain long term local or state support was not practiced by more than a slight majority of the project directors. Overall, there was little relation-

ship between type of incentives or disincentives employed by a project and quality of implementation. What little relationship did exist could be explained by the superintendent's level of commitment to career education.

Explicitness—Extent to which the theoretical basis for the innovation is well articulated and the desired outcomes are well defined and understood; extent to which the process activities (who, what, where, when, how) and alternatives are systematically delineated.

For the most part, the fifteen projects embraced *all* nine OCE learner outcomes. This wholesale adoption strategy may be in itself indicative of the unfocused, unexplicit nature of many project philosophies and activities. Although some projects attempted to link specific process activities conceptually to specific learner outcomes, most of the linkages were tenuous. There existed, at times, an almost mystical belief that somehow career education (in the abstract) if implemented, would result in a pervasive influence on all outcomes of interest. Project personnel were generally unable to catalog specific process activities, or impose a conceptual framework on the processes. Discussions about process often developed into platitudes far removed from daily instructional decisions faced by teachers, counselors, and building administrators.

If one factor stood out as an impediment to quality implementation, it was lack of process specification and attendant lack of delineated process-outcome relationships. If local project personnel are to be left with the task of translating theory into practice, there needs to be some mechanism to assist them with conceptualization and implementation. Even prior to developing a technical assistance mechanism, more effort needs to be expended on conceptualizing the process of career education at the building and classroom levels.

Complexity—Extent to which major adjustments in organization and role/behavior must be simultaneously implemented; number of people that must be involved in implementation; number of external agencies and the respective levels of involvement considered desirable.

The planning and implementation of a career education project fully consistent with the theoretical underpinnings of career education would be a complex endeavor indeed. This undertaking would require resocialization of actors ranging from teachers to business persons, involvement of diverse agencies not used to collaborating with one another, and alterations in fundamental beliefs toward education and work. Complex changes in teacher attitudes, roles, and behavior are not accomplished easily. Gross, et.al., (1971) and Evans and Schiller (1974) found that altering teaching strategies and role relationships proved much more difficult than changing administrative procedures or curriculum materials, and it is just such changes in roles and relationships that rest at the center of career education. It seems possible that, due to the complexity of the career education concept, the fifteen projects found it difficult to be explicit; however, the wholesale adoption of outcomes and lack of clarity regarding process outcome relationships suggest that there are other reasons for specification failure.

Time for Planning and Orientation—Amount of time to hire and inservice implementors; provisions for acquiring needed materials and facilities; and provisions for establishing necessary organizational linkages.

There existed considerable variability in "time for planning and orientation" across the fifteen projects. In five cases project directors reported that too much was expected too fast. As might be anticipated, the projects with previous background in career education were able to start up quickly and, unlike many of the newer projects, had few initial implementation problems. Moreover, delays in the grant award process further impeded implementation, expecially for the less experienced project directors.

Resource Commitment—Extent of dollars and in-kind contributions available for implementation; per pupil or per unit expenditure.

Career education is an extraordinarily inexpensive innovation. Average per pupil expenditures rarely exceed fifty dollars and, in several cases, are less than ten dollars. When viewed in light of per pupil expenditures for ESEA Title I, the cost of career education is almost inconsequential. Many Title I projects expend more than $400.00 per student (NIE, 1977) in the hopes of positively affecting a narrow set of learner outcomes. A natural question is how can career education be expected to affect not only basic skills but also career awareness and career knowledge when ESEA Title I has been only modestly successful with four to twenty times the resources available to most career education projects? We are not prepared to answer this question in this evaluation, but we do think that observed treatment effects must be interpreted only after comparing the modest investment required to initiate a career education project with the resources available to other recent innovative programs.*

Saturation of Adopting Organization—Extent to which an agency's units (e.g., schools) are involved in the innovation.

Nine sites report that 100% of their elementary school practitioners have been at least partially inserviced on career education concepts and practices. Similarly, ten sites report complete saturation at the secondary level. We are inclined to interpret such reports as indicants of project emphasis on numbers as opposed to an accurate reflection of quality of implementation. Most of the projects have made a philosophical commitment to breadth of coverage rather than intensity and follow-up. Such a commitment would have been more defensible had projects specifically proposed objectives dealing with teacher behaviors and awareness. The focus on learner outcomes emphasized to varying degrees by most projects' proposals seems somewhat inconsistent with the projects' operational commitment to reaching as many teachers as possible. The doctrine of infusion may not be well served by short-term projects, and, furthermore, project emphasis on wide-scale implementation acts as an impediment to high quality implementation. OCE might consider discouraging such emphasis in short-term projects and instead encourage more of a demonstration orientation with careful attention to high quality implementation.

Staff Characteristics—Demographic characteristics of implementors including: age, sex, race, education level, past experiences, and attitudes toward change.

Although we examine the effects of teacher, counselor and building administrator characteristics on implementation later in this chapter, it is informative to consider briefly several characteristics of the local project directors. Five project directors had little or no project management experience and two had no previous background in career education prior to assuming management responsibilities on the career education project. Four other project directors had extensive project management experience. All project directors had teaching experience, and ten also had building-level administrative experience. We observed a high coincidence of low quality implementation and project director inexperience, but given the large number of intervening factors, a direct casual relationship between the high coincidence of low quality implementation and project director inexperience is unlikely.

STUDENT REPORTED EXPOSURE TO CAREER EDUCATION

Students were asked to indicate their frequency of participation in twenty-seven (twenty for fifth graders) activities. The activities were organized into three sets: classroom activities, linkage activities, and extra school activities. In this section we summarize findings related to target-nontarget differences, grade level variation, project-to-project variation, and student background characteristics as determinants of student exposure. Rather late in the analysis phase of this study we discovered

*In the fifteen projects per pupil expenditures from project funds averaged from twenty to one hundred dollars.

that relationships between student reported exposure to career education and other variables such as target-nontarget designation were conditioned by student ethnicity. Within- as well as across-projects, black students consistently report more frequent exposure to career education activities than do white students. We are inclined to believe that this difference is due to overreporting by black students rather than true differences in exposure.* In an effort to account for this overreporting response we have analyzed the data separately for black and white students.

Target-Nontarget Differences

Among fifth grade students we observed a consistent pattern of differences indicating greater exposure to career education activities for target students. Consistent with expectations, classroom activities are more discriminating at the fifth grade level than either linkage or extra school activities. Those activities which affect the greatest differences involve the use of media in teaching about careers, discussions about job values and interests, discussions of race and sex stereotyping, and participation in career field trips. The findings, although not overwhelmingly, are clearly consistent with a conclusion that fifth grade target students are exposed to more career education-oriented activities than nontarget students. Although the overall pattern of differences between target and nontarget fifth grade students is essentially similar for blacks and whites, black fifth grade students consistently report more exposure to career education activities than white fifth grade students. Stated more precisely, there is about the same distance between black target and nontarget students' regression lines as there is between white target and nontarget students' regression lines; however, the black students' regression lines are more elevated (reflecting a higher level of self-reported exposure) than white students. We may interpret these differences in at least two ways: first, we might conclude that black students do, in fact, receive more exposure to career education activities or, second, that black students tend to overreport. The weight of evidence supports the later interpretation.

Among eighth grade students target-nontarget differences are not as consistent in either direction or magnitude as those observed for fifth graders. Again we observed a marked tendency for black students, whether target or nontarget, to report more exposure to career education activities than white students. However, unlike the pattern of black-white differences among fifth graders, the eighth grade target-nontarget differences are not consistent for black and white students. Four of five significant differences for black students favor target students, whereas only three of nine differences among white students favor target students.

In general, both the direction and magnitude of target-nontarget differences are consistent for black and white eleventh graders. The majority of contrasts for black and white students favor target students although again black students report markedly higher levels of exposure.

At the fifth and eleventh grades, there exists a clear pattern of differential exposure to career education which is consistent with observed instructional emphasis at the two grade levels: we expected to find more exposure to classroom-based activities among fifth graders and more exposure to extra school activities among eleventh graders. The magnitude of target-nontarget differences in exposure is not overwhelming, but given the "numbers" oriented adoption strategy employed by most projects, it is encouraging to find any process differences manifested at the student level. In contrast, eighth grade findings reflect no consistent pattern of differential exposure favoring target students. The results for black students slightly favor target students, but among white students the advantage goes overwhelmingly to nontarget students. Several possible explanations for these discrepancies between fifth and eleventh grade results and eighth grade results are offered later in a section on teacher reported implementation.

*This is based on the similarity of results across and within projects and across and within grades where we have been able to compare the responses of black and white students.

Grade Level Variation

The magnitude of differences between fifth and eighth grade target students' reported exposure to career education activities vary dramatically depending upon whether white students or black students' self-reports are examined. If the combined results are used to evaluate differences between fifth and eighth grade target students' exposure, then one would conclude that fifth graders report more exposure than eighth graders. Closer examination of these data, however, reveals that the relationship between grade level and self-reported exposure to career education activities is conditioned by whether the students are black or white. More precisely, there is an interaction effect. The vast majority of differences between black fifth and eighth grade target students favors the eighth graders, whereas just the opposite relationship holds for white students. Although the direction of the differences are opposite for black and white students, we should note that the magnitude of these differences is much larger among white students. Given what we believe to be a tendency for black students to overreport, we must conclude that fifth grade students perceive a higher level of exposure to career education activities than do eighth grade target students.

