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ABSTRACT

This second volume in the change-agent series reports the interim results of an exploratory statistical analysis of a survey of a nationwide sample of 293 change-agent projects funded by four federal demonstration programs--Elementary Secondary Education Act (ESEA) Title III, Innovative Projects; ESEA Title VII, Bilingual Projects; Vocational Education Act, 1968 Amendments, Part D, Exemplary Programs; and the Right-To-Read Program. The study addresses three research questions: To what extent did differences among the federal change-agent programs explain variations in the implementation and continuation of innovative projects? Which characteristics of innovative projects significantly affected their implementation and continuation? Were differences in institutional settings related to variations in project implementation and continuation, controlling for other factors, and, if so, which institutional aspects had significant and important effects? (Author)

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U.S. DEPARTMENT OF HEALTH
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FEDERAL PROGRAMS SUPPORTING EDUCATIONAL CHANGE, VOL. II: FACTORS AFFECTING CHANGE AGENT PROJECTS

PREPARED FOR THE U.S. OFFICE OF EDUCATION,
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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ERIC

PREFACE

Rand is conducting, under the sponsorship of the U.S. Office of Education, a several-year study of federally funded programs designed to introduce and spread innovative practices in public schools. These change agent programs normally offer temporary federal funding to school districts as "seed money." If an innovation is successful, it is assumed that the district will continue and disseminate part or all of the project using other sources of funds. The Rand study examines four such federal change agent programs—Elementary and Secondary Education Act Title III, Innovative Projects; Elementary and Secondary Education Act Title VII, Bilingual Projects; Vocational Education Act, 1968 Amendments, Part D, Exemplary Programs; and the Right-To-Read Program. The study identifies what tends to promote various kinds of changes in the schools and what doesn't; in particular, the Rand study will identify for federal, state, and local policymakers the nature, permanence, and extent of dissemination of innovations that are associated with the various federal programs and with various federal, state, and local practices.

A series of five reports describes the results of the first year of the Rand study (July 1973 to July 1974). Volume I (R-1589/1-HEW, *A Model of Educational Change)* provides a theoretical perspective for the Rand study by analyzing the current state of knowledge of planned change in education and by proposing a conceptual model of factors affecting change processes within school districts.[1]

This report, Vol. II of the series, contains the analysis of survey data collected from a national sample of 293 projects in 18 states during November and December 1973.

Volume III (R-1589/3-HEW, *The Process of Change)* summarizes the results of 29 case studies of change agent projects conducted by Rand staff members and consultants in 25 school districts during April and May 1974. These case studies were chosen from the original sample of 293 projects initially surveyed. Volume III also describes the role of state education agencies in choosing and disseminating the change agent projects.

Four technical appendixes to Vol. III describe in detail the federal program management approach, state education agency participation, and case studies for each of the programs in the study: Title III, App. A; Reading, App. B; Bilingual Education, App. C; and Career Education, App. D. Appendix A should be of particular interest to researchers or practitioners concerned with the introduction of new approaches to classroom instruction.

Volume IV (R-1589/4-HEW, *The Findings in Review)* summarizes the findings of Vols. I, II, and III, and also synthesizes extensive data collected by Rand on federal-level program strategy and management for each of the change agent programs. Volume IV also includes a discussion of alternative federal strategies for promoting innovation.

[1] Because of Rand's interest in advancing knowledge of organizational behavior in educational institutions, the research underlying this report was supported in part by an allocation of Rand corporate research funds.

Volume V (R-1589/5-HEW, *Executive Summary*) presents a distillation of the study's methods and results for a general audience.

Subsequent research will collect additional data on Titles III and VII of ESEA, with particular focus on projects whose federal funding has expired.

ERIC

SUMMARY

This second volume in the change agent series reports the interim results of an exploratory statistical analysis of a survey of a nationwide sample of 293 change agent projects funded by the following federal demonstration programs:

Title III, ESEA (State and Federal)
Vocational Education, 1968 Amendments, Part D, Exemplary Programs (Federal and State)
Title VII, ESEA, Bilingual Education
Right-To-Read

The study addresses three research questions:

- To what extent did differences among the federal change agent programs explain variations in the implementation and continuation of innovative projects?
- Which characteristics of innovative projects significantly affected their implementation and continuation?
- Were differences in institutional settings related to variations in project implementation and continuation, controlling for other factors, and, if so, which institutional aspects had significant and important effects?

DATA ANALYSIS PLAN

An explanatory model or series of assumptions and hypotheses about school district decisionmaking forms the foundation for the data analysis. The model implies that two levels of analysis should be pursued—the school/classroom level and the school district level. At the classroom level, implementation is the primary concern; at the school district, expected continuation is appropriate for analysis.

For each of these levels, the data analysis involved two steps. First, we selected and measured the most important dependent and independent variables implied by the central research questions. In particular, the independent variables measure important project characteristics, aspects of the institutional setting, and federal program inputs; the dependent variables measure implementation outcomes and expected continuation.

Second, the effects of an independent variable on the outcome measures were estimated using multiple regression techniques. This statistical approach allowed us to test the significance of the variables as well as suggesting the relative importance of the independent variables in explaining variations in project outcomes.

Dependent Variables

We measured, using teacher responses, four types of implementation outcomes at the classroom level—the perceived success of the project (percentage of goals achieved), the fidelity of implementation (the extent to which the project was imple-

mented as laid out), the extent of teacher change, and the difficulty of implementation. At the district level, superintendents' answers were used to measure expected continuation of the project, in whole or in part, after the end of federal funding.

Independent Variables

At the classroom level, we considered implementation outcomes to depend on project characteristics, aspects of the institutional setting, and the federal change agent program sponsoring the project. Project characteristics were divided into three components—project resources, educational method or treatment, and implementation strategies—and for each component operational variables were measured. Similarly, the institutional setting was categorized into organizational climate, school/classroom characteristics, and attributes of the principal actors.

At the district level, we conceived of the decision to continue an innovation to be a function of both the input variables—the educational treatment or methods and the different federal change agent management strategies—and factors reflecting political-economic and organizational concerns—the project's past success, the centrality or importance of the educational needs served by the project, the resources required by the project, and the organizational-political forces inhibiting or promoting the innovation.

FEDERAL PROGRAM COMPARISONS

The program guidelines and management strategies of the various federal change agent programs were briefly reviewed, and their differences from each other, which are marked, were noted. We examined the extent to which the federal programs had affected project design choices during the initiation phase of an innovation, difficulties arising during implementation, implementation outcomes at the classroom level, and continuation.

Program Effects on Project Design

We found that the guidelines, program characteristics, funding, and priorities of federal programs did affect project design, but only in a partial way. Whether local districts were seeking opportunities for federal money or were attempting to solve their problems by initiating innovative projects, some educational methods were more likely to be employed than others because some federal programs—either in their administrative guidelines or in their focus—fostered these methods. Thus, in the absence of the Right-To-Read program, locally initiated reading projects might be less likely to adopt behavioral modification techniques and concentrated traditional staffing. For Vocational Education, the existence of a federally funded program—and the funding opportunities it afforded—induced substantial enrichment activities that may by pursued only as long as the federal money exists. On the other hand, federal funding opportunities appeared to have less effect on such locally conceived projects as innovations in classroom organization.

Thus, federal policy, using as its instruments guidelines and categorical priorities tied to different types of funding, may have limited leverage on the design choices made by local school districts. In particular, the federal programs can influ-

ence how intensively some educational treatments are tried. However, federal policy instruments of the type employed by the change agent programs may have little influence on how frequently local districts initiate some types of educational methods, particularly classroom organization change, in order to meet their own needs and priorities.

Program Effects on Difficulty of Implementation

The problems that most seriously affected implementation stemmed from two sources. First, innovation is intrinsically a disruptive process. Problems attributable to inexperience of project participants in planning for change and adapting to its demands were bound to arise. Second, projects encountered difficulties that reflected the selection mechanisms, administrative guidelines, and substantive priorities of the federal programs. In particular:

1. State Title III projects experienced difficulties because of insufficiently defined goals and inadequate prior planning.
2. Federal Title III projects had "top-down" problems of complicated or unclear techniques and required more additional work than teachers could handle.
3. Title VII Bilingual projects lacked bilingual materials and staff.
4. Vocational Education projects experienced difficulties gaining support within the district and within the community.
5. Right-To-Read projects had difficulties of implementation that arose from the teachers' unfamiliarity with prescribed materials and methods, and from adaptation requirements that were not anticipated by the program management strategy. When parental opposition existed, Right-To-Read projects experienced considerable difficulty.

Thus, the patterns of difficulty associated with the implementation of different federal programs demonstrate that the management strategies have subtle influences beyond the initiation stage. Insofar as federal programs affect initial project design choices, they also may create specific barriers that innovations must overcome.

Program Effects on Implementation Outcomes

The federal change agent programs did *not* differ significantly from each other on the average implementation outcomes of projects that they fund. That is, the differences between programs explained little of the variation in project outcomes. Nor did variation in educational treatment for projects within the federal programs account for much more of the outcome variability. When other factors involving the institutional setting, implementation strategies, and project resources were statistically held constant, several marginally significant effects of program differences emerged:

1. Vocational Education projects had the highest average reported goals achieved but were the least likely to induce teacher change and were the easiest to implement.
2. Right-To-Read projects and Bilingual, Title VII projects were less likely to

produce teacher change than Title III projects. Bilingual projects were relatively difficult to implement.

Program Effects on Continuation

The findings for expected continuation parallel those for implementation outcomes. The differences between federal change agent programs explained little of the variation in the planned continuation of projects. This general conclusion held true after the introduction of variations in educational treatments within federal programs as well as after controls for other independent variables.

However, some federal program differences were marginally significant:

1. Vocational Education projects were the least likely to be continued even though superintendents viewed them as accomplishing a high percentage of their goals. Vocational Education projects seemed to achieve a high percentage of their goals because they were not attempting major innovations but simply added career enrichment materials to the curriculum. Data from the superintendents suggest that these add-on projects were the least likely to be continued by the district when federal funds terminated.
2. Title VII, Bilingual projects were viewed as the most difficult to implement and as having achieved the lowest percentage of their goals. Nonetheless, their expected continuation was significantly higher than the average of projects funded by the other programs.
3. Superintendents reported Right-To-Read projects as relatively the least difficult to implement and somewhat more likely to be continued than Vocational Education projects.
4. Title III projects with high levels of classroom organization changes were more likely to be continued than other Title III projects, even though they were more difficult to implement and not perceived as more successful.
5. The expected continuation and perceived success of Bilingual projects depended on the mix of methods employed. High levels of behavioral modification instruments and of classroom organization changes were seen as difficult in this program, as relatively unsuccessful, and as less likely to be continued. In contrast, intensive use of traditional staffing and enrichment tended to contribute to perceived success and to expected continuation.

FACTORS AFFECTING IMPLEMENTATION OUTCOMES

The following results were obtained from a multiple regression analysis of the factors affecting project implementation outcomes at the classroom level:

1. The effective implementation of innovative projects depended primarily on a supportive institutional setting and on an implementation strategy that fostered the mutual adaptation of the staff to the project's demands and of the project's design to the reality of its setting.
2. Projects funded by the same federal program showed considerable variation in their implementation strategies and institutional settings. These within-program variations affected project implementation more significantly than did the differences between federal programs.

3. Projects using similar educational methods or technologies varied considerably in their implementation strategies and institutional settings. These variations affected project implementation more significantly than did the differences between the educational methods or technologies themselves.
4. Superintendents, who tend to be organizationally remote, provided a generalized support that may have made schools receptive to innovations; such receptivity may be essential to Title III projects. Elementary school principals appear to have been "gatekeepers" of change, either facilitating or inhibiting implementation.
5. The following elements of implementation strategies promoted teacher change:

   a. Staff training.
   b. Frequent and regular meetings.
   c. Staff meetings held in conjunction with staff training.
   d. The quality and amount of change required by the project.

   The following elements of implementation strategies inhibited perceived success or teacher change:

   a. The lack of the above elements.
   b. Teachers not participating in day-to-day implementation decisions.
   c. For Title III projects, the lack of local material development.

   The following elements of implementation strategies were not significantly related to implementation outcomes:

   a. The *quantity* of planning.
   b. Participants' freedom to alter the basic project design on difficult projects.
   c. Part or full pay for training.

6. Elementary school projects were more effectively implemented than junior or senior high school projects and were more likely to produce teacher change.
7. Within the range of variation of differential funding considered here, a project's funding level did not have significant effects on teacher change or perceived success. Projects that serve most of, or the entire, student body of elementary schools were unlikely to produce teacher change. The more concentrated were the resources of Title III projects, the more likely was teacher change to occur.

FACTORS AFFECTING EXPECTED CONTINUATION

The results of a multiple regression analysis of the factors affecting continuation indicated that the district decision to continue a project was based on the superintendent's weighing of four general concerns: the project's past success, the centrality or importance of the educational need served by the project, the resources required by the project, and the organizational-political forces inhibiting or promoting the innovation.

In particular, the following detailed hypotheses proved statistically significant:

1. The higher the perceived success, the more likely the project was to be continued.
2. Projects that were central to the educational goals of the district were more likely to be continued.
3. The more expensive the project, the less likely was its continuation.
4. The larger the district, the more likely was project continuation.
5. The higher the percentage of blacks in the district population, the less likely was continuation. (This finding was not significant for our sample of Title III projects.)
6. The higher the percentage of Spanish-speaking population in the district, the more likely was continuation. This positive effect of percentage of Spanish on continuation reflected the likely continuation of Bilingual projects whether funded by Title VII or Title III.
7. General political-social difficulties failed to be significant (perhaps because of poor measurement) but difficulty from student test scores—a sensitive indicator of community pressure—was positively related to continuation.
8. Districts that initiated projects with the prior intention of continuing were likely to continue their projects, all other things being equal (e.g., resources and success). Such prior intention may be indicative of a problem-solving approach on the part of the district.
9. Projects supported by principals were likely to be continued.
10. The longer the superintendent's tenure in the district, the more likely projects were to be continued.

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Large-scale data analysis requires the help of many people. This study was fortunate in having the unselfish assistance and expertise of the following members of the Rand staff: Gail Bass and Gail Zellman who pieced the survey together; Gerald Sumner who designed, executed, and wrote the appendix on the sampling procedure; Sinclair Coleman who wrote the appendix on the sample's representativeness; Pierce Barker, Francois Christen, Peter deLeon, Bryant Mori, Roger Rasmussen, and Mary K. Vickers who conducted preliminary analyses that influenced the final product; Carol Frost who efficiently managed the highly complex data base; and Tora Kay Bikson and Stephen Carroll who reviewed the first draft and offered penetrating comments that greatly improved this report.

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We are particularly grateful to the two hundred superintendents and their numerous staff members who generously gave their time and extended their cooperation. We hope this report repays part of our debt to them and to the educational goals they serve.

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I. INTRODUCTION

This volume describes and identifies major factors affecting the outcomes of innovations attempted by school districts using federal funds. The analysis, which quantitatively examines data collected by a nationwide survey of 293 change agent projects, is one component of a Rand study sponsored by the U.S. Office of Education.

BACKGROUND OF THE CHANGE AGENT STUDY

During the 1950s and 1960s, two important initiatives, the National Defense Education Act of 1958 and the Elementary and Secondary Education Act of 1965, defined a new federal role in local education—large-scale support of federally mandated programs aimed at specified goals: subsidizing special curriculum developments, educating the disadvantaged, training young people for careers, broadening access to higher education, and encouraging innovation in the public schools, which is the subject of this study. Approximately 10 percent of the federal aid to public schools, currently exceeding $3.5 billion annually, is aimed at promoting educational innovations. These funds are spent, primarily by the U.S. Office of Education, through a number of avenues and with diverse strategies, including the so-called change agent programs analyzed in this study:[1] Elementary and Secondary Education Act Title III, Innovative Projects ($150 million annually); Elementary and Secondary Education Act Title VII, Bilingual Projects ($45 million); Vocational Education Act, 1968 Amendments, Part D, Exemplary Programs ($16 million); and Right-To-Read ($12 million).

Each change agent program has a distinct focus and management strategy. The largest of the programs considered here, Title III, is designed to improve the quality of public education both by introducing model practices that are new to American education and by spreading existing successful practices to schools that are not aware of them. The competition for Title III grants of three-year duration is open to almost any kind of project that local schools wish to propose. In 1973-1974, the first year of our study, 15 percent of Title III money was granted directly to local education agencies (LEAs) by the Office of Education, and the remaining was allocated to state education agencies (SEAs), who in turn made grants to LEAs. Other federal change agent programs are more narrowly targeted and have more specific funding criteria. *Right-To-Read* represents an attempt by the Office of Education to create a national educational priority for reading, particularly for disadvantaged students. The Right-To-Read demonstration projects, the program component addressed in this study, included a prescribed planning and management strategy in an effort to facilitate effective implementation. *Vocational Education, Part D,* was designed to create exemplary programs to enhance career awareness and readiness. Congress, believing that many SEAs were not able to promote significant innova-

[1] Other federal programs, not studied here, also aim at encouraging innovations, for example, certain programs for handicapped students, experimental schools, educational voucher demonstrations, Follow Through, elements of the Emergency School Assistance Act.

tions, gave USOE the authority to fund local projects directly through the Part D program. Half of the Part D appropriations are allotted to the SEAs, the other half to USOE. Title VII (*Bilingual Education*) originally sought to provide model projects for the special needs of children whose English-speaking ability was limited. The program has subsequently also developed into an effort to maintain and encourage "cultural pluralism" in American public education, with strong political support from many people of Spanish-language origin.

Despite these differences in focus and management strategy, the change agent programs have a common purpose. the stimulation and spread of educational innovations. They also have a common policy instrument. the provision of temporary funds (3 to 5 years), which, although small relative to the budget of a school district (ranging from grants of $10,000 or less to several hundred thousand dollars per year), are intended to fund new educational services, not to support existing practice. These programs also rest on common assumptions. They all assume more or less explicitly that American education should be doing better in respect to a variety of goals ranging from specific objectives, such as student reading achievement, to the broad concerns of student personality and social development. Moreover, the change agent programs assume that educational practices, procedures, and methods can be improved within the existing educational structure. Federal policy presumes that providing funds to a relatively small number of districts to try innovations will demonstrate the value of some of these innovations, which will then be adopted selectively by other districts.

Numerous studies have evaluated, described, or analyzed innovative projects and federal programs designed to stimulate educational change.[2] These studies are mixed both in their research quality and in their findings. Anecdotal and single-case study evaluations usually claim considerable "success" for projects supported by federal funds. Yet quantitative evidence and careful fieldwork suggest something quite different:

- Variations in student outcomes have not been consistently related to variations in treatments, once nonschool factors are held constant.
- "Successful" projects have lacked stability and have not been easy to "export" from school to school or district to district.

The alleged ineffectiveness and instability of innovative projects might be dismissed either as premature—it may indeed be too soon to judge innovations that take many years to develop—or as subject to measuring the wrong student outcomes in the wrong ways—profound measurement problems surely plague assessments in this field. However, it is more prudent to assume that present policies and the assumptions underlying them need to be reexamined and, where appropriate, revised and redirected. With these objectives in mind, USOE asked Rand to undertake a several-year study to examine innovative projects funded by the various change agent programs,[3] and, in particular, to treat the following questions:

1. How should the degree, quality, and extent of innovation and dissemination of change in the public schools be assessed?

[2] Volume I of this study reviews the literature.

[3] In this report, we refer to *programs* when describing the federal change agent initiatives, for example, Right-To-Read. We refer to *projects* when describing the particular innovation selected by a school district.

2. How do school districts select, introduce, implement, incorporate, and spread different kinds of innovations?
3. How do differences in target groups, resource use, educational treatment, project strategies, and other characteristics affect the initiation, implementation, persistence, and dissemination of innovations?
4. How do differences in institutional and political contexts affect the initiation, implementation, persistence, and dissemination of innovations?
5. How, if at all, do differences in the relations among the characteristics of innovations and the institutional-political setting affect the initiation, implementation, persistence, and dissemination of innovations?
6. Do the different federal change agent program strategies have different effects on the initiation, implementation, and outcomes of local projects?
7. What should federal policies be toward educational innovation in light of the political, financial, and organizational constraints that the federal government faces in its dealings with the public schools?

CENTRAL PREMISES AND THEORETICAL FRAMEWORK

To study the questions listed above, we developed a theoretical framework—a set of hypotheses and assumptions—that has guided the research. The framework rests on two assumptions: first, that there are distinctively different stages of the innovative process and, second, that the institutional setting profoundly influences the nature and impacts of an educational innovation, as well as its likely permanence and dissemination.[4]

Stages of Innovation

We view the change or innovative process as consisting of three stages: initiation, implementation, and incorporation. The initiation stage in the life of an innovative project occurs when local school officials conceive and formulate plans, seek resources, and make decisions about which projects they should select and support. We hypothesize that the support and commitments made in the initiation period affect what happens when project implementation begins.

In the implementation stage, the project confronts the reality of its institutional setting, and project plans must be translated into practice. Many innovative projects fail or are disappointing because they are not implemented according to plan. But the issue of implementation is often more subtle and complicated than mere fidelity to predesigned means for attaining specified educational goals. We hypothesize that as a consequence of the institutional characteristics of local school systems the implementation of those educational innovations that result in significant change intrinsically involves a process of mutual adaptation.[5] Thus, the initial design of an

[4] The theoretical framework is justified and elaborated in Vol. I.

[5] Volume I defines an innovation as a plan with a statement of goals and means designed to change standard behavior, practices, or procedures. Many educational innovations tend to have abstract goals, to lack specificity and clarity of means, and to have considerable uncertainty as to the relationship between means and ends. Such uncertainty makes it desirable for the innovation to become developed, revised, or, in short, adapted to the realities of its institutional setting. Accordingly, we define implementation as the change process that occurs when an innovative project impinges upon an organization

innovative project becomes adapted to the particular organizational setting of the school, classroom, or other institutional hosts; at the same time, the organization and its members adapt to the demands of the project. Therefore, many educational innovations may fail to have desirable effects because the project is not adapted to the institutional setting or vice versa.

The term *incorporation* is used to denote the final stage in innovation—when an innovative practice may lose its "special project" status and become part of the routinized behavior of the LEA. Incorporation represents the most serious commitment on the part of the district, as federal "seed money" is withdrawn and decisions must be made about not only *whether* but also *what components* of and on *what scale* a project should be continued within the district. We believe this decision may involve more than the success or failure of the project during its trial period. Economic, political, and organizational pressures and constraints may play major roles in determining the innovation's future.

Not only do these three stages involve somewhat different activities and decisions, but the significance of actors and issues also changes from one stage to another. Thus we believe that a key to designing and assessing federal, state, and local policy lies in understanding how the stages of innovation work in different locations, for different innovations, and for the various change agent programs.

Factors Affecting "Outcomes"

The change process itself is important, but systematic analysis also should identify major factors affecting the "outcomes" or effects of innovations. The first research problem is to select or devise suitable measures of outcomes. Since federal programs and local and state policies aim at improving the education of children, the most direct and natural measure of the effectiveness of an innovative project would be changes in behavior, attitudes, or test scores of students. However, for the purposes of the study, it was both premature and inappropriate to measure student outcomes. The innovations were generally new to the district and consequently require an extended period before their true effects can be assessed. Moreover, these projects differed considerably in their focus, goals, methods, and assessment procedures. Therefore, there was no practical way to compare, for example, outcomes of bilingual reading projects with projects dealing with remedial mathematics.[6] More important, innovations may not be implemented according to plan. The *first* issue before assessing longer range student impacts is thus to measure the effectiveness of the project's implementation.

We studied three types of effectiveness measures or "outcomes":

1. *Implementation:* (a) the relative extent to which project goals are achieved, (b) the type and extent of change in teacher behavior, and (c) the extent to which the project as proposed compares with the project as implemented.
2. *Continuation:* the extent to which the project is continued by the LEA after federal funds are withdrawn.
3. *Dissemination:* the extent to which the project is diffused to other schools in the district or to other districts.

[6] Volume I of this study reviews the literature on the measurement of student outcomes.

The change agent study consists of two phases. In phase one, which is covered in the first five volumes of this series, we deal with projects that have not yet completed their period of federal funding; consequently, the analyses here are limited to implementation outcomes and expected continuation (plus some preliminary information about dissemination).[7]

We believe that three interrelated sets of factors affect these outcomes:

- Characteristics of projects
- Federal and state policies
- Institutional settings

Most project evaluations investigate only the relationship between outcomes and the *educational technology* or *method* that is characteristic of the project. Yet two projects with the same educational method can be implemented in quite different ways, leading to different outcomes. This means that projects also can be characterized by their *implementation strategies*, that is, the design decisions about what should be done to implement the project, how it should be done, and by whom. We hypothesize that implementation strategies will have major effects on project outcomes.

Because project evaluations usually are case studies of LEA projects funded by the same federal change agent program, they tend to treat federal policy unsystematically. This study examines four federal programs, each with a different aim and different management strategies. This provides an opportunity to compare innovative projects funded by different programs and an opportunity to assess the extent to which project outcomes are explained by differences between the federal programs.

The most serious omission of most evaluation literature is its failure to take into account the institutional setting in which innovations operate. Such major elements of the institutional setting as demographic, economic, and political conditions of the district, community influences, student characteristics, and organizational characteristics are usually neglected. Although the analysis will examine all relevant institutional elements wherever possible, the research design and analysis have been predicated on our belief that organizational characteristics of LEAs have major impacts on innovations and that federal, state, and local policies largely ignore these characteristics.

OVERALL RESEARCH PLAN

The theoretical framework thus suggests that two areas need to be studied if the broad questions implied by federal change agent policy are to be examined systematically: first, the process of change and, second, the factors (project characteristics, institutional setting, and federal and state policies) affecting the innovative project Accordingly, the first phase of Rand's research efforts consisted of two principal data collection activities (App. A to Vol. IV provides a more detailed description of the overall study design):

[7] The Federal Vocational Education projects (9) and half of the State Vocational Education projects (14) were the only projects in the sample that had completed their federal funding before the beginning of our research.

1. A nationwide survey of 293 change agent projects in the last or next to last year of federal funding was administered in November and December 1973 and January 1974 by the National Opinion Research Center of the University of Chicago, under a subcontract with Rand. The survey, which included personal interviews with project participants at all levels of the LEA, was designed to elicit information about factors affecting a sample of innovative projects funded by the various federal change agent programs.
2. After the survey was completed, during April and May 1974, the Rand staff conducted 29 field studies of projects from the survey sample. The field studies, consisting of observations and interviews in project schools, were designed to explore and compare the process of change in a number of institutional settings for innovative projects with different characteristics, funded by the various change agent programs.[8]

Because data collection had to be completed within the 1973-74 school year, the survey and field studies could not be fully integrated (in the sense that the results of the survey would establish hypotheses and important research avenues that the fieldwork would then explore in depth). However, the two efforts were designed to complement and reinforce each other. The survey's quantitative information about structural factors affecting outcomes has provided a general perspective for the fieldwork's qualitative, small-sample information about process; the fieldwork's in-depth analysis has added realistic detail that has been helpful in interpreting the survey data. In short, the two efforts tend to validate each other.

The second phase of the change agent study, drawing on the preliminary findings and the data of the initial year, will focus on describing what happens when the federal funding for the innovative project is terminated. Accordingly, the Rand staff will revisit projects in the first-year sample that were in their last year of federal funding. Thus, we will be able to examine hypotheses about continuation and dissemination that are raised by the first year's findings.

SURVEY AND DATA ANALYSIS DESIGN

This report will identify and describe factors affecting innovative projects by means of multivariate statistical analyses of the survey data. We collected quantitative evidence and used it to examine three broad, interrelated inquiries:

- To what extent did differences between the federal change agent programs explain variations in the implementation and continuation of innovative projects?
- Which characteristics of innovative projects significantly affected their implementation and continuation?
- Were differences in institutional settings related to variations in project implementation and continuation, controlling for other factors, and, if so, which institutional aspects had significant and important effects?

[8] To place these major empirical efforts within the context of federal and state policy, the following additional steps were taken by the Rand staff: telephone interviews with 54 SEA officials in 18 states, visits to nine SEAs to interview various state officials, and a series of personal discussions and interviews with USOE, HEW, and Congressional staff concerning federal policy issues in change agent programs.