Differences between eighth and eleventh grade target students follow an interesting pattern that does not overwhelmingly favor either grade level. Based upon the combined black and white students' results, there is a tendency toward higher exposure for eleventh graders. Eleven of twenty-seven contrasts significantly favor eleventh grade target students, whereas seven contrasts favor eighth grade students. It is important to note that in only four of twenty-seven contrasts do black and white students differ in the sign of the correlation. Thus, for the most part, black and white students agree in their perceptions about which activities were more prevalent at the eighth and eleventh grades, but they disagree somewhat on their perceptions of the magnitudes of grade level differences, i.e., black and white eighth and eleventh grade students agree on the sign of the relationship but disagree on the size of the relationship. Whether we focus on the sign or the magnitude of the relationship between grade and reported exposure among target students, we must be cautious regarding any inferences about the quality of implementation at the eighth and eleventh grades when those inferences are based upon student reported exposure.

Project Variation

Overall, the within-project consistency across black and white target students' reported exposure to career education is high. Note that we previously observed that black students tend to overreport, but, when we control for this tendency by analyzing the groups separately, similar patterns emerge for projects serving both black and white students. When black and white students are studied separately, much less discrimination is seen among the projects in black students' reported exposure than white students' exposure. In several projects which served both black and white students the combined analysis suggested that these projects had significantly higher reported exposure than other projects; however, when black and white student reports were analyzed separately these differences disappeared. The cause of this anomaly was black students' tendency to overreport, a tendency which is left uncontrolled in the combined analysis; any project with relatively large numbers of black students will appear to have higher overall student exposure. When black and white students' reported exposure scores are analyzed separately, it is possible to find both groups actually are below their respective averages. Thus, the question of which projects have higher student reported exposure to career education cannot be answered without knowing the ethnic characteristics of the students served in each project.

In general, we must be impressed by the regularity of pattern in student reported exposure to career education activities. The data are clearly not random in that those projects promoting high exposure tend to do so on many of the activities, whereas projects which are less successful in promoting student exposure tend to be less successful across a wide range of student activities. Similarly, the most successful projects tend to have success at all grade levels with both black and white students, and less successful projects tend to be less successful at all grade levels with both black and white students. Both the within-grade across-activity patterns and the across-grade patterns are stable and

highly suggestive of differential project effects, although the magnitude of these effects is generally not overwhelming.

Determinants of Student Reported Exposure

There is no theoretically defensible reason for expecting student background characteristics to correlate with student reported exposure to career education activities. If, for example, males report less exposure to career education than females, then projects would need to investigate possible reasons for this differential exposure since all projects profess to serve all students regardless of post-secondary plans, sex, SES, or other characteristics.

At all three grade levels, sex, age, grade point average, and amount of television are essentially unrelated to student reported exposure. Amount of homework is consistently and positively related to classroom, linkage, and extra school activities at all three grade levels. Ethnicity is the most consistent predictor, with black students reporting consistently higher exposure than whites. Overall, most of the correlations are small, suggesting that, with the exception of ethnicity, background characteristics are poor determinants of student reported exposure to career education. The fact that relationships between grade and student exposure, project and student exposure, and target-nontarget group membership and student exposure are highly similar in direction suggests than an overreport response bias is operating in black students' reported exposure. Once this response bias is controlled by separately analyzing black and white students' responses many abnormalities in relationships between exposure and student outcomes disappear.

TEACHER REPORTED IMPLEMENTATION OF CAREER EDUCATION

A major premise of this study was that if the projects have had effects on educational practitioners, these effects should be manifested in increased knowledge and understanding of career education; increased use of career education materials, concepts, principles and activities; and changed attitudes toward the role of career education in the ongoing instructional process. In other words, the resocialization of educators should have resulted in changes in what they know, what they do, and how they feel. In this section we summarize findings related to target-nontarget differences, grade level variation, project-to-project variation, and determinants of teacher reported implementation.

Target-Nontarget Differences

Among fifth grade teachers, the results supported a conclusion that target teachers (i.e., those identified by the local project staff as being actively involved in the career education project) engaged in career education-related activities more frequently than nontarget teachers, and that, apparently, inservice also had a positive effect on knowledge and understanding and value internalization. Among eighth grade teachers the results were not as suggestive of a process effect as were the fifth grade findings. Although there was a slight tendency for grade eight target teachers to be more active in role/behavior, this tendency did not extend to knowledge and understanding and value internalization. The results observed at the eleventh grade paralleled those at the fifth; target eleventh grade teachers reported higher levels of knowledge and understanding, role/behavior, and value internalization than their nontarget colleagues.

Among fifth and eleventh grade teachers, we observe a pattern in the target-nontarget comparisons of differential knowledge and understanding, role/behavior, and value internalization, suggesting that teacher inservice was producing a resocializing effect. In the comparisons of target and nontarget teachers, the largest process effects were found among fifth grade teachers, eleventh grade teachers were second, and eighth grade teachers were markedly less knowledgeable and active. It is perhaps no coincidence that student reported exposure to career education followed a pattern

quite similar to teacher reported implementation, with eighth grade students reporting the lowest levels of exposure, and eighth grade teachers reporting the lowest level of implementation.

Grade Level Variation

Differences between fifth and eighth grade target teachers were substantial. Under knowledge and understanding, fifth grade target teachers reported: (1) a fuller understanding of career education, (2) more adequate preparation to implement career education, and (3) higher agreement with career education goals. Under role/behavior, sixteen of twenty-nine constrasts significantly discriminated between grade levels, with thirteen of these differences favoring fifth grade teachers. Under value internalization, fifth grade target teachers perceived greater benefits in career education and believed more strongly than their eighth grade colleagues that a proper role of the school is preparing students for the world of work.

Fifth grade target teachers appeared to be considerably better than their eighth grade colleagues at implementing career education activities. This finding held even when the fact that some activities are less appropriate at one grade level than another was considered.

There are substantial differences between eighth and eleventh grade target teachers' knowledge and understanding, role/behavior, and value internalization. Fourteen of thirty-nine contrasts (36%) were significant, and thirteen of those contrasts favored eleventh grade target teachers. Eleventh grade target teachers reported having more information about whom to contact for career education speakers, more understanding of career education, and a higher perceived level of implementation than eighth grade target teachers. Eleventh grade target teachers engaged in a broad range of career education activities more frequently than eighth grade target teachers. We observed no differences on the three value internalization constructs between eighth and eleventh grade target teachers.

Project Variation

Project variation in teacher reported implementation closely parallels project variation in students' reported exposure. Aggregating results across the three grade levels for white students, we find three out of five projects which are high on teacher reported implementation are also high on student reported exposure, with the other two evidencing mixed results. All three of the projects scoring low on teacher reported implementation also are low on student reported exposure. Two of seven projects which scored mixed on teacher reported implementation also scored mixed on student exposure, whereas three of the seven scored low, and two scored high on student exposure. Overall, this is a rather striking piece of confirmation for a process effect on teachers. Furthermore, this process effect appears to have translated into an effect on white students substantial enough for these students to report a difference in their educational experiences.

A similar pattern of relationships holds for teacher reported implementation and black students' reported exposure. Three of four projects with high teacher reported implementation also evidence high student reported exposure. None of the projects that showed low teacher reported implementation had enough black students to enter into the analysis. Of the four projects reporting mixed results for teacher implementation all four evidenced mixed results for black students' reported exposure to career education. Thus, again, we observe confirmation for the conclusion that level of teacher reported implementation is related to level of student reported exposure to career education activities.

Determinants of Teacher Reported Implementation

The four sets of determinants of implementation (i.e., staff characteristics, adoption strategy, teaching context, and organizational capacity) were related to variance in teacher reported implementation. The most consistently predictable process measure was knowledge and understanding, with classroom activities, extra school activities, and linkage activities following close behind. The value

internalization scales were less predictable, although in several cases the determinants explained upwards of twenty-five percent of total variance. It was heartening to observe that adoption strategy was consistently an important factor in explaining variance in implementation. The finding that "morale" was important at selected grade levels for selected process measures provides partial confirmation of findings from the RAND change agent studies (Berman and McLaughlin, 1975). It appeared that the quality of implementation of career education is strongly dependent upon frequency and type of inservice education. Teachers receiving more inservice knew more about career education, implemented career education activities with more frequency, and occasionally even manifested more positive attitudes toward career education's potential and ease of implementation.

COUNSELOR REPORTED IMPLEMENTATION OF CAREER EDUCATION

Target-Nontarget Differences

This section presents the differences between target and nontarget counselors' knowledge and understanding, role/behavior, and value internalization. We must caution the reader that the small nontarget sample obviates extensive generalizations about the counseling process and career education.

The most striking finding presented by our results, exceeded only by the absence of many statistically significant contrasts, is the direction of the differences. Except for two variables under knowledge and understanding (perceived level of implementation and agreement with career education goals), only one other difference (efforts to reduce race and sex stereotyping) was statistically significant, and it favored nontarget counselors. Many other variables approached significance, and most of these favored nontarget counselors. One interpretation of these findings is that projects have done a poor job of inservicing counselors. Another interpretation is that the small sample of nontarget counselors is somehow atypical of the universe of nontarget counselors. An examination of the frequency with which target counselors engaged in selected career education activities suggested that the former interpretation has more credence.

Project Variation

The project differences in counselor reported implementation bore little resemblance to project differences in teacher reported implementation. This finding, combined with the relatively low frequency with which target counselors engaged in most career education activities, suggests that the projects realized a rather limited process effect on counselors.

Determinants of Counselor Reported Implementation

The relationships between four sets of determinants and seven measures of counselor reported implementation of career education were examined. The most interesting observation from the analysis was that adoption strategy was largely unimportant in predicting most of the process measures. Neither number of hours inservice nor type of inservice explained any of the variation in counselor reported implementation. Staff characteristics and counseling contest, on the other hand, were quite important.

It is noteworthy that we observed few target-nontarget differences among counselors and found that, among target counselors, amount and kind of inservice were unrelated to level of implementation. This finding strengthened our conclusion that counselors were the weak link in the implementation chain, and, apparently, a partial explanation for low levels of counselor implementation could be traced to a lack of effective inservice.

PRINCIPAL REPORTED IMPLEMENTATION OF CAREER EDUCATION

Target-Nontarget Differences

The evaluation team found large differences between target and nontarget principals' knowledge and understanding, role/behavior, and value internalization. The knowledge and understanding differences between target and nontarget principals were substantially larger than those observed for the parallel teacher and counselor groups. Eleven of eighteen contrasts under role/behavior were statistically significant, and all favored target principals. Under value internalization there were no significant differences between target and nontarget principals.

Project Variation

With the exception of two instances, most project differences appeared sporadic. Beyond these two projects there appeared to be little distinction in principals' role/behavior across projects. As we noted above, target principals engaged in career education activities more frequently than their nontarget peers, but there was little project variation in the ways these target principals fulfilled their career education-related roles.

Determinants of Principal Reported Implementation

Background characteristics of the principal, school context, and organizational capacity were generally inconsequential in determining target principals' implementation of career education. A complex of adoption strategy variables acted as the primary determinant of principal reported implementation. The major departure of these findings from those reported for teachers was that staff morale, as perceived by the principal, was not related to principal reported implementation. In contrast, teacher perception of staff morale was very much related to level of teacher reported implementation; the higher the perceived morale, the higher the reported implementation.

SUMMARY OF THE IMPLEMENTATION/PROCESS OF CAREER EDUCATION

Aggregating reported levels of implementation for teachers, counselors, and principals, several generalizations about the implementation/process of career education are possible. Target teachers, counselors, and principals reported a high level of knowledge and understanding of career education. With near unanimity, target educators reported that the "concept of career education is being actively implemented" in their schools. Similarly, all three groups "strongly agree with the goals of career education." Target teachers and principals feel they have a "full understanding of the concept of career education" and are "adequately prepared" for the implementation of career education. In terms of role/behavior, target teachers and principals reported substantially more frequent implementation of career education than nontarget teachers and principals. Target teachers engaged in classroom-based and extra school activities most frequently, whereas principals were most often involved in linkage activities. Differences in value internalization between target and nontarget educators were infrequent. Fifth and eleventh grade target teachers showed some tendency to perceive more benefits in career education and less implementation burden than their nontarget colleagues, but these differences were not found between target and nontarget principals and counselors. Overall, we found educator knowledge and understanding of career education consistently affected by the projects. Role/behavior changes frequently were apparent, particularly among principals and fifth and eleventh grade teachers. Fewer changes in value internalization were apparent among members of the practitioner groups.

Career education as implemented in the fifteen projects studied in this evaluation was associated with differences in educators' knowledge, reported professional behavior, and, to a lesser extent, at-

titudes. There is also evidence that the ways projects implement career education and the setting in which implementation takes place were related strongly to quality of implementation. Last, there is support for the conclusion that the practitioners' changes were translated effectively into new instructional experiences for students.

Among students at the fifth and eleventh grades, we observed a clear pattern of process effect favoring higher exposure for target students. We expected more target-nontarget differences in exposure to classroom-based activities among fifth graders and more such differences in exposure to extra school activities among eleventh graders, and our expectations were confirmed. The observed process effects were not overwhelming, but they were sufficiently frequent and consistent in direction to conclude that fifth and eleventh grade target students had educational experiences which were different from those of nontarget students. Grade variation consistently favored white fifth grade target students over white eighth grade target students in exposure to career education activities; however, black eighth grade target students reported higher exposure than black fifth grade target students. The differences between eighth and eleventh grade target students were mixed. Project-by-project differences in student exposure evidenced a stable pattern. Projects promoting high student exposure did so consistently on a broad range of activities. Similarly, the most successful projects tended to evidence success in promoting student exposure at all grade levels, whereas projects having less success experienced difficulty at all grade levels.

CHAPTER IV
THE OUTCOMES OF CAREER EDUCATION

The primary objective of this study was not to evaluate career education, at least in the way the word "evaluate" is used commonly. Although we present a number of findings that may be of interest to practitioners, our main task was to assess the relative effectiveness of evaluation models in explaining changes in students' career education learner outcomes. In this regard we developed three complementary evaluation models; this chapter details the findings available from each. The models were developed to be complementary because of our distrust of results based on single methodologies. This distrust is shared by many evaluators and was expressed particularly well by Gilbert, Mosteller, and Tukey (1974):

> Any attempt to infer what will be caused by an active intervention ("natural experiments") or unrandomized intervention has to be subject to possibilities of error that are hard to evaluate. Any attempt to assert that the statistical significance or confidence associated with such an analysis allows us to conclude reliably what active intervention will do is dangerous and unsound.
>
> The best we know how to do in such a situation is to seek out alternative methods of fallible inference, use up to several of them, and then, recognizing their fallibility, trust moderately in their combined message (p. 155-156).

We have applied our three models to the student data using as levels of analysis students, classrooms, schools, and projects. Each of these applications is detailed below, along with a discussion of the methodological difficulties, foreseen and not, inherent in efforts such as this. As will be clear to the reader, the results one obtains depend largely on the approach and attendant assumptions one accepts.

THE MODELS

In order to meet the objective of identifying and testing a career education evaluation model, NTS developed three complementary models which could be used to explore the impact of career education processes on constructs measuring various student learner outcomes; these models have been described in Chapter 2, but will be reviewed briefly here. In applying these models it should be kept in mind that our main interest lay not so much with the statistical significance of an effect, but rather with the proportion of the outcome variance which was accounted for by an effect.

Group Membership Model

The first approach was the classical experimental design in which a nontarget group was used to estimate what the target students would have achieved had there been no career education program. The group membership effect, which we will also refer to as "treatment" effect, was estimated by the difference between the target and nontarget posttest construct means, adjusted for pretest differences. The treatment effect can be re-expressed, however, as the proportion of outcome variance that can be explained by group membership (target vs. nontarget) after the differences in pretest performance have been removed. The higher the proportion, the more we can be assured that membership in a target or nontarget group has had a bearing on student performance level as measured by the posttest measures. We have made the following distinction between outcome variance and criterion variance: outcome variance refers to the variance that is present in the observed posttest scores; criterion variance refers to the residual variance that remains in the posttest scores after the variance that can be attributed to pretest variation has been removed.

Process Model

The second approach assessed the relationship between students' exposure to career education

concepts and activities and their subsequent performance on the outcome constructs. If the career education program had an effect, then we would expect that students with high exposure to career education activities would have obtained higher posttest scores (adjusted for pretest differences) than students with low exposure to career education. To the extent that exposure scores were able to account for outcome variance beyond that explained by pretest, we inferred a process effect.

Joint Effects Model

The third approach consolidated the group membership model and the process model into one analysis. In the joint effects model, we dealt only with criterion variance and examined what proportions of this variance could be attributed to group membership and process components. Specifically, we examined what proportion could be uniquely attributed to group membership and not to process, what proportion could be uniquely attributed to process and not group membership, and what proportion was confounded between group membership and process. To the extent that the unique contribution of group membership to explaining criterion variation was large, we inferred that there was some treatment effect, but our exposure variables failed to specify the relevant aspects of the process. If, on the other hand, the unique contribution of exposure variables to explaining criterion variance was large, we inferred that the program did little to affect outcome scores, but we were able to specify some of the important process dimensions which might be addressed by future career education programs interested in maximizing the particular outcome under consideration. Last, if the unique contributions of both group membership and exposure were small relative to their confounded contribution, then the program succeeded in generating a treatment effect, and the evaluation team succeeded in specifying the particular process dimensions potentially responsible for that effect.

CONSTRUCT DEFINITION

Another of the major tasks of this study was a validation study of the learner outcome instrumentation. This substudy, which is discussed at length in Volume III, consisted of psychometric analyses of pretest learner outcome data, leading to the identification of outcome constructs. The procedures used for these analyses relied heavily on factor analysis. The items comprising constructs were scored using unit weights rather than factor weights to facilitate local usage of the findings.

In addition to identifying nine learner outcome constructs within the career education-specific instruments, we also developed two second-order factor scales from the *Self-Observation Scales* (a nationally normed self-concept measure), and generated comparable reading and math scores from a wide variety of achievement test data made available to this study. Research by Stenner, et al., (1978) has indicated, however, that the comparability of standardized tests, even though the tests may profess to be measuring the same areas of achievement, is questionable. Consequently, use of the achievement test data was limited to project-level analyses, and all plans to aggregate achievement test scores across projects and tests were abandoned. Exhibit 5 presents each of the learner outcome constructs employed in this study and the sources of items for each construct. In addition, we also analyzed the results based on the intact tests themselves and developed two "growth discriminant scores" (one affective and the other cognitive) based on items that showed the largest positive pre-post change. A "desire to work" construct also was developed, based on item content validity.

EXHIBIT 5

Learner Outcome Construct Measures* and Item Sources

Outcome	Source(s) of Items
Occupational Self-Awareness	Ohio, Part 2
Work Values	New Mexico 5001; New Mexico 5006
Interest in Career Preparation	New Mexico 5006
Attitudes Toward Work	New Mexico 5001
Knowledge of Work Values	PECE; Ohio, Part 1
Decision Making	New Mexico 5002; New Mexico 5006; New Mexico 5007; New Mexico 5008
Job Seeking/Job Getting	Ohio, Part 1; PECE; New Mexico 5002; New Mexico 5006; New Mexico 5007
Career Awareness	Ohio, Part 1
Economic Awareness	PECE
Affective Growth Discriminant	Ohio, Part 2; PECE; New Mexico 5001; New Mexico 5006
Cognitive Growth Discriminant	Ohio, Part 1; PECE; New Mexico 5001; New Mexico 5002; New Mexico 5006; New Mexico 5007; New Mexico 5008
Academic Perceptions	SOS-Teacher Affiliation and School Affiliation Scales
Social/Personal Perceptions	SOS-Peer Affiliation, Self-Acceptance, Self-Assertion, Self-Security, and Social Confidence Scales
Reading Achievement	Appropriate reading achievement test used in each project
Math Achievement	Appropriate math achievement test used in each project
Desire to Work	New Mexico 5001; Ohio, Part 2

*With the exception of Interest in Career Preparation and Decision Making, these outcome measures were employed at all three grade levels.