Although the answers to these inquiries must necessarily be incomplete, they, along with the companion fieldwork results, provide systematic knowledge to help us address the major policy questions motivating the change agent study.

We will outline below the survey and sampling procedures we designed to collect the data. The next section discusses operational measurements for various hypotheses implied by these questions.

Survey and Sample Specifications

Our basic research approach is deceptively simple. Using a personal interview survey of project participants in local school districts (backed by selective, intensive fieldwork), we collected data on the dependent variables—the implementation outcomes and expected continuation of individual innovative projects—and descriptive and attitudinal data on the factors or independent variables—project characteristics, institutional setting, and federal and state policy. The statistical analysis of this information consisted of determining the effect of any independent variable on implementation outcomes or continuation taking into account the other independent variables.

This "simple" approach masks major obstacles that required complex research design and analyses. First, since systematic knowledge of the factors affecting innovations and educational change is quite primitive, the survey design was comprehensive and exploratory rather than sharply focused.

Second, the projects funded by the federal programs were extraordinarily diverse, ranging, for example, from complex performance contracting techniques to field trips to local cultural attractions, from open education to computer-assisted instruction, from remedial reading in elementary schools to integrated curriculum in high schools. Describing project characteristics in comparable and analytical ways thus became a major design and analysis consideration. Accordingly, the sampling procedure was designed to cover a wide range of innovative projects, and the survey was designed so that various project participants were asked many questions about the nature of their project. Statistical methods were then used to describe the range of project characteristics.[9]

The complexity of the organization of the school district also had to be integrated into the research design and analysis. Because we assume that decisions and processes influencing innovation are not confined to one central location, data were collected for different levels in the school organization. For example, we hypothesized that the superintendent and school district officials play major roles in the initiation and continuation stages of innovations, but often do not directly affect the implementation stage. Accordingly, the personal interviews with teachers, principals, and project directors focused on questions of implementation, whereas those with superintendents and federal program managers dealt with initiation.

[9] Projects whose intent was not related to innovations affecting classroom activities were not included in this study—for example, projects that relied solely on home visits or only involved curriculum development The third section of App A details the excluded categories. Although our fundamental interest is understanding innovations and what determines their outcomes, it is difficult even after considerable data have been gathered to say whether a given project is "truly innovative." Attempting to choose a sample of innovations only on an a priori basis would have been a costly and uncertain undertaking Therefore, we limited the analysis to projects that were funded by the federal demonstration programs The sample consequently ranges from highly innovative projects to those that barely meet the loosest definition of an innovation—a project that is new relative to a classroom, school, or district.

On the basis of these considerations, a series of personal interview schedules was designed by Rand and administered by the National Opinion Research Center to a nationwide sample of 293 projects in 18 states funded by the federal demonstration programs The basic design involved the selection of 224 projects in 196 school districts in which the superintendent, federal program manager, principals from two project schools, and two teachers from each of the two schools were interviewed using a primarily close-ended questionnaire. Respondents were asked about:

- The characteristics of their project (e.g., its resource level and target group size, substantive focus, educational techniques or methods, and the steps taken to implement the project).
- The innovative process as it worked for their project (e.g., origin of the project and difficulties during implementation).
- The institutional setting (e.g., the organizational climate in the schools; the support from principal actors; and the social, political, and economic characteristics of the district, the school, and the students).
- The respondent's experiences with, and attitudes toward, federal and state programs and personnel, perceptions of project outcomes, and personal background characteristics.

The first section of App. A describes the survey instruments in detail. In addition to the 224 projects, project directors from other projects in the preselected districts were interviewed whenever the opportunity arose (increasing the sample of projects by 69).

The basic sampling procedure involved two stages: a sample of 18 states followed by the selection of federally funded projects within states. The purpose of the state sampling was to obtain a sample that was broadly representative of region, level of educational funding, and intensity of educational management at the state level. Subject to these criteria, the selection of states was weighted according to state population. Projects within the 18 states were selected to cover the range of diverse project characteristics and of institutional settings. That is, using information from USOE files on the nature of projects and from the census on the demographic characteristics of the school districts, samples were chosen that excluded irrelevant projects and that provided sufficient numbers of projects for critical school district attributes (e.g., size, urbanness, race and ethnicity, and socioeconomic status).

Table 1 lists the number of interviews actually obtained for each of the principal types of respondents by each federal program. Table 2 shows the distribution of sample projects for each state by federal programs. The net result of the sampling procedure is not a probabilistically representative sample but a sample that covers a broad range of projects in a wide variety of local and state settings. As the last part of this section details, the purposive nature of this sample permits the drawing of statistical inferences of the type necessary to investigate the study's central research questions. The second section of App. A details the sampling procedure and the nature of the sample obtained; the third section of App. A compares the sample obtained with the national school district population.

Data Analysis Plan

An explanatory model or series of assumptions and hypotheses about school

Table 1

NUMBER OF PERSONAL INTERVIEWS BY PROGRAMS

Respondent	Title III		Right-To-Read	Title VII	Vocational Education		Total
	State	Federal			State	Federal	
Projects/project directors	176	18	32	41	16	10	293
Superintendents	115	11	22	24	12	10	194
Federal program managers	113	11	22	24	12	9	191
Principals	213	32	36	44	23	20	368
Teachers	397	58	75	83	41	35	689

Table 2

NUMBER OF SAMPLE PROJECTS BY STATE

State	Title III		Right-To-Read	Title VII	Vocational Education		Total
	State	Federal			State	Federal	
Arkansas	4				1	1	6
California	32	4	3	9	1		49
Colorado	5			3	1		9
Florida	6	2	1	2		1	12
Georgia	4		2		1	1	8
Illinois	27	2	2	2			33
Kentucky	7				2	1	10
Massachusetts	6	1	2	4			13
Michigan	6			2			8
Missouri	6	2	2		1	1	12
New Jersey	21	1	2	2	2	1	29
New York	19	2	8	9	1		39
North Carolina	5				1	1	7
Ohio	6		2		3	1	12
Pennsylvania	4	1				1	6
Texas	4	1	6	7			18
Washington	7	2			2	1	12
Wisconsin	7		2	1			10
Total	176	18	32	41	16	10	293

district decisionmaking forms the foundation for the data analysis. The model, which will be discussed in Sec. II, implies that two levels of analysis should be pursued—the school/classroom level and the school district level. At the school/classroom level, implementation is the primary concern; at the school district, expected continuation is appropriate for analysis.

For each of these levels, the data analysis involved two steps. First, independent and dependent variables, as appropriate for the central research questions, were selected and measured. In particular, the independent variables measure important project characteristics, aspects of the institutional setting, and federal program inputs; the dependent variables measure implementation outcomes and expected continuation.

Second, we used multiple regression techniques to estimate the effects of an independent variable on the outcome measures. This statistical approach allowed us to test the significance of the variables as well as suggesting the relative importance of the independent variables in explaining variations in project outcomes.

Section II discusses the explanatory model and describes the characteristics of the independent and dependent variables relevant to implementation of the classroom level. Section III describes the management strategies of the federal change agent programs and examines the effects these programs had on the design of projects and on the difficulty of implementing them. Section IV estimates the effects of the independent variables on implementation outcomes at the school/classroom level; Sec. V does the same for expected continuation at the district level.

SCOPE AND LIMITATIONS OF THE ANALYSIS

Because this inquiry is ambitious, its scope and limitations should be made explicit. Three types of considerations limit and qualify the study. First, being one in a series of volumes, this report deliberately focuses the discussion on quantitative evidence primarily from the survey. Thus, we will not deal with the process of change itself—the subject of Vol. III—but only with the project characteristics, institutional settings, and federal and state programs that affect educational change and thereby the implementation and continuation of projects. Accordingly, we will not "flesh out" the findings with the highly interesting and important case study material presented in Vol. III. Nor will we describe the federal demonstration programs except as necessary for quantitative analysis or inference. The theoretical context of the entire study is treated in Vol. I, and we assume that the reader is familiar with that presentation. Finally, we do not reflect systematically on policy conclusions that might be drawn from the quantitative evidence. Such inferences are better made in conjunction with the parallel fieldwork study. Volume IV synthesizes the quantitative findings presented in this report with the fieldwork findings presented in Vol. III and suggests some tentative policy implications from the first phase of the change agent study.

Other limitations are intrinsic to the survey methodology, its design, the sample, and to statistical analysis in general. The survey necessarily sacrificed in-depth questioning for cross-project comparability. A loss of detail and substance was thus incurred. Of course, details often are idiosyncratic. The survey's strength lay in gathering data relevant to major patterns, not in deciphering complex processes.

The survey was vulnerable to systematic biases as well as to random distortions on the part of the respondents. But so are most nonobservational data-gathering methods. Without in any way discounting the seriousness of this problem, it should be recognized as one of degree. Project directors probably tended to believe their project was more successful than an objective outsider might say. Moreover, they might have been even more optimistic when responding to a federal evaluator than to a social scientist, but less optimistic when complaining to a spouse. Insofar as possible, we tried to reduce these measurement errors by using multiple measurements, by checking the consistency of answers of the same respondent and the consistency of answers to the same questions for different respondents, and by checking answers to critical questions with a validation instrument designed to tap the assessments of Rand fieldworkers at the case study sites. Finally, we eliminated data from the analysis for which the distortions appeared too great.

Nonetheless, response bias existed in the data. For example, the average percentage of goals achieved on a project was reported by project directors as being approximately 75 percent. This average might have been "distorted" in two ways. First, it might have been systematically higher than an average from observations of disinterested parties. Second, the extent of distortion might have depended on systematic (and nonsystematic) characteristics of the project and the respondent. We believe that the first type of problem—being overly optimistic—was the major problem. Accordingly, we did not rely on the *absolute level* of such answers. However, since our analysis deals essentially with comparing projects, the perceived success of project A *relative* to project B (and what explains this relative success) was more pertinent than the "correct" absolute levels.[10]

We also avoided absolute assessments of success for another reason: The sample was not statistically representative. For example, even if 75 percent average success of projects had no measurement error, 75 percent would not have provided an accurate estimate of the average success of all projects funded by the federal demonstration programs (nor would the average of projects within programs provide a reliable estimate of program success). However, the sample did allow us to make relative and comparative statements for many of the crucial concerns investigated.

A third general qualification of the results reported here falls under the heading of perspective. This study describes *interim* analyses of the first phase of a complex and ambitious two-phase undertaking. Whereas we are confident about all those statements we call conclusions, additional and more refined analyses will be undertaken to elaborate the findings and to hypothesize new ones. The results should, in short, be treated cautiously.

[10] Insofar as distortions vary systematically with factors explaining effective implementation or continuation, the analysis based on answers that are relatively accurate is subject to error. We believe this problem to be less prevalent in the data chosen for analysis than the absolute bias mentioned above. However, when we suspect these errors in any given analysis, we shall indicate them. We were often able to avoid the problem of "correlated error terms" by a careful selection of those responses were analyzed.

II. SELECTION AND MEASUREMENT OF VARIABLES

This section outlines the explanatory model on which the data analysis was based and describes the choice of independent and dependent variables used in the analysis of classroom implementation outcomes presented in Sec. IV.

DATA ANALYSIS MODEL

The analysis of factors affecting the outcomes of innovative projects is predicated on a hypothesis derived from our fieldwork experience: On one hand, school district officials generally make crucial decisions during the initiation and continuation stages of innovations rather than during implementation and, on the other hand, teachers, project directors, and principals are the primary actors during implementation. District officials are usually too busy and too remote to become involved in the day-to-day implementation of projects. Teachers and other project participants seldom have the authority or influence to play direct roles in district allocation decisions about the future of projects. Accordingly, the data analysis was divided into two levels. project implementation at the classroom level and project continuation at the district level.

Figure 1 presents a schematic diagram of the data analysis model that indicates the type of analysis planned within each level and the relationship between the two levels. For the classroom level, we shall consider implementation outcomes to depend on project characteristics, aspects of the institutional setting, and the federal change agent program funding the project. Both independent and dependent variables consist of several components that will be described in operational terms in succeeding sections.

We assume that the decision to continue a project using district resources was essentially made by the superintendent. This decision was, we hypothesize, a function of the perceived success of the project, project characteristics, political-economic factors, internal organizational considerations, and federal change agent policy. Section V identifies these variables more specifically and describes their operational measurements.

Although the two levels of analysis are conceptually distinct, they are presumed to be linked in two ways. First, the superintendent's perception of the success of a project is assumed to have been based on how the project was implemented. (The downward arrow in Fig. 1 represents this linkage.) That is, the superintendent's perception was presumably derived from information about project outcomes as they were communicated by project participants from the various schools implementing the project. Consequently, the statistical analysis presented in Sec. V consisted of a first stage that estimated the superintendent's perception of project success as a function of the attitudes of project participants and a second stage that used this estimated perception of success as one input to the continuation decision. The analysis will test whether perceived success was positively related to continuation of a project

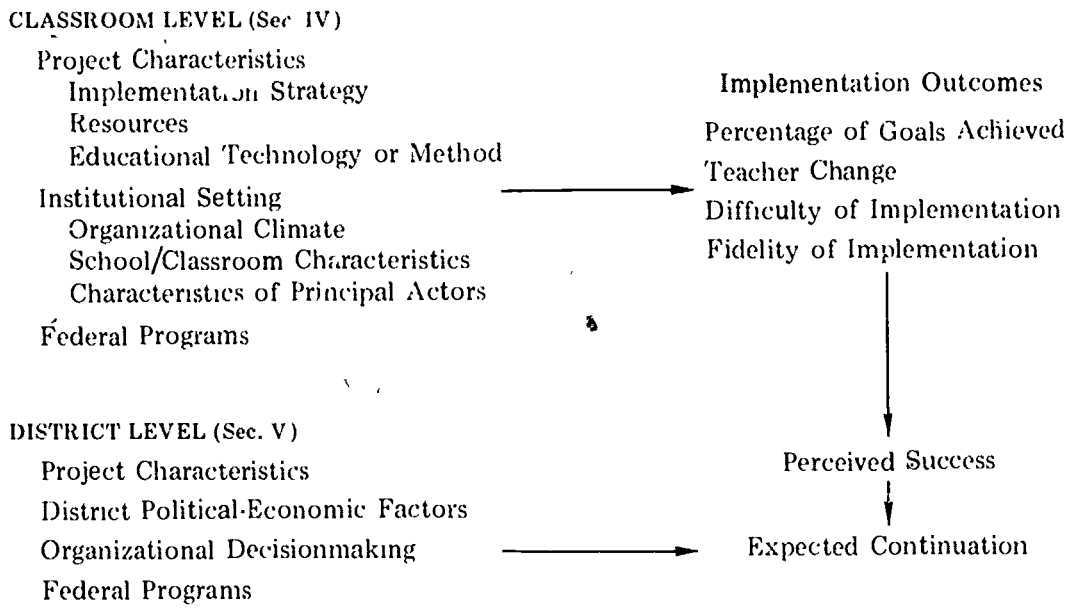

Fig. 1—Data analysis model

A second link between the levels may occur in the relationship between organizational climate and implementation. Among the elements composing the organizational climate or milieu in which the teacher must implement an innovation is the support or lack of support of the superintendent. We will test whether the superintendent's support affected the success of the project's implementation.