METHODOLOGICAL ISSUES

Difficulties emerged in both the development of the evaluation models and the construct definition procedures. These methodological issues were anticipated by neither OCE nor NTS at the initiation of the contract but were discovered during the course of this research. Specifically, the following issues were identified and will be discussed below: adequacy of construct definitions, appropriateness of the aggregation level, and appropriateness of the unit of analysis.

Adequacy of Construct Definitions

In this research nine career education-specific learner outcome constructs were derived from the pretest data collected on several instruments. These instruments were designed by their publishers to possess at least face validity in measuring one or more of the career education learner outcomes. Since face validity exists only in the eye of the beholder, and few consultants could agree on what various items held in common, factor analysis techniques were used to explore the structure of the data, and nine constructs and their component items were identified. These constructs afforded a somewhat clearer reflection of the underlying structure; items which possessed face validity but, in fact, only contributed "noise" to the observations were weeded out. The rationale for the use of extensive psychometric analyses was that well-elaborated constructs should be more sensitive than the intact instruments to the effects of career education. Such sensitivity is needed as one typically finds, when pretest levels have been taken into account, that less than half of the observed posttest variation is left for attribution to any treatment effect.

The constructs remain, however, dependent upon the items that were borrowed from extant instruments. If these items prove largely insensitive to the effects of career education, then no amount of statistical manipulation will create a construct on which treatment effects will be observable. Thus, while the individual items may possess face validity, and while sufficient interitem congruence may exist to permit the derivation of nine constructs, there is no guarantee that these items are sensitive to the changes that career education may produce.

While a direct measure of such sensitivity could not be obtained, we were able to take an inferential step backwards and assess indirectly the construct measure for such sensitivity by examining each construct's sensitivity to growth, based on the pretest and posttest scores. Consequently, two additional outcome construct scores were developed that would be maximally sensitive to growth: the cognitive growth discriminant and the affective growth discriminant. These scores were computed from those items at each grade level that exceeded a minimal level of positive pre-post growth (as measured in standard deviation units).

In addition to the discriminant scores, intact learner outcome total test scores were also used in the analyses. These instruments were developed with heavy emphasis on content validity. We argued that if the construct measures failed to indicate any effects, the discriminant and total test scores would be available to perhaps capture those effects and provide some sort of baseline against which the adequacy of the construct measures could be judged.

Appropriateness of the Aggregation Level

As originally conceived, the unit of analysis in this research was the student, and the level of aggregation was all students across all projects. Two situations, however, made it advisable that other aggregation levels be considered. First was a problem regarding the student samples; many of the projects were unable to provide any nontarget student data. Thus, when the overall aggregation level was used, we were comparing two groups which differed at least in their geographic makeup, not to mention any other characteristics that may be unique to particular projects. This would suggest that if we are to apply the group membership model appropriately, it should at least be at the level of the individual project.

Second, and much more critical, was the problem of trying to examine a relationship, be it between outcome and group membership or outcome and process, that may be inextricably tied to the attributes of certain subgroups in the sample. In trying to examine the relationship as it exists for the aggregate of these subgroups, we may well have ended up with a clouded image of the relationship as it exists in a subgroup, or worse, with a completely false image. The implementation of career education is by no means standard or uniform. Substantial differences between the projects with respect to implementation have been found in this evaluation; it is possible, therefore, that what is observed in the overall results will basically be a hodge-podge which possesses no uniform structure and, consequently, resists the efforts of any of the models to account for the variance.

Appropriateness of Unit of Analysis

In most research, the unit of analysis is taken to be the most elemental level of observation. For this research, the most elemental level was the individual student. It can be argued, however, that since the teacher is the vehicle for disseminating information, it would have been more appropriate to use the classroom as the unit of analysis. Using individual data in such a situation may have resulted in substantial proportions of outcome variation being attributed to error; consequently, a lesser proportion would be available for the examination of effects that could be attributed to group membership or process.

In order to assess this issue, analyses were conducted for all units of analysis under consideration. For the fifth grade these were student, classroom, and building, while for the eighth and eleventh grades, these units were student and building.

MODELS APPLIED TO OVERALL AGGREGATION OF INDIVIDUAL STUDENTS

Data from all sites were pooled for each grade level. The regression analyses necessitated, however, that each student in the analysis have no missing data. Thus, depending on the model and the data it required, the number of available students and, consequently, the degrees of freedom varied considerably.

There was a wide disparity between the target and nontarget sample sizes. Typically, the nontarget group was from one-fourth to one-tenth as large as the target group. In addition, the nontarget students were mostly drawn from only three projects at any grade level. This raised considerable concern about the representativeness of the nontarget sample. Application of the group membership model to the entire data set required the assumption that the nontarget students in three projects could provide a reasonable estimate of the no-treatment expectation for students across fifteen projects.

These concerns generally were not eased by inspection of the target-nontarget pretest differences; the general pattern was for the two groups to differ by one-fifth to one-fourth of a standard deviation or more. Given pretest differences of this magnitude, it was unlikely that the statistical adjustment of removing pretest from posttest would be adequate. The amount of growth shown from pretest to posttest was also unencouraging, particularly in light of the fact that fifth graders showed negative change on one of eleven constructs, eighth graders showed negative change on seven of thirteen constructs, and eleventh graders showed negative change on seven of thirteen constructs. The proportions of the outcome variance for each construct that could be attributed to the pretest performance level were, in general, moderate in size. This indicated that while the measures were probably sufficiently stable to be measuring the same constructs at pretest and posttest, there was still sufficient variation left unexplained to permit treatment and/or process to account for a sizable portion of the outcome variance. Although most outcome measures failed to register significant target-nontarget differences, there were some exceptions. Most notable was the Ohio Test, Part 1, which reflected treatment effects at all three grade levels. The construct based most directly on that test's items, "Career Awareness," also reflected consistent but smaller treatment effects. The affective

discriminant showed a treatment effect at the fifth and eighth grades, and "Attitudes Towards Work" and the cognitive discriminant showed a treatment effect at the fifth grade; for these three measures, the proportion of explained criterion variance ranged from two to five percent.

Results from all outcome measures converged on the conclusion that the evaluation of career education at the eleventh grade would be extremely difficult with a group membership model. To some extent the extremely small nontarget sample size can probably be blamed for the failure to find effects based on group membership. The possibilities will need to be considered, however, that either career education is not as effective at the eleventh grade, or, what is more likely, the instrumentation developed to assess learner outcomes at the eleventh grade is insensitive to the effects that career education is exhibiting.

The process model accounted for substantially more criterion variance than the group membership model for virtually all the learner outcome measures at the overall aggregation level using the individual student as the unit of analysis. For only a few of the measures was less than five percent of the criterion variance being accounted for.

What caused considerable concern, however, was that the effect of process on the outcome measure appeared to be far from uniformly positive. Assuming that career education activities would not have a deleterious effect, it is unclear what confounding influences might be operating in this situation. For instance, one hypothesis might be that low scoring students tend to over-report their activity levels. What must be considered as well, however, are the concerns raised earlier in this chapter regarding level of aggregation and unit of analysis. Because these analyses used the individual student at the overall level of aggregation, a completely false picture of the relationship between process and outcome may have been presented.

Regardless of the reasons, when using individual students as the unit of analysis and the overall level of aggregation, process appears to have a generally negative relationship with all the cognitive constructs and "Academic Perceptions" across all three grades. Positive relationships do exist, on the other hand, with some of the affective constructs and "Social/Personal Perceptions." It is very interesting to note that the constructs tended to be somewhat more sensitive to process effects than either the total test scores or the discriminant scores. The Ohio Test, Part 1, which was relatively sensitive to group membership effects, exhibited considerably less sensitivity to process.

When the career education outcomes were assessed by the joint effects model, the proportions of outcome variance contributed by either joint effects of group membership models were minimal compared to the contribution made by process. In fact, for almost all measures process accounted for over ninety percent of the criterion variance explained by the entire model. The only exceptions to this pattern were: the discriminant measures, the "Career Awareness" construct, Ohio Test, Part 1, at grade five; both parts of the Ohio Test and the affective discriminant at grade eight; and "Career Awareness" and Ohio Test, Part 1, at grade eleven. This indicated that the cognitive items of the Ohio Test are apparently reflecting an outcome that is sensitive to group membership but not to the process activities assessed in this study.

In general, the joint effects model provided no additional insights over and above those gained by the other two models. This was reflected clearly by the virtually nonexistent proportions of criterion variance attributable to the joint effect. The group membership and process components were operating virtually independently of one another. The implication of this finding is that the activity variables that measure process are not sensitive to those differences in process that would be caused by membership in either the target or nontarget group. For all intents and purposes, group membership and process are accounting for disjoint portions of criterion variance, with the portion accounted for by process being substantially larger. In other words, if the educational experiences of target students vary from those of nontarget students, the experimental differences that produced the effect are not being reflected in the activities. On the other hand, the activities are measuring some part of the students' experiences that are reflected also in the learner outcome measures. The group membership and process models, therefore, seem to be assessing separate portions of the students' experiences.

Our analysis of individual student data at the overall level of aggregation yielded three major conclusions. First, the group membership data indicated that the treatment effect was minimal, if not nonexistent; nonetheless, where the interaction of group membership and pretest was small, the treatment effect tended to be positive for the fifth and eighth grades. Second, the process model indicated a moderate to strong relationship between process and outcome. The relationship was almost exclusively negative for the cognitive constructs, however, and mixed for the affective constructs. Third, the joint effects model indicated that the effects of process and treatment on outcome were virtually disjoint, with process accounting for the bulk of the variance explained by the joint effects model; that is, the activities chosen to measure the process of career education were not sensitive to those aspects of membership in a career education project that affect performance on outcome.

The poor showing of the group membership model raised strong concerns about the appropriateness of the nontarget group sample as a source of no-treatment expectations. It was therefore necessary to consider whether it would be more appropriate to use the nontarget groups only to generate no-treatment expectations for the target groups in their sites, that is, to change the level of aggregation from the overall to the project level.

The apparently negative relationship between process and outcome also raised strong concerns. It was recognized that insufficient information existed for exploration of the existence of some subtle underlying influence that could result in the negative relationships. The possibility of the negative relationships being an artifact of level of aggregation was available, however. In other words, it was possible to investigate whether subgroups in the sample could actually have a positive relationship, even though, due to their pre- and posttest means, aggregation of their data yielded an apparently negative relationship.

Given the unique nature of the sites included in this study, it does not seem at all unreasonable, in the light of the preceeding discussion, to question whether the assessment of career education can truly be accomplished at a national group level. The implementation of career education is by no means standard or uniform; substantial differences between the projects with respect to implementation were highlighted in Chapter 3.

For all of these reasons, it seemed appropriate to lower the level of aggregation from the overall to project level, while retaining the student as the unit of analysis. Making this change presumably would yield more appropriate target-nontarget comparisons and, perhaps, reveal the presence of positive process-outcome relationships.

MODELS APPLIED TO PROJECT AGGREGATION OF INDIVIDUAL STUDENTS

At each of the three grade levels there were three projects with a sufficient number of both target and nontarget students to allow the application of each of the three evaluation models. It should be emphasized that analysis of the results at the project level was never envisioned as being able to produce any sort of nationally generalizable results. In light of the aggregation discussion such a goal would be inappropriate. Rather, the objective was to see if, by applying the models at the local level, the models would be able to account for a substantial portion of the outcome variance and, thus, be able to describe how career education operates at the project level. If there had been sufficient subjects, it probably also would have been appropriate to further divide the projects into racial and sex subgroups to assess the effects of grouping and group context on the outcome-process and outcome-group membership relationships. This was not possible. Since the data were being analyzed at the project level, it was possible to include the achievement test data because the same instrument was used within, although not across projects. It was still necessary to exclude some of the learner outcome, achievement, and SOS measures from the analyses, however, due to the limitations forced by small numbers of students.

Analysis of individual student data at the project level of aggregation yielded some intriguing

results across the three grade levels. The group membership model tended to reveal the presence of treatment effects at the local level that were no more substantial than the treatment effects observed in the overall analyses. Only one of the site-grade sets consistently showed substantial positive treatment effects; for the rest of the site-grade combinations, treatment effects were either nonexistent or confounded with interaction effects.

The process model at the project level of aggregation tended to reveal much more positive relationships between process and outcome that were observed at the overall level. Several sites exhibited generally positive relationships between process activities and virtually all the constructs at each grade level.

The joint effects model continued to show few, if any, effects that could be attributed to the joint effects of process and group membership. The effects of process and group membership tended to be disjoint across all the sites, with the bulk of the explanatory power of the joint effects model vested in the process component. The constructs tended to be more sensitive to the process and treatment effects than the total test scores. Although the Ohio Test, Part 1, provided an occasional exception to this pattern, the effects were not as strong as those observed in the overall analyses.

Thus, even at the project level of analysis, either an appropriate nontarget group could not be found, or the outcome measures were not sufficiently sensitive to effects that could be attributed to group membership. The emergence of strong process-outcome relationships at the project level, however, provided a very strong indication that level of aggregation could be a crucial determinant of the observed polarity of the relationship. While, admittedly, the polarity at the project level was by no means uniform, its shifting quality indicated that site characteristics might have a much stronger influence on the process model than was previously suspected.

The inability of the group membership model to work left us in a quandry. If our measures were, in fact, insensitive to group membership, it seemed contradictory that they should be so sensitive to process. The noncomparability of the target and nontarget groups seemed a likely explanation, but this was a post-hoc conclusion which provided limited guidance for further analyses. Conferences with staff at OCE led to the recommendation that a level of analysis higher than the student be used. Career education, it was pointed out, is delivered at the classroom level. For that matter, Berman and McLaughlin (1975) found that career education was implemented most effectively when principals were supportive. This suggested that the classroom or the building might be used as the unit of analysis. If the effects were occurring at the classroom and/or building levels, then using the student as the unit of analysis might have resulted in so much extraneous variance that the presence of main effects was obscured.

MODELS APPLIED TO OVERALL AGGREGATION OF BUILDING AND CLASSROOM DATA

Due to the nature of the educational environment at the eighth and eleventh grades, students cannot be identified as belonging to any one particular classroom. They circulate, instead, through a variety of classroom situations, some, none, or all of which may provide exposure to career education. Consequently, only the building could be used as the unit of analysis at these grades. The building and classroom were both used as units of analysis at the fifth grade, however.

Using the building as the unit of analysis did not enhance the explanatory power of the group membership model, nor did changing the unit of analysis substantially alter the direction of the treatment effect; at the fifth and eighth grades the group membership effect was generally positive, while at the eleventh grade the effect was generally negative.

What was especially interesting, however, were the results of the process model, although it only could be applied to the fifth grade data. Less than six percent of the key activity variable relationships

with outcomes were negative; that is, the relationships between process activities and outcomes were positive across nearly all the learner outcomes. The other results from the process model were generally discounted due to the low degrees of freedom and the large number of model parameters. The joint effects model continued to show little in the way of joint effects; the process component once again constituted the bulk of the model's explanatory power.

The models also were applied to the grade five data using the classroom as the unit of analysis. For the group membership model, the treatment effects continued to be small but predominantly positive. "Attitudes Towards Work" and "Career Awareness" exhibited somewhat more sensitivity to group membership than was evident in the overall analyses of the fifth grade student data. The process model revealed a strong positive relationship between process activities and outcomes. While the relationships were not as positive as those observed in the analyses of the fifth grade building-level data, they were considerably more positive than the overall student analyses had indicated. In addition, the relationships were consistently positive across all the learner outcome constructs.

In this section, analysis of building and classroom data at the overall level of aggregation yielded three conclusions. First, the group membership model did not reveal the presence of any treatment effects that analyses using student level data had not indicated. Second, the process model revealed, at least at the fifth grade level, the emergence of positive process-outcome relationships when a unit of analysis higher than the student level was used. Furthermore, the higher the level of analysis unit utilized, the more positive were the relationships. Third, the joint effects model did not reveal the presence of any component effects that had not been observed through analyses using student level data.

At this point, four different combinations of aggregation levels and units of analysis had been analyzed using the three evaluation models. The results from the group membership model did not vary markedly from one combination to another; the effects tended to be small at all grade levels and were generally negative at grade eleven. This pattern suggests two explanations. First, while the process activities and outcome variables have strong relationships with one another, the processes have not captured what truly occurs in a federally-funded career education project, nor do those processes reflect the project's consequences. Given that the instrumentation used in this study was based on off-the-shelf products, often developed for a single project, this possibility cannot be dismissed. Further, since the construct measures proved insensitive to growth, it is important that any future evaluations of career education be preceeded by the development of new process and outcome instrumentation that will possess sensitivity to the effects of growth and treatment.

A second explanation for the lack of a group membership effect is the noncomparability of the target and nontarget student groups. Suppose, for example, that the process of career education goes on, regardless of the presence or absence of formal federal funding. The federal program might be supplanting an effort that would otherwise be taken on by the school administration. The relatively small expenditures necessary for career education reinforce the potential for this tendency. A related possibility might be that federally-funded career education programs have an effect on the entire cohort in which the target group is embedded. For example, nontarget teachers could convey to their students information acquired from interactions with target teachers. It has been frequently observed in compensatory education programs that nontarget students benefit by being in a target school; materials and the effects of teacher inservice training will not likely be confined just to the target population. That target and nontarget teachers' reported levels of implementation were not vastly different suggests that this may occur.

These possibilities, along with the strong process-outcome relationships observed throughout this study, have led us to conclude that the process model will probably be the most useful for evaluation of career education programs. It is a model that must be applied with great care, however. As has been evidenced time and time again throughout this study, the effects of aggregation level and unit of analysis on the nature of the observed relationships can be profound. We have seen that the overall aggregation of student level data tends to yield negative relationships, but as the unit of

analysis is raised from the student to the classroom and building levels the relationship becomes strongly positive. The relationships can be positive, negative, or mixed when student data are aggregated to the project level. It seems clear, then, that the primary source of this instability is tied to the characteristics of the individual students. It was deemed appropriate, therefore, that this chapter should conclude with a somewhat more detailed application of the process model, both from the viewpoint of assessing how transitory the process-outcome relationships are and also providing the reader with some insights into the relationships between individual activities and outcomes.

PROCESS MODEL APPLIED TO VARYING AGGREGATIONS OF INDIVIDUAL STUDENTS

The purpose of this section is to apply the process model to various aggregations of student data to examine the sensitivity of the process-outcome relationships to the nature of the aggregation. In considering what sorts of aggregation would perhaps be most sensitive, there were two logical choices. The first was to aggregate by project, the effects of which have been documented earlier in this chapter. The unique characteristics of the sites, such as level of implementation and demographic differences, seemed likely to produce differing process-outcome relationships. The second choice was to aggregate by ethnicity or, more specifically, by black and white students (other ethnic groups were not represented in sufficiently large numbers). Chapter 3 documented that blacks tended to report more exposure than whites, much as students in one project tended to report more exposure than students in other projects. While the combination of the two analyses into one was considered, the absence of either sufficient blacks or sufficient whites within any one of the projects precluded this alternative. Further, to eliminate one possible source of confounding, only target students were included in these aggregations.