IMPLEMENTATION OUTCOMES

Although student outcomes might be the ultimate indicator of the effectiveness of an innovation, it was both premature and inappropriate to attempt such measurement in this study. As we pointed out in Sec. I, the projects studied here were generally new to the district or school and usually needed time for development before anyone could make an accurate assessment of their long-run effects on students. Moreover, the change agent projects were so diverse in their goals and ambitions that comparisons across projects on absolute or content-free student performance measures were meaningless. For example, an increase of a half grade level in cognitive test scores for a remedial mathematics project in an elementary school cannot be readily compared with a measure of greater awareness of career opportunities for a high school career education project.

Important conceptual reasons also lead us to measure project "outcomes" other than student outcomes. Projects must go through the complex and uncertain process of implementation before they can affect students. It makes sense to put first things first and to measure the effectiveness of implementation before examining potential student impacts. Moreover, projects may "mutate" during implementation. Unless

one can predict how the project changes, it is not possible to determine whether variations in student outcomes are the result of the initial project plans or of the interplay of the project with its institutional setting. In short, for the purposes of this study, we focused on implementation and developed measures of the effectiveness of a project's implementation.

We employed four measures that tapped different yet related aspects of the effectiveness of implementation. One aspect was the extent to which a project was implemented as originally planned or, for short, the *fidelity* of the implementation. Our fieldwork experience suggests that some projects encountered so many problems of one sort or another that they never "got off the ground" and thus were not implemented; they did not provide a true test of the educational treatment. Many of the innovations we studied were designed as demonstrations; therefore, the fidelity of implementation to the project's design is a useful indication of outcome and consequently was measured as a dependent variable.

Even if a project were implemented as proposed, it might fail to reach desirable goals. The innovation might be no better than what it replaced. Thus, it is reasonable to measure the extent to which the project achieved desirable goals, that is, its *perceived success*. This outcome was measured independently of the fidelity of implementation in the sense that the original goals may or may not have been followed or evaluated. Indeed, we observed projects, particularly ambitious classroom organization innovations, that altered or redefined their original goals during implementation. Survey questions about perceived success were asked in the last year or years of the projects' federal funding. Because these change agent projects may not have been in operation a long time relative to the time required for some innovations to take root, perceived success measures short-run achievement of goals. Thus, fidelity of implementation was distinguishable from perceived success, and different factors can be expected to have affected these outcomes differently.

A third possible result of a project's implementation was *change* in the behavior of teachers and administrators. A project might have been deliberately planned to introduce specific kinds of change, or the changes might have been an unanticipated consequence of implementation. In any event, it can be argued that unless teachers alter their traditional behavior, significant innovations cannot be accomplished and maintained. Projects that induced changes in teachers' behavior were not necessarily successful in terms of achieving desirable educational goals (e.g., some staff development projects introduced new teaching styles or practices but did not have positive effects on students because an extended period of implementation was necessary). Therefore, we will test whether different independent variables were significantly related to changes in teachers' behavior and will compare these effects with those for perceived success and fidelity of implementation.

A final dimension of the outcomes of an innovation was the organizational costs or *difficulty* of implementation. One objective of demonstration projects was to generate information for the school, school district, and other potential users. Knowledge about how hard it is to put an innovation into practice is thus an important outcome of the implementation stage. Projects that were hard to implement may or may not have remained true to their original design, may or may not have resulted in significant change in teachers' behaviors, and may or may not have achieved desirable goals.

These four measures of implementation effectiveness or outcome allow us to

determine whether different factors affect different aspects of implementation and, therefore, enable us to make overall judgments about implementation. For example, project characteristics that are positively related to fidelity of implementation may be negatively related to teacher change. This result would be consistent with the following hypothesis: Unless the project deviates from its original proposal, that is, unless it adapts, teacher change may not occur. As another illustration, project characteristics that are positively associated with perceived success but negatively associated with teacher change might reflect (depending on the characteristics in question) "successful" but trivial projects.

The survey asked several questions of each respondent type (teacher, principal, project director, federal program manager, and superintendent) about their perception of the above outcomes. Although the use of these self-perceived measures introduces "subjective" biases, which we will discuss, they have the important advantage of providing data on the participants' perception of the implementation of their project. These self-perceived assessments are thus automatically adjusted so that they are relative to the local context of the project. On the basis of a series of reliability and validity analyses, we selected the following operational measures.

To measure perceived success, we employed a simple question that was intended to elicit the self-perception of teachers on the extent to which the goals of the project were achieved.[1] This question was subject to a variety of response biases. Participants in projects tended to be more optimistic in their evaluation of success than were outside observers.[2] This systematic exaggeration was partly idiosyncratic or random and partly related to the role of the participant. Thus, project directors gave, on the average, the highest success rating, followed by the federal program managers, superintendents, principals, and teachers. We resist the temptation to speculate on these discrepancies except to note that the perception of success (percentage of goals achieved) related to the respondent's own frame of reference and therefore was linked to his role. Whatever the reasons for these differing answers might have been, two conclusions for measurement follow. First, a measurement of success combining respondents' answers at different levels of the organization (e.g., superintendent and teachers) would have induced serious validity problems. Second, the teachers' answers were the ones closest to those of disinterested observers and, considering the

[1] The specific question and statistics for the distribution of responses were:

Overall, when you take into account the goals you started with and the resources you had, about what percentage of the project's goals would you say were achieved?

Mean = 73.1%
Median = 80.0%
Standard deviation = 19.7%

Number of responses = 642; no answers = 47.

[2] Using the fieldwork sample for validation purposes (29 projects), the Rand observers rated their projects systematically lower than the reports of participants. However, this "absolute" exaggeration (or upward bias) did not seem to be greater for some types of projects than for others. It should be noted that the Rand fieldwork sample and thus the validation sample was biased toward more successful projects. Five alternative measures of success were used in the preliminary analysis. Although all the measures were reasonably correlated (for the *same* respondent but not highly correlated across different respondents on the same project), the validation check and a series of internal consistency tests indicated that the success measure used in the test was the most valid, reliable, and fruitful.

teachers' involvement in the day-to-day operation of the project, the ones most likely to have reflected implementation at the classroom level.[3]

Although we thus have tried to guard against undue distortion, it would be naive to trust the absolute average figures from any project participants, even teachers. But it is the relative figure—comparing one project with another—that is particularly important in our central concern of determining the effects of various factors on implementation. Hence, the absolute distortions in our measure of perceived success can be tolerated.

Aside from measurement errors, the interpretation of perceived success must be carefully understood. Percentage of goals achieved was a surrogate for the success of a project in achieving desirable goals, not a measure of the extent to which the project produced effects on students that were comparable across projects. This surrogate avoided the value problem of trying to weigh the importance of reading against mathematics or enrichment. Project participants implicitly defined their own goals.

In lieu of direct observation and because of the variability in project characteristics, we used a neutral measure to quantify changes in teacher behavior. We asked teachers to judge how much the project had caused them to change the way they did things in their classroom.[4] Similar considerations of reliability and validity apply to this measure of teacher change as those discussed for percentage of goals achieved. Consequently, we need not repeat that discussion. Nor need we dwell on the operational measurements of the other dependent variables, namely, the fidelity of implementation measured as the degree to which a project was implemented as initially laid out[5] and the difficulty of implementation.[6]

[3] It is altogether possible that participants on "unsuccessful" projects exaggerate their success more than those on successful projects. Unlike the distortion mentioned above, this "correlated error" would seriously affect the statistical analysis. However, teachers have little to gain from distorting their answers in the context of this interview situation. On the contrary, the main reason why teacher success reports exceeded those of the Rand observers may be that teachers lack Rand's overall perspective of having seen a wide range of projects, some of which were very successful.

[4] The specific question and the frequency of response were:

Overall, would you say the project has caused a great deal, some, very little, or no change in the way you actually do things in your classroom?

		Coded as
Great deal	31.66 %	4
Some	43.89 %	3
Very little	15.02 %	2
None	9.43 %	1

Number of responses = 674; no answers = 15.

[5] The specific survey question and frequency of response were:

In general, to what extent would you say the project at your school has been implemented as initially laid out in the proposal? Would you say almost completely, somewhat, very little, or not at all?

		Coded as
Almost completely	56.27 %	4
Somewhat	37.77 %	3
Very little	5.17 %	2
Not at all	0.78 %	1

Number of responses = 630, no answers = 59.

[6] The specific survey question and frequency of response were:

These four measures—percentage of goals achieved, behavioral change in teachers, the degree of implementation as laid out, and the difficulty of implementation—were systemically interrelated.[7] However, because we wanted to balance the results for each measure against one another in order to arrive at an overall assessment, we analyzed each measure separately for the same factors and compared the results (see Sec. IV).[8]

INDEPENDENT VARIABLES AT SCHOOL/CLASSROOM LEVEL

Three classes of independent variables might have affected implementation outcomes—project characteristics, the institutional setting, and federal program characteristics. We next describe measures of the first two classes. A discussion and analysis of the federal change agent programs as independent variables is deferred until the next section.

Project Characteristics

The literature on the evaluation of educational innovations usually deals with the technology (alias treatment, method, or practice), the goals, and the resources of projects but largely ignores the project's implementation strategy—that is, the design choices made in order to implement the innovation. Yet implementation strategy may play the most important part in determining a project's outcomes. The

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In your judgment, how difficult has this project been for the teachers here to carry out: very difficult, somewhat difficult, fairly easy, or very easy?

		Coded as
Very difficult	8.52%	4
Somewhat difficult	42.14%	3
Fairly easy	37.59%	2
Very easy	11.75%	1

Number of responses = 676, no answers = 13

[7] The pairwise correlations were not as high as one might expect Because of the low correlations, the procedure of analyzing these variables separately was justified. The pairwise correlations were

	Percentage of Goals	Change	Implementation
Change	.14		
Implementation	34	15	
Difficulty	−.13	.15	−.08

Since as many as four teachers were questioned about the same project, the above correlations across all teachers reflect within-project teacher variation and thus might be lower than comparable project-level figures. Although such is the case, the following correlations for the same variables averaged across projects remain sufficiently low to justify the above approach·

	Percentage of Goals	Change	Implementation
Change	35		
Implementation	.60	.24	
Difficulty	−.17	.26	−.03

[8] These variables affected each other simultaneously In lieu of a mathematical model of these interrelationships, we estimated them separately in reduced form

analysis distinguished these different characteristics of projects, measured them, and tested differences in their effects on project outcomes. Given below are our measures of project resources, educational methods, and implementation strategy.[9]

Project Resources. The resources available for a project can be specified in a variety of ways. In our analysis we treated three dimensions of project sources—funding level, number of students in the project, and funding level per student in the project

Funding Level and Project Grant Size. Although federal grants in aid were generally designed to bear the greatest share of the increased costs associated with an innovative project, they were not the only source of project funds. Many change agent projects obtained substantial funds, *in addition to* the federal change agent project grant, from state categorical programs, special LEA appropriations, or private foundations. Moreover, some LEAs had "packaged" federal grants from such sources as Title I, EPDA,[10] or NDEA[11] to supplement the primary change agent grant. For the evaluation of the effect of incremental resources on project outcomes, we used information on the *sum of special grants from all sources* that supported the innovative project.

However, many projects in the Rand sample experienced considerable variability in funding over the several years they existed. What was the best summary of the "fiscal scope" of a project that received $40,000 in its first year, including a $10,000 planning grant; $125,000 in its second year; and $75,000 in its third year? The simple measure of average grant received over several years could be deceptive because of year-to-year variation; for example, a project primarily concerned with introducing new technology and hardware to a school may have a large capital grant in one year and much smaller support and maintenance grants in other years. Various analyses indicated that the most useful measure for present purposes was the largest yearly funding level, that is, the sum of special project grants in the year of greatest expenditure.

The frequency distribution of the largest yearly funding level of projects in the Rand sample is shown in Fig. 2. Although several change agent projects depended on federal grants that in any one year never exceeded $75,000 (about 90 of them), most projects had at least $100,000 in grant funds available for implementing an innovative project.[12] The distribution of total grant packages is highly skewed; that is, many projects had funding levels less than $150,000 and fewer projects had very large grants.

Number of Project Students and Funding per Project Student. The range of target group sizes for change agent projects in the Rand sample was large: From

[9] We could not measure project goals in comparable ways. Although a variety of questions was asked of various types of respondents about the specific nature of a project's goals, there was little comparability in their answers. This may reflect either a poor choice of questions or a lack of specificity and clarity intrinsic to educational innovations. In either event, the most useful coding was on the basis of the substantive focus of the project. For the Right-To-Read, Bilingual, and Career Education projects the substantive focus is obvious For Title III projects, it was possible to distinguish among reading, bilingual, and career education projects. Subsequent analysis employs some of these categorizations.

[10] Education Professions Development Act

[11] National Defense Education Act.

[12] As previously noted, the various federal programs differ in their funding levels and size of grants. An exclusion criterion in the Rand sampling procedure was a cutoff level of $10,000 for any project. Thus, the Rand sample neither includes nor represents the small projects of $10,000 per year or below

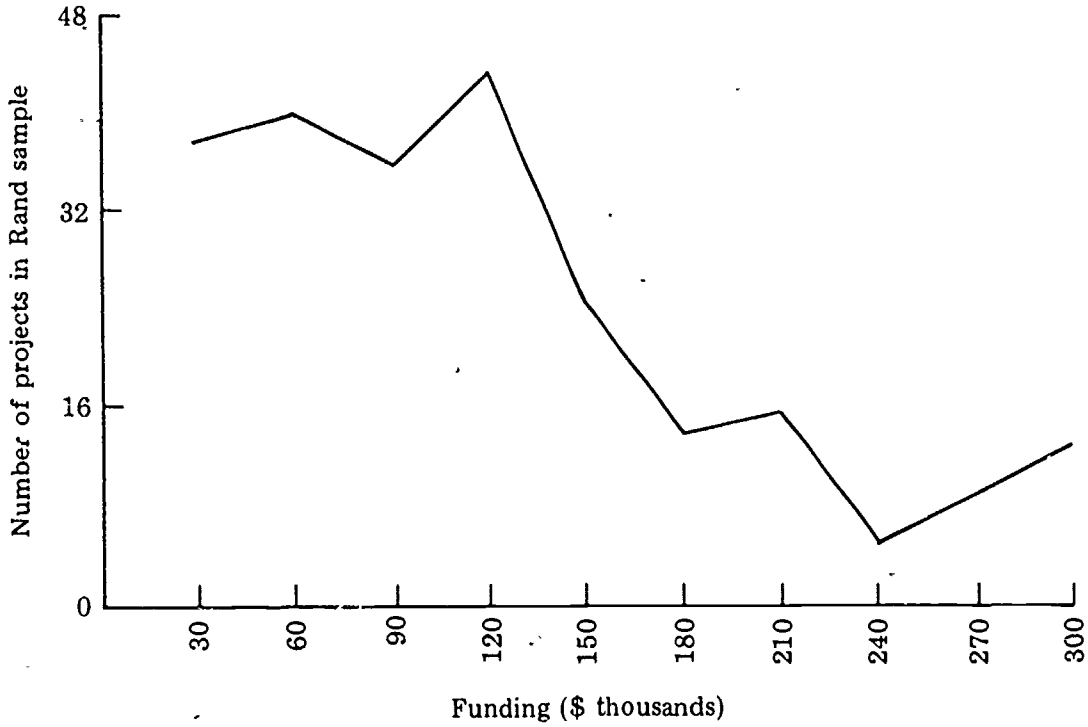

Fig. 2—Largest yearly funding level (28 projects over $300,000 not shown)

fewer than 50 to more than 5000 students may have benefited from a single project. The frequency distribution of the size of projects in the Rand sample is given in Fig. 3. Much of the variation in project size is associated with school district size (total enrollment), and consequently with urbanness. But there were often small projects within large school districts.

By combining the information on the size of change agent grants and on the number of students served by the projects, we derived a measure of the *concentration* of project resources. The project grant per pupil in the target group (in the project's biggest funding year) can be taken to indicate several phenomena:

- The expense per pupil of introducing and maintaining a project.
- The degree of focus on particular students (or dispersion among students) in a project.
- The policy intentions and priorities of the funding source.

Table 3 shows the pattern of concentrating resources for each of the federal grant-in-aid programs. Only the State Title III program had enough observations to permit good comparisons, but we may note that it supported more projects that spent less than $25 per student (24.8 percent of State Title III projects) than did the other federal programs (11.9 percent of the five other program projects). Still, almost a fifth of the Title III projects spent more than $450 per target student.

In sum, there was clearly variation in the sample for the three measures of project resources and concentration: the absolute level of project funding in its

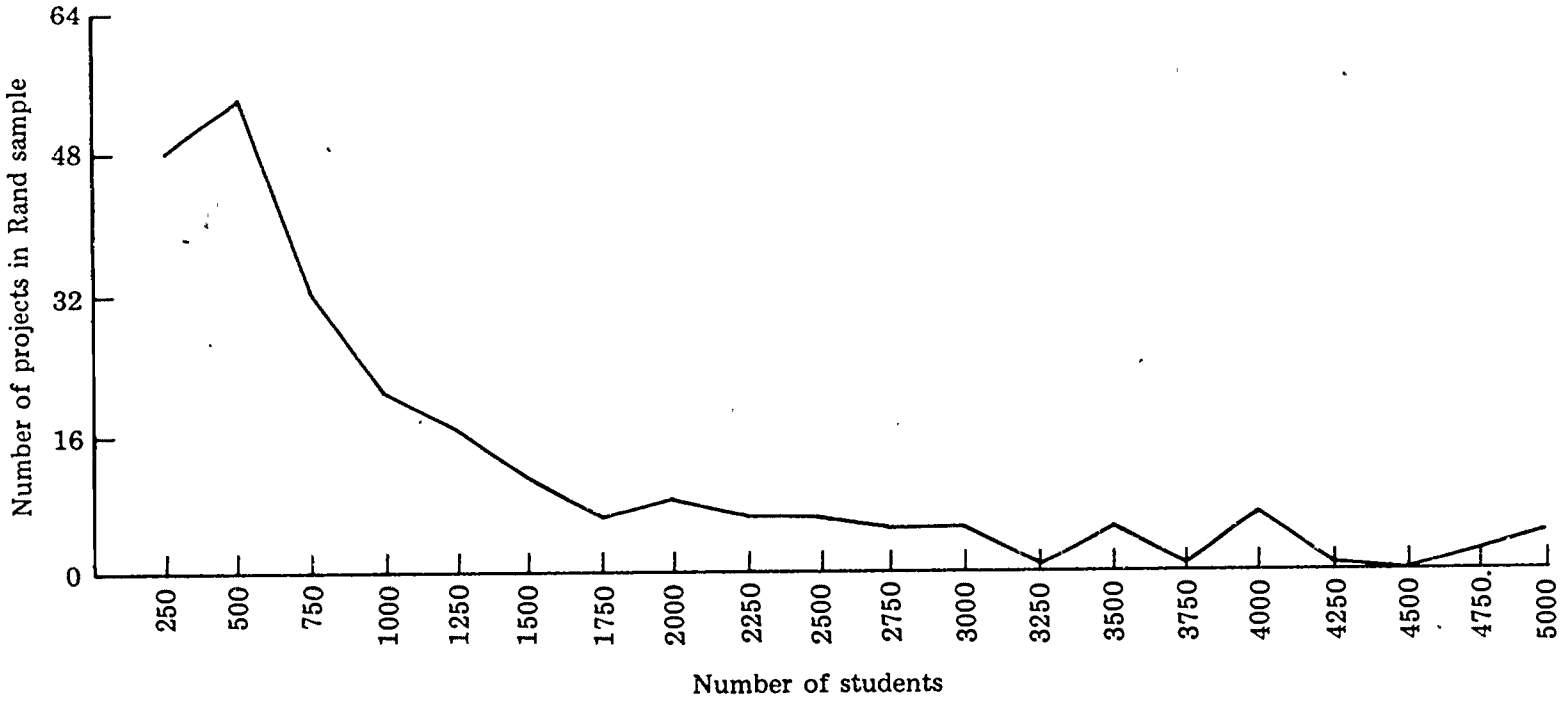

Fig. 3—Size of target group (29 projects from 5000 to 50,000 not shown)

Table 3

DISTRIBUTION OF FUNDING PER PROJECT STUDENT FOR FEDERAL PROGRAMS

Federal Program	Percentage of Sample Projects Funded by Federal Program					Total Responses	No Responses
	Under $25 per Student	$25-$64	$65-$200	$201-$450	Over $450		
State Title III	24.8 (38)	19.0 (29)	24.8 (38)	17.6 (27)	13.7 (21)	153	23
Federal Title III	29.4 (5)	17.6 (3)	23.5 (4)	23.5 (4)	5.9 (1)	17	1
Right-To-Read	--	31.0 (9)	44.8 (13)	13.8 (4)	10.3 (3)	29	3
Bilingual	--	5.9 (2)	2.9 (1)	35.3 (12)	55.9 (19)	34	7
Federal Vocational Education	25.0 (2)	37.5 (3)	12.5 (1)	25.0 (2)	--	8	2
State Vocational Education	38.5 (5)	38.5 (5)	15.4 (2)	--	7.7 (1)	13	3
Total	19.7 (50)	20.1 (51)	23.2 (59)	19.3 (49)	17.7 (45)	254	39

biggest year, the size of the target group, and the funding level per project student. Subsequent analysis will investigate whether the differences in resources affected project outcomes, all other things being equal.

Educational Methods. The designers of projects at the level of the local school district may not, and often do not, plan in neat analytical terms that separate means from ends. Rather, they begin with a set of ideas consisting of an intermixture of goals, techniques, and strategies. Nonetheless, for comparative analysis we can separate the educational technology from other aspects of project design. We next suggest an analytical classification of the educational method or techniques of the innovations in the Rand sample.

The survey asked project directors to check off the educational techniques employed in their project. Table 4 enumerates the educational techniques and lists the number of times each technique was mentioned. Considering the lack of clarity and diffuseness of educational treatments, it is not surprising that project directors never mentioned only one technique but indicated that their projects employed several techniques in combination. Thus, it would be confusing and almost meaningless to identify a project as a "needs assessment project" or a "parent involvement project." Rather, it is more accurate to ask how extensively needs assessment was used, for example, and what combination of techniques was used in conjunction with needs assessment. The data, when analyzed by correlations among the various techniques, clearly suggest that certain techniques went together in practice. Moreover, it seems reasonable to hypothesize that likely combinations of techniques were united by underlying and more general educational methods. Since there were

Table 4

EDUCATIONAL METHODS OF PROJECTS

Special projects can call for a variety of different techniques. Please tell me which of the techniques on this card the project makes use of. CODE ALL MENTIONED.	Number of Times Mentioned
Needs assessment	224
Paraprofessional staff (teacher aides, etc.)	188
Instructional specialists	180
Counseling and guidance specialists	90
Performance incentives for students	100
Educational technology (audiovisual materials, computers, etc.)	186
Development of new curricula or materials	225
Adoption of new curricula	113
Field trips	141
Open classrooms	88
Nongraded or ungraded classrooms	81
Learning centers	169
Peer instruction	130
Team teaching	148
Individualized instruction	234
Behavioral objectives	216
Diagnostic/prescriptive methods	181
New management techniques (decision-assisting technology such as PPBS,[a] MBO,[b] etc.)	81
Parent involvement	201
Use of community resources	185

NOTE: Total respondents = 289.

[a]Planning-Programming-Budgeting System.

[b]Management by objective.

relatively few likely combinations of techniques, we suspect that these general educational methods were also few in number.

These theoretical premises suggest the use of factor analysis, a statistical procedure designed to reduce a large number of elements, such as diverse educational techniques, into a smaller number of underlying dimensions. The validity of factor analysis, apart from technical considerations, rests on whether the factors, or underlying dimensions, have any valid interpretation or meaning. Our factor analysis of the data of Table 4 indicates that the interpretations of the factors were meaningful and provided an efficient means for analytically describing the educational methods of innovative projects in the Rand sample.[13]

Table 5 displays the results of a factor analysis designed to discriminate a small number of underlying or general educational methods. Five analytical types of educational methods emerged:

- *Behavioral modification instruments,* involving techniques and instru-

[13] This report does not discuss the statistical details of the factor analysis.

Table 5

FACTOR ANALYSIS OF EDUCATIONAL METHODS

Educational Techniques	Rotated Factor Loadings[a]					Commonality
	Behavioral Modification	Enrichment	Classroom Organization	Intensive Staffing of Traditional Classroom	School Administrative Changes	
Needs assessment	-.102	-.023	.221	.511	.412	.491
Paraprofessional staff	.218	-.000	.324	.575	-.096	.492
Instructional specialists	.387	.121	.114	.436	.110	.379
Counseling and guidance specialists	.013	.264	-.139	.550	.019	.392
Performance incentives for students	.643	.008	.201	-.033	-.024	.456
Educational technology	.726	.121	.071	.104	.109	.570
Development of new curricula or materials	.430	.436	.132	-.042	.321	.497
Adoption of new curricula	.020	.358	.177	.135	.543	.470
Field trips	.088	.758	.112	.260	-.038	.665
Open classrooms	-.049	.282	.665	.159	.238	.606
Nongraded or ungraded classrooms	.046	-.170	.672	.147	.002	.504
Learning centers	.446	.070	.310	.260	.185	.402
Peer instruction	.162	.217	.472	.100	.146	.327
Team teaching	.085	.213	.678	.226	.062	.489
Individualized instruction	.399	-.173	.575	.112	.097	.541
Behavioral objectives	.322	-.036	-.054	.217	.666	.599
Diagnostic/prescriptive methods	.244	-.502	[illegible]	.463	.310	.678
New management techniques	.063	-.073	.151	-.061	.650	.458
Parent involvement	.020	.343	.194	.616	.101	.545
Use of community resources	.159	.727	.085	.257	.048	.629
Sum of squares	1.931	2.138	2.339	2.080	1.703	10.191

[a]Loadings refer to the correlation between an educational technique and a factor or general educational method. The boxed entries indicate high loadings on a factor that serves to define the meaning of the factor. Commonality and sum of squares are statistical measures that indicate the technical validity of the analysis.

ments designed to alter student learning behavior such as student performance incentives and various technological innovations.

- *Enrichment* techniques, involving heavy components of field trips and community resources and clearly not involving diagnostic methods.
- *Classroom organization* methods, typified by open classrooms, nongraded or ungraded classrooms, and team-teaching.
- *Intensive staffing of traditional teaching* approaches.
- *Administrative changes* in the school, such as new management techniques or the adoption of new curricula.

The names of these underlying methods, which were chosen to reflect the likely combinations of techniques revealed in Table 5, suggest general methods widely recognized by educational specialists. The prima facie intuitiveness of these general methods gives us reasonable confidence in their validity.[14]

The factors, or underlying educational methods, may be interpreted in several ways. Each project in the sample received a score on each factor. A factor score can be thought of as representing the amount of a particular educational method for a project. For example, a score of 2.0 on the classroom organization factor means that an innovative project employed a very high degree of classroom organization change activities in its design.[15] If an innovation had a high degree of classroom organization methods and scored low on the other factors, we would be justified in calling the project a classroom organization innovation.[16] Thus, any project in the Rand sample can be described in terms of its mix of the five educational methods.