Analysis of target student data using the process model at project and ethnic aggregation levels yielded three primary conclusions. First, certain activities possess high correlations with outcome measures across all projects and ethnic groupings. The following activities were consistently and positively related to virtually all the learner oucomes at all grade levels: talking with other students about jobs and careers, listening to their own parents talk about their jobs and careers, asking their own parents about jobs and careers, and taking part in activities designed to reduce race and sex occupational stereotyping. At the eighth and eleventh grade levels three additional activities tended to be positively and consistently related to the outcome measures; these included: studying the interests and abilities needed for particular jobs and careers, learning basic skills through the infusion of career-relevant information, and learning about their own work values. There were also two activities that presented consistently negative relationships across the outcomes at all three grade levels: simulations of world of work experiences in the classroom and listening to other parents make presentations about their jobs and careers. At both the fifth and eighth grade levels, attending career fairs and taking home career education materials also were related negatively to most of the outcomes. Other specific relationships are detailed in Chapter 6, Volume II.

Second, the pattern of correlations between activities and outcomes across project and ethnic groupings can vary substantially; the scope of this study was not sufficiently broad, however, for us to begin to identify the determinants of such variation.

Third, some learner outcome measures tended to be more sensitive across grades to exposure to the activities than were other outcomes. Occupational self-awareness, work values, and social/personal perceptions tended to be positively related to the activities at all grades, and interest in career preparation was positively related to the process activities at applicable grade levels (i.e., eighth and eleventh). At the same time, the relationships between some of the learner outcome measures and the activities tended to be negative. The only outcome falling into this category across all three grades was math achievement.

In general, while the process model would appear to be the procedure of choice for evaluating career education projects, considerable care must be taken in its application. While the impact of cer-

tain activities on outcomes seems to be unaffected by changes in grouping, nonetheless, such activities are clearly in the minority. Substantial differences exist between projects and ethnic groups regarding the nature of the process-outcome relationships. In the absence of any additional information at this time that would serve to explain and/or predict the occurrence of these variations, the career education evaluator would be well advised to implement process models on groups that are as homogeneous as possible. While the extent to which the project participants can be subdivided into homogeneous groups is certainly limited by administrative necessities, a few gross groupings based on ethnicity and general background would be well recommended.

SUMMARY OF THE OUTCOMES OF CAREER EDUCATION

In this chapter we reported the results based on the application of the group membership, process, and joint effects evaluation models to the student learner outcome data collected during the course of this study. From the many particular findings based on these applications, three general conclusions stand out. First, the learner outcome construct measures used in this study did not tend to be sensitive to growth. Although the process model was more effective than the other models in explaining pre-post change, the fact remains that there was little change to be explained. We are inclined to interpret this more as a problem in measurement of the outcomes than as an indication of a lack of real growth.

Second, the clients of career education evaluators would be better served through the application of the process than the group membership model. Probably the only instances in which the group membership model will provide useful information are those rare cases where, by random assignment or fortuitous circumstances, the treatment and control groups are similar on demographics (particularly ethnicity) and pretest scores. Even if those conditions can be met, however, we still are inclined toward the process model as it provides detailed information not only about overall results but also specific process-outcome relationships.

Third, the results one obtains from the application of the models are conditioned by basic choices of the unit of analysis and level of aggregation. In this study we not only observed the magnitude of effects to be dependent on the unit of analysis and/or level of aggregation used, but even found changes in the direction of those effects as the units of analysis and levels of aggregation were manipulated.

As has been noted frequently in this report, this study was neither designed nor conducted as an evaluation of career education. Nonetheless, it is clear from the results of our tests of the three models that both the supporters and the critics of career education could use selected results to buttress their convictions. We strongly urge that the results presented in this study not be used in this way, but rather that these results be used to help further clarify the career education concept and facilitate its implementation. Only when these steps have been done will evaluations of career education itself be useful.

CHAPTER V
ANALYSIS OF KEY POLICY ISSUES AND RECOMMENDATIONS

Much has been learned about career education during the twenty-four months of this study. Some of our findings confirm common sense expectations; others provide new insights into the implementation/process of career education and its effects on students. This chapter organizes selected findings around key policy issues facing career education planners at local, state, and federal levels.

GUIDELINES FOR GRANT PROPOSALS

The OCE guidelines for grant proposals should be redrafted to foster more precise thinking from prospective grantees. It is not sufficient, however, to simply request that grantees be more specific; rather, a proposal format is needed that will provoke grantees to address certain definite questions. (1) What are the proposed process changes that the project hopes to attain? For example; what changes in tangible resources, intangible resources, implementor knowledge and understanding, implementor role/behavior, and value internalization are the projects trying to accomplish? (2) What adoption strategies are proposed; how much inservice is done on what topics and with what frequency? (The present evaluation study has documented adoption strategy as the single most important determinant of implementation). (3) What are the project level determinants of implementation which might affect the proposed project, and how will these be manipulated to facilitate implementation? (4) Apart from wholesale adoption of all nine OE learner outcomes (which, incidentally, should not be encouraged), what are the most important outcomes that the project is working toward? (5) How do the process dimensions relate to the learner outcomes, i.e., what are the linkages between proposed changes in student experiences and subsequent changes in student's behaviors and attitudes?

We wish to emphasize two things about proposed changes in the guidelines. First, to anticipate a rejoinder, there is nothing in the proposed changes that erodes OCE's nonprescriptive and collaborative posture toward the field. We are not proposing that OCE prescribe certain implementation processes or require a particular adoption strategy; rather, we perceive the need for a generic conceptual framework which will facilitate more precise planning and higher quality implementation. Second, it would be insufficient to simply list a set of questions similar to those presented earlier in the guidelines. Prospective grantees need to understand how the conceptual framework is structured, so that it can become a useful tool rather than another bureaucratic hurdle.

Last, we do not pretend to have formulated the ultimate conceptual framework for viewing the implementation/process of career education. Much more could be learned from the expanding literature on implementation that would improve the framework and provide it with a firmer theoretical foundation. Our efforts in this study represent only a beginning, but even this modest beginning holds promise for dramatically improving the implementation/process of career education.

LEARNER OUTCOME INSTRUMENTATION

Throughout the life of this study, we have bemoaned repeatedly the non-existence of good learner outcome instrumentation. Projects are gravitating toward learner outcomes for which adequate instrumentation is available; thus, a severe mismatch is developing between what is being taught and what is being tested. Both the short and long-range consequences of this schism are dangerous. In the short run, projects will be unable to muster more than weak treatment effects without quality instrumentation; in the long run, career education will be unable to launch meaningful longitudinal studies due to the inadequate definitions appended to most career education outcome constructs. Further, available instrumentation may tend to dictate instructional emphases; this is quite different than instructional needs dictating the instruments. *OCE and/or NIE should seriously consider funding a comprehensive instrument development effort with provisions for specifying in more detail the range of constructs considered important in career education. Such a study might give particular attention to the intrinsic and extrinsic definitional properties of proposed construct measures.*

OCE is faced with a catch 22 situation, as far as funding an instrument development study is concerned. Commercial test publishing companies are not going to move swiftly into career education until there is convincing evidence of its long-term viability. Career education's continued acceptance depends, in part, upon well-implemented evaluations documenting its benefits; however, good evaluations remain a vain hope without quality measures of commonly agreed upon constructs. It has taken the Office of Child Development ten years to realize that the early childhood market is not attractive enough for publishers to expend the resources required to develop an appropriate early childhood battery. Early childhood evaluations, and policymaking based upon these evaluations, have suffered accordingly. It is unlikely that career education can afford to wait ten years before embarking on the kind of instrument development recommended here.

SPECIFYING THE PROCESS OF CAREER EDUCATION

In spite of frequent pessimistic notes about the lack of measurable process effects of many innovations, we submit that process delivery of career education is possible and was accomplished to a significant degree in the fifteen projects. We also are persuaded, however, that the process was poorly specified in most projects and, had process specification been more precise, implementation would have been better.

The conceptual framework developed for this evaluation operationalized the implementation/process of career education as seven constructs: knowledge and understanding, classroom or counseling activities, linkage activities, extra school activities, perceived benefits of career education, perceived burden of career education, and perceived role of school in implementing career education. This formulation did prove valuable for evaluating career education but, more importantly, it also demonstrated the importance of conceptualizing and precisely specifying desired career education changes in educator's knowledge and understanding, role/behavior, and value internalization. The potential benefits of a well-articulated schema for specifying the career education process to present and future career education efforts are substantial.