Subsequent analysis makes use of the factor score description of educational methods. As a preview of that analysis and a significant illustration of how the factors can clarify the issues at hand, Table 6 presents a comparison of federal change agent programs in terms of the average level of the various methods. The average values of the factor scores suggest that projects funded by Vocational Education primarily deal with enrichment methods; that Right-To-Read projects relied on intensive staffing using traditional methods and behavioral modification techniques; that Bilingual projects did not involve school administrative changes but concentrated on a combination of intensive staffing, enrichment, and some classroom organization changes. These quantitative relationships are in accord with the findings of the case studies on the federal programs as reported in Vol. III.

Although both the Title III programs administered by the states and by the federal government allow projects to be formulated by individual LEAs for a broad range of objectives, Federal Title III projects were more likely to involve large-scale administrative changes in school organization (see Table 6), such as the introduction of planning, programming, and budgeting principles. The Federal Title III program was announced in 1970 and subsequent years in letters from USOE to each superintendent that indicated the approximate grant size (for 1971 projects, the announced USOE objective was for grants averaging $150,000 for each of three years). These

[14] The validity of factor analysis also depends on technical considerations not discussed here. In general, the factor analysis of Table 5 has relatively good but not very strong statistical characteristics. Other statistical methods using nonparametric assumptions and clustering analysis yielded essentially similar factors.

[15] Factor scores are distributed as a standard normal distribution. A score of 2.0 represents two standard deviations greater than mean project score.

[16] The high-scoring projects on the various factors were checked against fieldwork and other qualitative information and found to be pleasingly accurate.

Table [illegible]

DISTRIBUTION OF EDUCATIONAL METHODS ACROSS FEDERAL PROGRAMS

Federal Programs	Mean Values of Factor Scores				
	Behavioral Modification	Enrichment	Classroom Organization	Intensive Staffing of Traditional Classroom	School Administrative Changes
State Title III	-.104	-.1[illegible]	-.103	-.180	-.012
Federal Title III	-.017	-.151	.078	-.052	.27
Right-To-Read	.201	-.368	.291	.494	.041
Bilingual	.212	.493	.317	.531	-.413
Federal Vocational Education	.426	1.035	-.302	.091	-.232
State Vocational Education	-.167	.715	-.531	-.280	-.419
Significance level of f-tests across programs	.31	.00	.02	.00	.[illegible]

guidelines may have encouraged projects of considerable scope, as well as projects favored by the superintendent's office. The resulting "top-down" style of innovation may account for the relatively high "school administrative change" factor score (.275) for Federal Title III projects. Conversely, the smaller grant size and greater spreading of resources among school districts that characterized State Title III projects allowed for the funding of more "bottom-up" projects of the type initiated by teachers in a single school. Therefore, there was less reason to expect State Title III projects to focus on organization-type changes. This contrast between the state and federal administration of Title III illustrates an effect of different guidelines and management strategies on project design choices. The next section will consider such effects in detail.

Implementation Strategies. The design of innovative projects implies explicitly or implicitly a strategy for implementing the change anticipated by the project's goals and educational methods. That is, decisions are made—by superintendents, federal programs, project directors, principals, and occasionally teachers—about planning, training, which schools to place the project in, etc. Such strategic choices largely determine how the innovations are implemented. In what follows we characterize elements of implementation strategies employed by the change agent projects

The survey instruments used in this study collected data about those various elements of implementation or planned change strategies identified in the literature as being effective in aiding the implementation of innovations in the school environment. In particular, the following strategic choices were measured:[17]

- Planning
- Staff training and development
- Project meetings
- Actor participation

[17] An additional implementation strategy might involve approaches for introducing the educational method to the student. Such student strategies were seldom observed in the fieldwork, and no systematic data were collected by the survey in this area.

- Implementation flexibility
- Incentives offered to teachers
- Change or effort required of teachers
- Selection of schools and teachers
- Concentration and location

Section IV will examine each of these elements to determine their influence on implementation outcomes. For example, statistically controlling for other relevant variables, we will estimate the extent to which planning affected the perceived success of projects.

The strategic components listed above could be defined in various ways. The exploratory nature of the survey meant that many of these elements were measured in broad and simple terms rather than in the in-depth, multiple-scale approach of more focused work. We believe that the survey's comprehensiveness in this uncharted area of implementation strategy compensates f consequent loss in internal validity. Preliminary data work analyzed a large ber of variables testing for reliability, validity, and independence from (or low correlation with) other explanatory factors. This procedure reduced the number of implementation strategies used in the analysis presented in Secs. III and IV to the operational measurements listed by Table 7. To afford the reader a sense of the preliminary data, Table 7 also indicates items that will not be used in the analysis.

Institutional Setting at School/Classroom Level

We observed in the field a variety of idiosyncratic circumstances or events that affected the implementation of projects. For example, personality conflicts between project participants disrupted one project, and a change in overall management altered the course of another project. As important as such idiosyncratic occurrences may be, the quantitative analysis must focus on systematic aspects of the institutional setting. In particular, three aspects that may have affected implementation outcomes were:

- Organizational climate
- School/classroom demography
- Characteristics of principal actors

Organizational Climate. We believe that the organizational climate of a school—that is, the nature of its authority patterns, social and interpersonal relationships, and esprit de corps—may significantly affect implementation. Given the exploratory nature of this study, we did not develop precise survey instruments that could be used for refined measurement of many important components of organizational climate (e.g., the principal's leadership style). Our primary concern was to provide general data to test the significance of organizational climate in broad terms.

In particular, three aspects that could be tapped in a reasonably reliable and valid way were support for the project from various principal actors,[18] the teacher's

[18] The following question asked of project directors will be used in subsequent analysis

About how much support do you feel you have received in your work on this project from the district superintendent, the federal program manager, project principals, the project faculty, and funding agency personnel: a lot, some, a little, or none?

Table 7

OPERATIONAL MEASUREMENT OF IMPLEMENTATION STRATEGIES

(1) Description of Variables Used in Preliminary Analysis[a]	(2) Names of Variables Used in Analysis	(3) Range of Variables	(4) Respondent Used as Source of Variable
Planning: Number of months spent in planning and writing the original application; *percentage of the project's first-year budget spent in planning and project design; whether the methods or materials of the project were developed on-site or elsewhere*	Percentage of planning	0-80	Project director
	Materials not developed locally	0-1	Project director
Staff training: Percentage of the project budget allocated to training; the proportion of the teachers on a project receiving training; *the amount of time (in weeks) participating teachers spent in training*	Staff training time	0-7	Principal
Project meetings. The frequency with which principals met with project staff; the frequency of project meetings; *the teachers' assessment of the value of the meetings*	Value of meetings	0-4	Teacher
Actor participation. The extent to which *teachers* and principals participated in various project decisions	Teacher not participating in implementation decisions	0-1	Project director
Implementation flexibility: The extent to which *teachers*, principals, and project directors had freedom to alter project design characteristics during implementation	Teacher free to alter project design	0-1	Teacher
Incentives offered teachers: *Whether teachers received extra pay for training*	Teacher paid	0-1	Project director
Change or effort required of teachers: *amount of extra effort required, type of change required*	Overall teaching change required	0-1	Principal
	Change in specific teaching technique required	0-1	Principal
	Extra effort required (principal's view)	1-4	Principal
Selection of schools and teachers: How schools were chosen; how teachers were chosen; the proportion of teachers volunteering for the project; *number of students in the project school; percentage of minorities* and Title I in the project school	Number of students in school	25-3653	Principal
	Percentage of black students in school	0-100	Principal
	Percentage of Spanish students in school	0-100	Principal
Concentration and location. *Whether the project was in elementary school only, senior or junior high school only, or in all grades*; the proportion of teachers at the school involved in a project; whether the project was located solely in a classroom, *in a special unit*, or outside of the school	Project covers high and elementary schools	0-1	Project director
	Project located in special unit	0-1	Project director

[a]The italics in the variable descriptions indicate variables used in the final analysis; those names are given in col. 2

feeling of the school's morale,[19] and the teacher's extra effort expended on the project.[20] During preliminary analyses, each of these independent variables was checked against the answers of different respondents for the same (or similar) questions and against the answers of the same respondent on related questions. These reliability and validity analyses will not be reproduced here.

School/Classroom Characteristics. In addition to the internal organizational climate of the school, a wide variety of school and classroom characteristics may systematically affect implementation—for example, the size of the school, the racial and socioeconomic composition of students in the school and classroom, and the innate attributes of students. This list could be easily extended. However, given the lack of a theoretical understanding in the literature about the way such variables might relate to project outcomes, we elected not to attempt major data collection in these areas. Rather, we gathered information on a small number of variables that could be used as basic controls for the multivariate statistical analysis. After preliminary data analysis, the following variables were selected for controls:[21]

1. Elementary school: coded 1 for elementary school, 0 otherwise; number of elementary schools is 212.
2. Number of students in school: mean ≃738, median ≃588, standard deviation ≃558.
3. Percentage of black students in school: mean ≃23, median ≃9, standard deviation ≃30.
4. Percentage of Spanish-speaking students in school: mean ≃12, median ≃1, standard deviation ≃23.

Characteristics of Principal Actors. It is quite plausible that personal attributes of individual teachers, principals, or project leaders, rather than their roles

[19] The specific question asked of teachers was

On the whole, would you say that the morale of teachers at this school is very high, moderately high, or not high at all?

		Coded as
Very high	41.14%	3
Moderately high	49.34%	2
Not high at all	9.52%	1

Number of responses = 684

[20] The specific question asked of teachers was

About how much extra effort would you say this project requires from project teachers now: a lot, some, a little, or none?

		Coded as
A lot	49.78%	4
Some	37.44%	3
A little	8.96%	2
None	3.82%	1

Number of responses = 676.

[21] Data were collected on approximately twenty characteristics. However, problems of multicollinearity limit the usefulness of employing all characteristics as controls. For example, we asked principals to estimate the proportion of students in the school that were disadvantaged according to Title I definitions. This variable is not used in the subsequent analysis because of its high correlation with the percentage of black students and the percentage of Spanish-speaking students in a school.

or positions, have major and pervasive effects on implementation. Yet e mating these effects requires measurement and sampling conditions that are ficult to meet.[22] Because of our other comprehensive concerns, the sampling d survey instruments of this study were not designed to test the importanc f personal characteristics. Nonetheless, background data of the usual type—r , experience, race, ethnicity, and sex—were collected nd used in the preliminary analysis. The only attribute that made a difference under these conditions was teacher experience (the number of years teaching) and, hence, it will be used in subsequent analysis.

EXPECTED EXPLANATORY POWER

The preceding discussion indicates a number of measurement and specification difficulties. These problems, which are to be expected in an exploratory study, are within tolerable limits. Perhaps the most serious deficiency of the data is our inability to measure and control for many personal characteristics of principal actors, especially teachers and students. We suspect that a relatively large proportion of the variation in implementation outcomes may be related to the variability in personal characteristics that we cannot introduce into the analysis. However, the findings of interest here may not be very sensitive to these omissions (i.e., specification errors). In any event, we do not expect the total amount of variation explained in implementation outcomes to be high. Since our primary concern involves testing the significance of individual variables and hypotheses, a low overall percentage of explained variation would not seriously hamper the analysis.

[22] Attributes such as experience are relatively easy to measure, whereas measuring whether a teacher or principal has an open or closed personality is difficult. Moreover, the sample and the statistical model must be devised so as to distinguish among various effects For example, to determine whether an effect is the result of a teacher's attributes or of the school that selected the teacher, it is necessary to have a sample that allows for analysis of both within-school variation and between-school variation of teacher attributes

III. FEDERAL PROGRAM COMPARISONS: DESIGN CHOICES AND DIFFICULTIES

The Rand study examined four federal change agent programs that had diverse management strategies and substantive priorities. This diversity provided an opportunity to compare innovations funded by different programs and thus assess the extent to which variations in implementation outcomes could be explained by differences in federal program strategies and priorities. In particular, this study will examine the extent to which the federal programs had differential impacts on:

- Project design choices during the initiation phase
- Difficulties arising during implementation
- Implementation outcomes
- Continuation

Analysis of the last two categories involves the comparison of the mean outcomes of projects funded by each federal change agent program with the mean project outcomes of other programs. This type of analysis can test whether, for example, the mean perceived success of Title III projects was greater than the mean of Title VII projects. However, to avoid specious inference, comparisons of this nature should take into account variations in project characteristics and in the institutional setting. Section IV will compare the federal programs with respect to implementation outcomes, and Sec. V will make similar comparisons for expected continuation. This section examines the extent to which project design choices and difficulties of implementation were related to particular federal change agent programs. To provide the reader with background material for these analyses, we first sketch the relevant elements of the programs.

CHANGE AGENT PROGRAM GUIDELINES AND MANAGEMENT STRATEGIES

Title III of ESEA

Title III was the first major USOE program to provide funds to local school districts for innovation. Since the authorizing legislation places no restrictions on educational areas in which projects can be funded, Title III provides a broad program of support for local innovation.

The goals of Title III are to stimulate and assist in the development of model elementary and secondary school programs through grants to local districts, and to support the spread of these models to other schools. Grants are awarded on the basis of competitive proposals submitted by LEAs. Title III is also intended to give school districts experience in managing innovation and encourage them to undertake locally funded efforts to innovate.

When first authorized in April 1965, Title III was a Commissioner's program; funds were managed by USOE and went directly from USOE to local districts. Two

years later, Congress amended Title III to give the states responsibility for management of Title III funds.

The State Plan Program. The 1967 amendments to Title III underwrote a great expansion in SEA staff and in the Title III program as a whole. SEA staff working on Title III have increased from the 50 full- and part-time persons working in 1967 to over 450 full-time and 483 part-time people today.

The 1967 amendments also required that states set forth a plan to be reviewed and approved by the Federal Title III officials for spending their allotment of Title III funds. The federal office was empowered to withhold up to 50 percent of a state's allotment until a satisfactory plan was submitted.

The first official guidelines for the State Plan program were issued in the fall of 1971. These guidelines specified criteria for the states to follow in designing a Title III management plan that would be evaluated by the federal State Plans Branch. The guidelines outline seven main components for which the SEA was responsible:

- Educational needs assessment
- Project development
- Selection and funding of model projects
- Project and program evaluation
- Validation
- Dissemination
- Adoption

The State Plan strategy also included criteria for organizing Title III at the state level, notably the creation of State Advisory Councils and provision for professional staff development.

Section 306. In 1970-1971, three years after the conversion of Title III to the State Plan program, Congress re-established a Commissioner's program in Title III by amending the legislation to establish the Section 306 program. Beginning in FY 1971, the authorization provided that at least 15 percent of Title III funds be allotted USOE, with the remaining 85 percent allocated to the states. The Section 306 program has the same broad legislative intent as the original Title III program and has been similarly managed.

Budget. Congress has always appropriated more money for Title III than for other change agent programs. Local projects are typically funded for three years. Title III appropriations have been about $150 million a year, which is about twice the current budget for the largest of the other change agent programs (Title VII, Bilingual program). The appropriations for the Title III budget reached a peak of almost $190 million in 1968, after a rapid increase from $75 million in the first year. After 1968, Title III appropriations fell back and stabilized at a level of about $150 million until FY 1975, when they were reduced to $120 million. The current appropriation is about one-third of the authorized level. The Title III legislation allocates the funds among states by formula, specifying that states should receive $200,000, plus an amount in proportion to the school-age and total population of the state.[1]

[1] U S Congress, PL 89-10, Sec 302(a) (2)

Title VII, Bilingual Education Program

The Bilingual Education program was enacted in 1968 as an amendment to ESEA The legislation recognizes "the special educational needs of the large numbers of children of limited English-speaking ability in the United States," and authorizes bilingual projects in local districts to meet these needs. More than any other program in the change agent study, the Bilingual program aims at public acceptance of a fundamentally new concept in public education; as a result, it has been marked by turbulence and conflict.

Guidelines. USOE spent the first five years (1968-1973) formulating the social role and objectives of bilingual education, developing curricula for different languages and grade levels, providing in-service training for teachers, devising new assessment techniques, and stimulating the SEAs' interest by involving them in program management. Of all the programs in the change agent study, Title VII began with the fewest available resources and the least developed program strategy.

Title VII focuses on poor children between the ages of 3 and 18 and areas that need bilingual education programs. The law, however, is vague about what educational programs it envisions. In the first year of the Bilingual program, the federal program office sent grant announcements and guidelines to SEAs, which then forwarded them to districts that might qualify. Great leeway was given to LEAs so that they could focus on their own specific needs. LEAs could propose almost any education project for the target population as long as two languages were used in instruction and the history and culture of the non-English language group were taught.

The legislative language merely said that "Title VII funds are available for exemplary pilot or demonstration projects." There was little in the early guidelines to indicate that applicants would be participating in a nationwide effort to develop models of bilingual education. In later years, four components—instructional program, curriculum, community involvement, and staff development—were urged on projects. But the initial guidelines did not clearly focus or structure the program. Approximately half of the bilingual projects in the Rand sample were funded under the 1968 guidelines.

More recently, the Bilingual program office has developed a program manual that clarifies the definition of a bilingual education project and provides informal funding guidelines. After the first year, project and budget size could grow, but were limited to a vertical expansion in grade levels. For instance, if a program began with a kindergarten class in the first year, it could add a 1st grade class the second year, to allow for the development of a continuous program for the students. However, federal funds could not be used to expand the project horizontally, for instance, to two or more kindergarten classes in the second year. After the third year of vertical expansion, LEAs were expected to absorb the cost of the highest grade level participating.

State Participation. The states had no official role in managing Title VII during the period covered by this report. SEA involvement with Title VII projects varies directly with state interest in bilingual education. In states that have not needed to focus on bilingual education, responsibility for Title VII programs is usually housed in some other bureau, such as Title I, migrant workers, foreign language coordinator, and so on. In states where bilingual education has been a

major concern, a fully functioning Title VII staff is the rule.[2] These staffs have no formal direct authority over the funded LEAs, but they do exercise influence over Title VII programs by means of their connection with LEA officials and USOE staff. In western states, for example, Title VII is a higher priority for SEAs. Accordingly, they typically devote considerable staff time to monitoring projects, making regular site visits, holding workshops, and the like.

Budget. The budget of the Bilingual Education program has risen steadily since its inception to its present level of $85 million in FY 1975, but did so only after a friendly Congress overruled administration requests to limit the program's growth. In the first year of the program, FY 1969, the program funded 76 projects in 21 states, with the $7.5 million appropriation. Most of the projects were in California and Texas, and by far the largest number included Spanish-speaking children. Most projects had budgets exceeding $100,000 and, following the legislation, were sponsored by a LEA, a group of LEAs, or a LEA in conjunction with a college or university. The regulations limited projects to a maximum of five years of funding.

After 1969, the proportion of grants to California and Texas dropped dramatically as the program grew and tried to spread to new areas. Legislation and program policy have encouraged more language groups to participate in the projects.

Vocational Education, Part D

The Vocational Education, Part D, program was enacted in 1968 as part of the comprehensive amendments to the Vocational Education Act of 1963. The goal of the Part D program is "to stimulate new ways of bridging the gap between school and earning a living for young people" through providing grants to local districts for exemplary career education projects. Each project was expected to develop a plan that incorporated four elements:

1. Broad occupational orientation in elementary and secondary schools to increase student awareness of the range of career options open to them.
2. Work experience and cooperative educational studies.
3. Specific training in job entry skills.
4. Intensive occupational guidance and counseling during the last years of school.

These goals are quite similar to what was later embodied in the concept of career education.

State Participation. Half of the Part D program funds are managed by the states and half by USOE. The federal program office wanted the federally managed projects to provide examples for state and local educators, to emulate or modify, using state or local funds.

The federal portion of the Part D program encouraged proposals by an announcement sent to the executive officers of the state boards for vocational education and the state directors of vocational education. They, in turn, publicized the

[2] The information about the operation of SEAs was derived from informal interviews with state officials.

program and solicited proposals from local educational groups. On request, the federal program office sent a prospective applicant a manual on how to prepare a proposal, the program regulations, a booklet on exemplary vocational education programs, and a brief bibliography of previous research put out by the Educational Resources Information Center (ERIC) The manual and regulations were purposely vague to allow local groups to formulate their own ideas within the parameters set up by the policy paper. No planning grants were given, and applicants were required to develop complete 36-month operating plans as their proposals.[3] DHEW Secretary Finch decided to bypass this process in the case of 20 projects for Model Cities programs in specified cities. In these 20 cases, the Model Cities program planners were essentially given a grant and asked to write an operational plan for it.

Beyond requiring that SEAs use funds to support exemplary projects within the categorical purposes of the legislation, Part D guidelines do not dictate state management strategies, and the federal program office has no supervisory power over the SEA. Thus, SEA administration of Part D funds varied greatly. For example, SEAs had various strategies for selecting and funding their projects. A number of states funded the same projects selected by the federal program office. Some states elected to fund their own large projects, comparable in size to the federal Part D project. Other states funded three or four smaller projects. One state funded hundreds of mini-grants.

In states where a number of proposals were received, different techniques were used to select those that would be funded. In one state, staff members selected projects that "they feel will be the best" without any formal attempt at competitive ranking. In another, a unit outside of the regular vocational education staff ranked each of the proposals, using a standard rating form. The vocational education staff then funded the projects in the order of ranking. In one state, the SEA staff exercised the initiative in getting projects started. Those LEAs that wanted Part D funds notified the SEA of their interest. The SEA staff then presented the LEAs it selected with the particular projects it wanted developed.

The degree of SEA management of local projects also varied considerably, apparently as a direct result of the interest that the SEA had in any given project. In states where only a few projects—all of particular interest to the state—were actually funded, project monitoring was likely to be intense. In states funding a large number of projects, there was only token monitoring with only one or two visits a year.

SEA dissemination strategy also seemed to vary with its funding strategy. States that funded only a few carefully developed projects were likely to be interested in developing high-quality curriculum packages or exemplary project models, which could be applied in other LEAs. However, states that attempted to fund many projects, in order to involve as many LEAs as possible, devoted less attention to developing exemplary packages, and spent most of their effort on simply promoting the career education cause.

Budget. The Part D program has been funded at a stable level of $16 million—far below its $75 million authorization level. The legislation requires that the Com-

[3] Applicants sent proposals simultaneously to USOE and to the state board of education The states had 60 days to reject any proposal sent to them From the remaining proposals, the federal program office staff and 16 outside reviewers selected the grantees in each state.

missioner of Education allocate $200,000 to each state. In addition, he is required to allocate the remainder of the appropriation to the states in proportion to the population in each state between the ages of 15 and 19. The Commissioner and each SEA then divide the sum allocated to each state in half and administer the halves independently.

In FY 1970, the Part D program funded its first round of projects. The federally administered Part D program funded one project in each state for a maximum of three years with budgets generally between $100,000 and $150,000 per year. The federal contribution to the budgets remained constant in each of three years, and grantees were not required to provide any matching funds. However, they were required to state in their proposals how they expected to finance the projects after the expiration of the federal grant. Because the level of funding has remained stable, the program initiated few other new projects until the expiration of the first-round projects in FY 1973.

Right-To-Read

The Right-To-Read program, under the authority of the Cooperative Research Act, has developed a demonstration strategy for improved reading practices in the schools.[4] Right-To-Read designed a prototype problem-solving approach as a model for local districts to use in changing their reading programs at the school level. Right-To-Read supports a number of projects in local districts to demonstrate the approach. These projects, the first activities funded by Right-To-Read, were the ones we investigated for the change agent study.

Guidelines. The Right-To-Read local implementation strategy, called the "School-Based Plan of Action," prescribes the kind of innovation that a school district is expected to undertake, a planning process, and organizational guidelines. The key elements of the Plan of Action are:

- Project schools should implement some form of the *diagnostic/prescriptive approach to reading* based on teaching by objectives that allows flexibility in the actual choice of curriculum and instructional methods.
- Project schools should attempt a *total approach* to reading improvement. Rather than changing one or two components of the school reading program, the program advocates a whole series of interrelated changes, such as introducing new instructional methods, new curriculum materials, parent involvement, a reading center, and specialized staff.
- In each school all teachers and students, whether or not the students have severe reading problems, should be involved. This is called the *whole school* concept.

[4] Two additional components of the Right-To-Read program were not included in the change agent study:

1. Community-based projects.
2. Right-To-Read works with the SEAs to coordinate existing state and federal reading improvement funds and to develop the SEAs' capacity for training local educators in methods of planning and implementing reading improvement programs. Right-To-Read provides the states with technical assistance, and a small grant of funds for the administration and conduct of training programs for local educators

- In each school, the *principal should be the project director* and should be fully responsible for project decisionmaking and management.
- Each school should appoint a *Unit Task Force* consisting of a central office staff member, the principal, two teachers, two parents, and, optionally, the school librarian to plan the project and oversee implementation.
- Each project school should decide on its own reading improvement program and plan it by following an *11-step planning process kit* designed by Right-To-Read staff. This planning process begins with a needs assessment (which has also been laid out in a kit form) and includes steps to select project objectives, instructional materials, diagnostic instruments, instructional components, personnel, in-service training, and the project budget.
- Each project should emphasize *staff development* by spending 85 percent of the total budget on in-service training and other training activities.

In addition, Right-To-Read provided each project with technical assistance from technical assistance teams located at five sites across the country. Members of these teams visited projects periodically to help with planning, in-service training, and problem solving. Team members were specifically trained in the 11-step planning process and were supposed to work closely with projects during this phase of activity.

State Participation. Although the states are involved in other components of the Right-To-Read effort, management of the Right-To-Read demonstration school projects bypass the states entirely.

Budget. The funding of the Right-To-Read program has remained stable at the relatively low level of $12 million. A portion of these funds has been spent on projects in both local school districts and communities to generate model reading programs that will be useful demonstration sites for SEAs and LEAs developing their own reading improvement programs. The school district projects are of two types. school-based projects, which are three-year grants of approximately $40,000 per year to a single school in selected local districts; and large-city projects, which are three-year grants of $100,000 per year to groups of several schools in each of the 21 largest cities in the country.

PROGRAM EFFECTS ON PROJECT DESIGN CHOICES

Federal change agent programs differ from each other in their management strategies and substantive focuses. What effect did these differences have on project design choices? What differences were there between Right-To-Read projects and reading projects funded by Title III? Or between Vocational Education projects and Title III career education projects? Or between Title VII projects and Title III bilingual projects? If the answer is "none," then federal policies aimed at shaping change using the instrument of administration guidelines may be having little effect.

These questions can be examined by determining which design choices were characteristic of projects funded by the different programs. Table 8 presents the results of a statistical analysis (multiple linear regression) of the relationship between each educational method and the programs controlling for project resources, implementation strategy, and school characteristics. The standardized regression

Table 8

FEDERAL PROGRAM EFFECTS ON EDUCATIONAL METHODS CONTROLLING FOR PROJECT CHARACTERISTICS

Project Design Choices	Standardized Regression Coefficients for Educational Methods				
	Behavioral Modification	Enrichment	Classroom Organizational Change	Intensive Traditional Staffing	Administrative Change
Resources					
Funding	.12*	.00[a]	.09*	.14**	.15**
Number of students served	-.07**	-.00	-.15**	.05*	-.12**
Funding per student	.16**	-.01	-.06	.10*	-.04
Implementation Strategy					
Percentage of planning	.05	.07*	.00**	-.02**	.16**
Staff training time	.06	-.09*	.15**	.14*	-.06
Value of meetings	.00	.08*	.01	.10*	.01
Teacher not participating in implementation decision	.05	.06	-.13**	.04	.01
Teacher free to alter project design	-.03	.05[a]	.11**	.01	-.06
Materials not developed locally	-.14**	-.15**	-.05	.11**	-.16**
Project located in special unit	.10*	-.09*	.02	.16**	-.09*
Project covers high and elementary schools	-.03	-.01	.03	.00	.06
Overall teaching change required	.03	-.04	.06	-.07	.07
Change in specific teaching technique required	.12*	-.10*	.03	-.06	-.02
Extra effort required (principal's view)	-.07	.05	.07*	-.03	-.05
School Characteristics					
Number of students in school	-.01	.06	.06	.00	.15**
Percentage of black students in school	-.01[a]	-.00	-.14**	.06[a]	-.13**
Percentage of Spanish students in school	.01	-.05[a]	-.12**	.03[a]	-.06
Elementary school	-.01	-.09*	.11*	.04	.00
Federal Programs					
Right-To-Read	.16**	-.12**	.03	.26**	.12*
Bilingual, Title VII	-.01	.21**	.07	.11*	.03
Federal Vocational Education / State Vocational Education	.15**	.28**	-.08*	.11**	-.12**
Title III Focus					
Reading	.04	-.25**	.01	.02	.11*
Bilingual	-.02	.10**	-.02*	.03*	.02
Career Education	.05	.14**	-.08*	.07*	.04
R^2/adjusted R^2 [b]	.13/.09	.37/.34	.17/.13	.22/.18	.14/.09

NOTE: An asterisk (*) indicates significance at the .10 level; and a double asterisk (**) indicates significance at the .01 level.