It is recommended that OCE prepare a generic framework for classifying alternative career education processes and field test the framework on a representative sample of career education efforts. One possible difficulty with such a developmental effort can be anticipated. Although we now know a great deal about what factors facilitate and impede implementation of a career education project, we do not know the extent to which these same factors are important for attempts to institutionalize career education-based curricula throughout a school district. It is our suspicion that most of the determinants of implementation examined in this study would apply to such a large-scale effort, but some other factors also would undoubtedly come into play. Since we did not study this institutionalization process in our evaluation, we are unable to comment on the nature of some of these additional factors. It is clear, however, that infusion and institutionalization are not well-understood concepts; project staff often confused them with aggregated counts of inserviced staff or numbers of buildings with career education coordinators. *We recommend that OCE examine further the meaning of infusion and institutionalization and delineate what it means for a project to move toward these goals.*

TECHNICAL ASSISTANCE TO PROJECTS

Many of the projects studied in this evaluation could have made excellent use of technical assistance in the early stages. The inexperienced project directors, in particular, had little opportunity to learn either the rudiments of project management or, more importantly, how to manipulate the determinants of implementation to facilitate quality implementation. We observed that some projects suffered short-term credibility problems within the school district because the project director was preoccupied with learning the mechanics of project management. Some well-informed technical assistance during these early stages could have improved implementation measureably. Among the topics in which technical assistance would prove especially beneficial are the following: (1) theory and application of adoption strategies, (2) day-to-day management of a training and development effort, (3)

planning and budgeting, (4) politics of special purpose projects, (5) conceptualizing the process of career education, and (6) general career education instructional techniques and methods for involving the total community in career education. *We recommend that OCE consider alternative mechanisms for providing technical assistance, with the full recognition that OCE currently does not have sufficient in-house personnel to supply the amounts of assistance required by many newly funded projects.*

The present study combined providing evaluation technical assistance to the projects with implementing fifteen full-blown local evaluations and one overall, or common, evaluation. Mixing technical assistance and onsite operational responsibilities resulted in neither service being effectively provided. Most projects, knowing that NTS was responsible for their local evaluations, did not develop a deep commitment to the total evaluation efforts. NTS, for its part, was so occupied with managing a large-scale, multi-site evaluation that, beyond initial design conferences, no intensive onsite technical assistance was provided. *If technical assistance is to be effective, operational responsibilities must reside uncompromisingly with the recipient of that assistance. If large-scale evaluation is to be successfully implemented, operational responsibilities (particularly instrument administration) must be the exclusive province of the contractor.*

PROJECT FUNDING MECHANISM

Projects operating under external funding are marginal enterprises appended to ongoing systems. The exernal funding usually leads to underdeveloped, hectically planned programs. Thus, the wide-scale implementation strategy leading to program institutionalization embraced by most career education projects is not well-served by short-term, external funding.

The project mechanism is at its best when the primary objective is demonstration, documentation, or awareness-building. When the goals shift to institutionalizing a concept, then the project mechanism is not appropriate, and completely different strategies are required.

Project directors often confused the notion of institutionalization with inservicing large numbers of staff. Such important long-term issues as locating ongoing responsibility for career education within the organization and gaining local support for career education were not associated with implementation in the minds of most project directors. We have observed several times that projects should be discouraged from playing the "numbers game" to enhance implementation of career education ideas and, instead, should concentrate intense inservice activity on a manageable number of staff. *In parallel, we recommend that OCE investigate alternative mechanisms for institutionalizing career education and make explicit the position that institutionalization of career education should not be a major objective of short-term, externally-funded projects.*

GRADE EIGHT RESULTS

The implementation/process of career education was weakest at the eighth grade level. Eighth grade teachers reported less knowledge and understanding and fewer classroom, linkage, and extra school activities than either fifth or eleventh grade teachers. We might be inclined to dismiss this finding, were it not for the fact that eighth grade students reported less exposure to career education activities than did their fifth and eleventh grade counterparts.

We remain somewhat at a loss to explain these findings. It is possible, certainly, that these results are merely an anomaly and would not be replicated in similiar studies; however, the agreement we found between teacher implementation and student exposure argues against such a simplistic interpretation. A second possibility is that our eighth grade sample is biased. We checked this possibility and determined that the eighth grade samples are not unlike the fifth and eleventh grade samples on important demographic variables. A third possibility is that career education is more difficult to implement at the junior high level. It is this last possibility that deserves serious attention from OCE. If taken seriously, this finding has numerous implications for career education projects. *We recommend that OCE articulate the career exploration stage more clearly, indicating the forms implementation could take and explicating expected outcomes.*

COUNSELOR ROLE

Counselors displayed the fewest target-nontarget differences among the practitioner groups. Examining the frequency with which target counselors engaged in career education activities confirmed our observation that counselors were considerably less active implementors than teachers or principals. Furthermore, adoption strategy was not as important a determinant of implementation among counselors as it appeared to be for teachers and principals.

One explanation for these findings is that some of the counselors' traditional responsibilities were usurped by project personnel, leaving the counselor to fill a largely undefined role. It was apparent, from our contacts with the projects, that teachers and principals received the bulk of the inservice, but it did not appear to us that counselors were as isolated as the questionnaire results suggest. *Taken as a whole, the counselor results argue persuasively for a more careful delineation of the counselor's role in a career education project.*

RESOURCE ANALYSIS STUDY

One constant source of amazement to NTS staff was the yield that project staffs got out of what amounted to a miniscule per student expenditure. The parallel results for teacher implementation and student exposure suggest that it is possible to realize changes in teacher knowledge, behaviors, and attitudes which translate into desired instructional experiences for students. The observed process effects are by no means overwhelming; however, it is quite likely that, given improved process measurements, the effects would have been larger. The observed effects are, in fact, likely to be lower-bound estimates of the impact of career education on students, teachers, counselors, and principals. It is our belief that career education projects similar to those evaluated in this study are accomplishing a significant amount of change with a low expenditure of resources. *It is recommended that OCE study the cost-benefit implications of career education, in situations in which benefits are measured initially as process effects on practitioners and students.*

METHODOLOGICAL DIFFICULTIES

We faced a number of difficulties in this study, difficulties stemming from the overall evaluation design we used and from the limits of the methodologies available to us. Some of these have been discussed extensively in this chapter (i. e., the quality of learner outcome instrumentation and the need to further specify career education processes). In this section, difficulties related to sampling design, unit of analysis, and level of aggregation are explored.

Our sampling design made a number of assumptions which constrained the evaluation design. These assumptions included presumed demographic similarities among target and nontarget respondents, low levels of "contamination" of the nontarget sample, and the willingness and ability of project staff and practitioners to carry out the test administration program. These assumptions proved to be invalid. Nontarget respondents differ markedly from their target peers, particularly on the educationally significant ethnicity variable. This required us to conduct analyses by ethnicity as well as by treatment group membership, projects, grade, etc . At the same time, differences in treatment between target and nontarget respondents were not as large as had been expected. Finally, biased attrition from pre- to posttest stemming from local decisions concerning test administration seriously hampered our ability to compare treatment groups, limited the generalizability of the results, and virtually precluded conducting valid overall analyses.

For these reasons, we reiterate the importance of the recommendation made earlier that, if large-scale evaluation is to be successfully implemented, operational responsibilities (particularly instrument administration) must be the exclusive province of the contractor.

Selecting the unit of analysis for a study such as this dictates numerous subsequent decisions. We selected the individual respondent as the most appropriate unit since that unit would provide more adequate data for the implementation/process and exposure/outcome analyses. This selection,

however, prevented us from conducting rigorous analyses based on other units. Most obviously, we could provide only rough estimates of the relationships between practitioner reported implementation and student reported exposure. Further, the selected unit allowed few opportunities for examining the role of the teacher or the school as a catalyst. *We recommend that studies be funded which explicitly are designed to evaluate process and outcome interrelationships not based on the individual as the unit of analysis.*

We feel that one of the major methodological strengths of this study has been the recognition of problems stemming from the use of multiple levels of aggregation. In this study we observed process/outcome relationships changing, often markedly, based on the level of aggregation used in the analyses. Classroom, building, project, ethnic group, and overall levels were all used where appropriate during this evaluation, and each level led to somewhat different inferences about career education's impacts. Little is known about how changing the level of aggregation can affect evaluation results. It is our impression, however, that insensitivity to the problem has led to many of the "no observed differences due to treatment" reports seen in too many major evaluations. *We recommend, therefore, that research on level of aggregation be funded in the near future, and, further, this research should include reanalyses of earlier large-scale evaluations.*

GLOSSARY

Canonical Redundancy Analysis (CRA) — The extension of multiple regression analysis, when the criterion is multivariate.

CIPP MODEL — a model developed by Stufflebeam and others which leads to an examination of the context, input, process, and product in an evaluation and which leads to a broadly focused evaluation.

Comparison Group Model — presumes that "treatment" is discrete, i.e., that career education, per se, is a distinct educational methodology.

Construct Definition — A procedure (or set of procedures) combining extrinsic definition and intrinsic definition to delimit, validate, and label a set of constructs.

Constructs — hypotheses concerning the nature of organizing influences of observed patterns.

Determinants — facilitating or impeding forces.

Determinants of Implementation — a set of thirteen generic and career education-specific contextual variables which shape and limit the quality of career education implementation. Examples of these determinants include saturation of the adopting organization, time for planning and orientation, organization capacity and history of innovation, adoption strategies, and incentives and disincentives for adoption.

"Early Adoption" — refers to institutions which have readily accepted career education concepts into their programs.

Exposure to Career Education — The extent to which the individual student participates in career education-specific activities and is presented with career education-specific concepts. Exposure is a function of the quality of implementation and opportunity to learn.

Extrinsic Definition — procedures, such as determining the face content, for labeling a set of items according to their common content.

Factor Analysis — a process for examining a matrix and expressing the correlations of each variable with every other variable.

Fidelity Perspective — refers to an attempt to assess the discrepancy between a project and non-project achievement level in implementation.

Implementation/Process Model — A conceptual framework which posits a set of determinants of implementation which effects the quality of implementation (a function of five process dimensions). The quality of implementation interacts with opportunity to learn to produce student exposure to career education. Exposure, coupled with pretest, determines posttest scores.

Intrinsic Definition — procedures, such as factor analysis, used to determine the common content of responses to sets of items. Used in this study to delimit constructs among the student learner outcome and practitioner value internalization items.

Invariance — structural stability of statistical solutions.

Joint Effects Model — combines the comparison and process models into one analysis to allow determination of the unique effects of treatment group and exposure as well as the common effect from both.

LEA — local education agency.

Learner Outcomes — Desired product objectives for students. Three sets of learner outcomes are considered in this study: (1) the nine OE learner outcomes current at the initiation of this study; (2) a list of nine learner outcomes developed by NTS adapted from the OCE list designed to be more readily operationalized; and (3) a set of thirteen learner outcome constructs developed by NTS through construct definition procedures from the pretest results of the outcome instrumentation.

"Mapping" — The process of breaking down evaluation questions into data elements and data sources.

"Matched" Student Samples — Samples of groups of students for whom parallel test data were available from both pre- and posttesting and from process testing.

MRC — Multiple regression/correlation analysis.

"Mutual Adaptation" Perspective — an assessment viewpoint that recognizes the evolving character of career education and the multiplicity of evaluative concepts that may be used to judge its achievements.

NM5001 to NM5008) - *The New Mexico Career Education Test Series.*

NTS — NTS Research Corporation.

OCE — Office of Career Education.

Ohio 6, 8, and 10 — *The Ohio Career Development Test Series.*

OMB — Office of Management and Budget.

Opportunity to Learn — A complex of factors including motivation, attendance, and attitude toward school which, in combination with the quality of implementation, determines student exposure to career education. This component of the Implementation/Process Model was not addressed directly in this evaluation.

PECE — *The Program of Exploration in Career Education Knowledge Test.*

Power Analysis — seeks to control the error rate of failing to detect a treatment effect by determining sample sizes needed to reach statistical significance.

Process Dimensions — A set of five resultants of the determinants of implementation which describe the quality of implementation. The five dimensions include: (1) changes in tangible resources, (2) changes in intangible resources, (3) changes in implementation knowledge and understanding, (4) changes in implementor role/behavior, and (5) changes in implementor value internalization.

Process Model — presumes that "treatment" is a continuum and that students vary in exposure to career education concepts and activities.

PSI — "Process Specification Index" — the ratio of the unique effect on the criterion of treatment to the unique effect of treatment plus the common effect due to process and treatment group.

Quality of Implementation — the level of implementation of an innovation, described by the five process dimensions.

Regression/Commonality Analysis — procedure which partitions the variance in a criterion that is predictable from two or more sets of predictor variables into the proportion that can be uniquely associated with each predictor set, and the proportion that is in common with two or more other predictor sets.

SEA — State Education Agency.

SOS — *The Self-Observation Scales.*

Type I Error — concluding that there is an effect when there is none.

Type II Error — concluding that there is no effect when there is one.

"Uniquenesses" — first order commonality coefficients.

USOE — United States Office of Education.

Value Internalization — implementor commitment and attitudes toward an innovation.

BIBLIOGRAPHY

Abt Associates. National Evaluation of Project Follow Through 1971-72. (Untitled). Cambridge, Mass.: Abt Associates, 1973. (Two volumes)

Arterbury, Elvis, John Collie, Dave Jones and Jayne Morrell. *The Efficacy of Career Education: Career Awareness.* Washington, D.C.: National Advisory Council for Career Education, 1976.

Berman, P., M. W. McLaughlin, et al. *Federal Programs Supporting Educational Changes.* Volumes I-V. Santa Monica, Calif.: The Rand Corporation, 1975.

Bloom, Benjamin. *Human Characteristics and School Learning.* New York: McGraw-Hill, 1976.

Bracht, Glenn, H., Kenneth D. Hopkins and Julian C. Stanley. *Perspectives in Educational and Psychological Measurement.* Englewood Cliffs, N. J.: Prentice-Hall, 1972.

Campbell, Donald T. and Stanley, Julian C. *Experimental and Quasi-Experimental Designs for Research.* Chicago: Rand McNally College Publishing Company, 1963.

Carroll, J. B. "A Model of School Learning." *Teachers College Record* 64 (1963): 723-733.

Cattell, R. B. and B. Tsuijioka. "The Importance of Factor Trueness and Validity Versus Homogeneity and Orthogonality, in Test Scales." *Educational and Psychological Measurement* 24 (1964): 3-30.

Cohen, Jacob and Patricia Cohen. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences.* Hillside, N.J.: Lawrence Erlbaum Associates, Publishers; New York: John Wiley & Sons, 1975.

Cohen, Jacob. *Statistical Power Analysis for the Behavioral Sciences.* New York: Academic Press, 1969.

Cooley, William W. and Paul R. Lohnes. *Evaluation Research in Education.* New York: Irvington Publishers, Inc., 1976.

Cox, D. R. *Planning of Experiments.* New York: John Wiley & Sons, 1958.

Cronbach, Lee J. *Research on Classroom and Schools: Formulation of Questions, Design, and Analysis.* Stanford, Ca.: Stanford Education Consortium, School of Education, Stanford University, 1976.

Emrick, J. A., P. H. Sorenson and M. S. Stearns. *Interim Evaluation of the National Follow Through Program 1969-71: A Technical Report.* Menlo Park, Calif.: Stanford Research Institute, 1973. Draft.

Evans, Richard I. *Resistance to Innovation in Higher Education.* San Francisco: Jossey-Bass, 1968.

Fullan, Michael and Alan Pomfret. "Research on Curriculum and Instruction Implementation." *Review of Educational Research* 47 (Winter 1977): 335-397.

Gallup, George H. "Fifth Annual Gallup Poll of Public Attitudes Toward Education." *Phi Delta Kappan* 56 (September 1973): 38-52.

Galtung, J. *Theory and Methods of Social Research.* New York: Columbia University Press, 1967.

Gilbert, J. P., Mosteller, F. and Tukey, J. W. "Steady Social Progress Requires Quantitative Evaluation to be Searching," In *The Evaluation of Social Programs.* Edited by C. C. Abt, Beverly Hills, CA.: Sage Publication, 1974.

Gorsuch, Richard L. *Factor Analysis.* Philadelphia: W. B. Saunders Company, 1974.

Grubb, W. Norton and Marvin Lazerson. "Rally 'Round the Workplace: Continuities and Fallacies in Career Education." *Harvard Educational Review* 45 (November 1975): 451-474.

Guertin, Witt and J. Bailey. *Introduction to Modern Factor Analysis.* Ann Arbor, Mich.: Edwards Brothers, Inc., 1970.

Herr, Edwin L. *The Emerging History of Career Education: A Summary View.* Washington, D.C.: National Advisory Council on Career Education, 1976.

Herr, Edwin L. *Review and Synthesis of Foundations for Career Education.* Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, 1972.

Hoyt, Kenneth B. and Nancy Pinson. *Career Education and the Elementary School Teacher.* Salt Lake City, Utah: Olympus Publishing Company, 1973.

Hoyt, Kenneth B., Rupert Evans, E. F. Mackin and G. Mangum. *Career Education: What It Is and How to Do It.* Salt Lake City, Utah: Olympus Publishing Company. 1972.

Hoyt, Kenneth B. *An Introduction to Career Education: A Policy Paper of the U.S. Office of Education.* Washington, D. C.: U.S. Department of Health, Education and Welfare, 1975.

Hoyt, Kenneth B. *A Primer for Career Education.* Washington, D. C.: United States Government Printing Office, 1977.

Hoyt, Kenneth B. "Testimony Prepared for Presentation Before the Subcommittee on Elementary, Secondary and Vocational Education, United States House of Representatives. February 9, 1977," Washington, D.C., 1977. (Mimeographed)

Hurley, J. R. and R. B. Cattell. "The Procrustes Program: Producing Direct Rotation to Test a Hypothesized Factor Structure." *Behavioral Science* 7 (1962): 258-262.

Jesser, David L. "The Concept of Career Education. *Career Education: an Education Priority for the Seventies.* Washington, D.C.: Council of Chief State School Officers, 1974.

Katzenmeyer, William G. and Stenner, A. Jackson. "Strategic Use of Random Subsample Replication and a Coeffecient of Factor Replicability". *Educational and Psychological Measurement* 35 (1975): 19-29.

Knapp, Thomas R. "The Unit of Analysis Problem in Applications of Simple Correlational Analysis to Education Research." *Journal of Educational Statistics* 2 (1977):171ff.

Louis, Karen Seashore and Sam D. Sieber. *The Dispersed Organization.* Unpublished. 1977.

Marland, S. P., Jr. *Career Education: A Proposal for Reform.* New York: McGraw-Hill, 1974.

Mayeske, G.W., T. Okada, W.M. Cohen, A. E. Beaton, Jr. and C. E. Wisler. *A Study of the Achievement of Our Nation's Students.* Washington, D. C.: United State Government Printing Office, 1973.

Newell, Terry. "Introduction to the Special Issue on Evaluation of Career Education." *Journal of Career Education* 2 (Winter 1976): 2-3.

Raymond, Bill and Carolyn Raymond. "Evaluation Concerns from the Local Practitioner's Point of View." *Journal of Career Education* 2 (Winter 1976): 4.23.

Robinson, W. S. "Ecological Correlations and the Behavior of Individuals." *American Sociological Review* 15 (1950): 351-357.

Rogers, Everett M. and F. Lloyd Shoemaker. *Communication of Innovations.* 2nd ed. New York: The Free Press, 1971.

Smith, M. S. *Some Short-Term Effects of Project Head Start: A Preliminary Report of the Second of Planned Variation — 1970-1971.* Cambridge, Mass.; Huron Institute, 1973. (Draft)

Stenner, A. Jackson. *An Overview of Information Based Evaluation A Design Procedure.* Durham: National Testing Service, Inc., 1973.

Stenner, A. Jackson, Bland, June, D., Hunter, Earl L., and Cooper, Mildred L. "The Standardized Growth Expectation: Implications for Educational Evaluation." Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada, 1978.

Stufflebeam, D. L., W. J. Foley, W. J. Gephart, E. G. Guba, R. L. Hammond, H. O. Merriman, and M. M. Provus. *Educational Evaluation and Decision Making.* Itasca, Ill.: F. E. Peacock Publishers, Inc., 1971.

Wiley, D. E. "Design and Analysis of Evaluation Studies." *The Evaluation of Instruction: Issues and Problems.* Edited by M. D. Wittrock and D. E. Wiley. New York: Holt, Rinehart, and Winston, 1970.