[a]This coefficient is interestingly different from that of Table B-1 in App. B.

[b]All equations are significant for the F-statistic (24,484). Although the number of observations is 509, the number of projects is 287. The classroom level is the unit of analysis for this table to allow for classroom and school variation in project design and implementation.

coefficients (beta weights) indicate how much weight each independent variable has on the degree of educational method (when all other variables are controlled). In particular, the coefficients for Right-To-Read, Bilingual (Title VII), and Vocational Education measure the amount of differences in each of the program's educational methods from the average Title III project. Similarly, the weights for Title III-Reading Focus, Title III-Bilingual Focus, and Title III-Career Education Focus measure the shift up or down in levels of each educational method dimension for these three types of project focus, as compared with residual Title III projects with some other focus.[5] The R^2 and F-statistic measure the net extent of association between the independent variables and each educational method.

By inspection of the coefficients in Table 8, let us first investigate which educational methods were linked with which federal programs.[6] Projects supported by Right-To-Read were likely (compared with the average base Title III) to involve intensive traditional staffing in a major way and behavioral modification and top-down administrative change. Title VII, Bilingual projects were associated with enrichment, as one would expect, and intensive traditional staffing. Vocational Education projects were likely to employ enrichment, and to a lesser extent behavioral modification and intensive traditional staffing. Title III projects were so diverse that no educational method was more likely than any other; however, projects involving a high degree of classroom organization changes were more often associated with State Title III than with other programs.

These significant associations indicate that the various federal programs affected project choices about educational methods in different ways. However, the nature of this influence hinges on the interpretation of the issue of *programmatic characteristics versus substantive focus:* Does a federal program matter for the educational methodology of an innovative project because of its administration, guidelines, and funding, or because of the problem area or "focus" that programs tend to carve out for themselves? When we pair the Right-To-Read, Bilingual-Title VII, and Vocational Education programs with, respectively, the Title III projects focusing on reading, bilingual education, and career education, we have a natural test of the relative importance of federal program characteristics versus project focus. If federal guidelines matter more for the level of use of the various educational methods than does focus, the three Title III groups would have weights that differ from the three other programs. If substantive focus dominates the pattern of relationships with methodology, the signs and weights of the Title III groups would "match up" with the programs of corresponding focus.

Table 8 suggests that insofar as design decisions about the type and degree of educational methods were concerned, both program characteristics and substantive focus played important though different roles. Right-To-Read but not Title III-Reading was significantly related to the use of behavioral modification techniques. Thus, intensive use of behavioral modification was influenced by Right-To-Read guidelines rather than the substantive focus of reading. Similar remarks hold for Right-To-Read's influence on the level of intensive traditional staffing. The equivalent signifi-

[5] As noted in Sec. I, since the purposive nature of the sample does not permit reliable estimates of the "absolute" association between any particular federal program and educational methods, the federal program effects are measured relative to the base of Title III projects other than reading, career education, and bilingual.

[6] Appendix B presents an analysis of the relationship between educational method and the independent variables excluding the federal programs.

cant coefficients for Right-To-Read and Title III-Reading on administrative change suggest that top-down reading curriculum changes occur for projects in both programs.

The importance of guidelines and federal program characteristics is also demonstrated in career education where, as Table 8 shows, the coefficients of the Vocational Education program are significantly greater than the corresponding Title III-Career Education for the use of behavioral modification and intensive traditional staffing. The evidence thus suggests that in the absence of guidelines, administration, and funding for Right-To-Read and Vocational Education, behavioral modification and intensive traditional staffing would have been less often employed.[7]

In contrast, the *substantive focus* was highly important for enrichment. The paired coefficients, particularly Vocational Education and Title III-Career Education, reveal comparable associations and were all significantly different from zero. Similar remarks hold for classroom organization: Career education rarely involved classroom organization changes whether sponsored by Title III or Vocational Education.[8]

In summary, the guidelines, program characteristics, funding, and substantive priorities of federal programs did affect project design, but only in a partial way. Whether local districts were seeking opportunities for federal money or were attempting to solve their problems by initiating innovative projects, it seems clear that some educational methods were more likely to be employed than others because some federal programs—either in their administrative guidelines or in their focus—fostered these methods. Thus, in the absence of the Right-To-Read program, behavioral modification techniques and concentrated traditional staffing might be less likely to be adopted by locally initiated reading projects. For Vocational Education, the existence of a federally funded program—and the funding opportunities afforded by it—induced high levels of enrichment activities to be pursued only as long as the federal money existed. However, the federal change agent programs did not greatly influence the design of such locally conceived projects as innovations in classroom organization.

[7] The same conclusion held for the importance of Title VII on intensive traditional staffing. In the absence of Title VII, bilingual projects would have been less likely to employ intensive traditional staffing.

[8] Table B-1 of App. B presents the results of an analysis that is identical with the analysis of Table 8 except that the appendix table does not include the federal programs as independent variables. Two general observations about program implications are suggested by comparing Table 8 with Table B-1. Aside from some exceptions to be discussed shortly, the sign, significance, and strength of association between implementation strategies and educational methods remain about the same when the ("shift") effect of federal programs and focus are taken into account. This indicates—although not conclusively—that the patterns of implementation strategies and choices are linked to educational methods independently of the source of federal funding. For example, classroom organization projects have common strategic elements regardless of the program that funds them.

Another obvious but sometimes ignored effect of federal policy is suggested by the several changes in coefficients when federal programs are introduced into the analysis. Comparing Table 8 with Table B-1, the percentage of black students at a project school loses its strong association with intensive traditional staffing and behavioral modification when federal programs are controlled for. This statistical effect, which arises from the relationship between Right-To-Read and percentage of black students, reflects a targeting policy used by the Right-To-Read program of giving grants to large cities; some of these grants were given in cases where the districts had not developed a project design and became viewed as grants in aid comparable with Title I money. The loss of significance for percentage of Spanish students in a school on intensive traditional staffing is due to the obvious correlation between Bilingual programs and their main target group (in conjunction with the Title VII emphasis on intensive traditional staffing). Thus, the evidence indicates that target populations who traditionally have had lower priority in the allocation of local funds have received some special benefits. However, in the absence of effective federal monitoring, there is no guarantee that these categorical funds will be used for their intended purpose.

Thus, federal policy using the instruments of guidelines and categorical priorities tied to differential funding may have some limited leverage on the design choices made by local school districts. In particular, the federal programs can influence how intensively some educational treatments are tried. However, federal policy instruments of the type employed by the change agent programs may have little influence on the frequency with which some types of educational methods, particularly classroom organization change, are initiated by the local districts in order to meet their own needs and priorities.

IMPLEMENTATION DIFFICULTIES

Many types of problems arise in implementing innovations. Some difficulties involve the substance of the innovation itself. For example, an innovation employing a new teaching technique may lead to problems because teachers find it difficult to learn the technique. Other problems can be attributed to inadequate planning, for example, the lack of space, equipment, or materials essential to the project. Some innovation arouse faculty resistance or community opposition. And some projects suffer from poor leadership. To develop a comprehensive picture of these implementation difficulties, we asked teachers what problems they had to deal with during the life of the project. The catalogue of problems along with the frequency of responses are shown in Table 9.

Behind these responses lie revealing stories about the process of change that only fieldwork of the type reported by Vol. III can document. Our purpose here is to describe the patterns of difficulties that arise during implementation for different

Table 9

IMPLEMENTATION PROBLEMS AS CITED BY TEACHERS

[illegible]

Problems	Number of Times Mentioned
Goals not sufficiently defined	170
Techniques complicated or unclear	161
Teachers unfamiliar with materials and methods	334
Inadequate space, materials, or equipment	328
Unanticipated requirements	116
Unrealistic goals or schedule	96
Teachers already overloaded	187
(Leadership or management conflicts)	85
Faculty or staff resistance	107
Parental or community opposition	55
Delay or reduction in funding	113
Other problems	8
No problems	48

NOTE: Number of responses = 684.

types of federal programs. To this end, we analyzed statistically how much each problem cited by teachers contributed to their own evaluation of the difficulty of project implementation. Specifically, we regressed the difficulties of implementation (as defined in Sec. II) on the problems cited by teachers. Table 10 presents the results—a comparison of the effects of the problems for the various federal programs.[9]

As Table 10 indicates, the problems may be grouped into four types. First, there were problems associated with the *substance* of the project's goals or educational methods, namely, goals not sufficiently defined (i.e., lack of *specificity* of goals), techniques complicated or unclear (which is a dimension of *complexity*), and teachers unfamiliar with materials or methods (which is dependent on the relative *newness* of the innovation). Second, some problems were a consequence of deficiencies of the *prior plans* for implementation, namely, the inadequate space, equipment, or materials, unanticipated requirements, unrealistic goals or schedule, and teachers already overloaded with other commitments. Third, some projects provoked difficulties as they became implemented in the given *institutional setting*, namely, leadership or management problems, faculty or staff resistance to the project, and parental or community opposition. Fourth, delay or reduction in *funding* caused problems on some projects. In addition to this classification, other idiosyncratic problems, as well as the absence of any mention of problems, were coded.

Before comparing federal programs, we will discuss the results for all programs combined, as shown in col. 1 of Table 10. The most striking finding is the significance of deficiencies in prior planning. The four types of prior planning problems individually and jointly had very significant effects on the teachers' perception of difficulty.

To show how large these effects were, as well as to illustrate the interpretation of the regression coefficients, let us consider the coefficient of .31 for "Teachers already overloaded" indicated in Table 10. Since the independent variables are dichotomous, the coefficient means that a project for which teachers say that they were already overloaded adds a .31 increment of difficulty as compared with a project not having this problem; in other words, the average difficulty of all projects if teachers did not mention any problems was 1.98 (on a scale of 1 very easy, 2 fairly easy, 3 somewhat difficult, and 4 very difficult), and projects experiencing teacher overload—but no other problems—would have an average difficulty of 2.29. Another interpretation of the regression coefficients is as a set of linear weights; in these terms, the perception of being overloaded contributes .31 to the teachers' overall feeling of the difficulty of implementing the innovations. All four of the types of problems arising from deficiencies in prior planning of projects contribute 1.07 to difficulty (.27 + .25 + .24 + .31), which is the difference between an easy project and a difficult one.[10]

[9] Because of the nonrepresentative nature of the sample, it is not useful to analyze the frequency of responses per se shown in Table 9. However, it is appropriate to examine the conditional question: Given that certain problems arose in a project (according to the teachers), what effects did these problems have on the teachers' overall feeling about the difficulty of implementation? The regression results shown by Table 10 provide an answer to this conditional question. The independent variables are dichotomously coded (i.e., they are dummy variables).

[10] A T-test indicates that the sum of these problems is not significantly different from 1.0. The various problems are, of course, intercorrelated. However, neither the pairwise correlations of problems nor multiple correlations of any problem with all other problems are so high as to preclude reasonably accurate estimates of the contribution made by each problem. (The regressions for Right-To-Read and

That deficiencies in prior planning for an innovation contributed to the difficulty of implementation is not unexpected. However, lest this finding be misinterpreted, a distinction about different types of planning should be noted. The nature of prior planning can be conceptualized into three ideal strategies that are based on usually implicit notions of how change occurs. First, there is a *technological* notion that implementation difficulties are not anticipated or planned for, and an innovation is assumed to be more or less automatically put in place. Planning based on this technological view is usually limited to logistical considerations. The implementation of such technologies as computer-assisted instruction often has followed this model without serious consequences. But some local designers of more complex innovations have ignored the need for prior planning about implementation.

A second approach recognizes that innovations cause difficulties but assumes that *rational planning* can anticipate not only the problems, but also their solutions. The third strategy takes an *adaptive* view in which unanticipated requirements are expected, but rather than trying to lay out all possible contingencies, prior planning takes the form of trying to build problem-solving mechanisms into the project design. The planning for any particular project may be characterized in terms of the mixture of these elements in its design.

Our purpose in drawing these distinctions here (Vol. III will illustrate them in detail) is to warn against a too simple inference from the data analysis: Since deficiencies in prior planning strongly influence the difficulty of implementation (as perceived by teachers), more planning would solve the problem. Undoubtedly, many projects suffer from a technological assumption and consequently do not plan sufficiently for new materials needed in day-to-day implementation. But the cure is not necessarily the rational planning model, which can lead to unanticipated requirements and unrealistic goals and schedules. Instead, a flexible plan that allows for adaptation and the local development of materials may produce fewer true difficulties in implementation.

Of the group of problems associated with the project's goals or educational methods, Table 10 shows that both the lack of specificity of goals and the complexity of techniques contributed significantly to the teachers' perception of difficulty of implementation. However, the newness of the materials was not significant, although teachers cited problems caused by their unfamiliarity with methods and materials more than any other problem. Apparently, teachers did make the distinction between newness and fuzziness or complexity.

Of the group of problems relating to the institutional setting, Table 10 suggested that parental or community opposition was very important, whereas the other problems were not significant.[11] This finding will be discussed in more detail

for Federal Title III contain several poor estimates due to multicollinearity as indicated by inflated standard errors) Rather than display the six pairwise correlation matrices, an indication of the low level of intercorrelations are the following figures for the highest correlation among the problems for each federal program all programs, 26, State Title III, 25, Federal Title III, 39, Bilingual, 26, Federal and State Vocational Education, .33; and Right-To-Read, 44

[11] We expect teachers to be biased in their report of faculty resistance to innovation. Consequently, the estimate of the effect of faculty resistance is likely to be lower than the estimate for other participants. Using the answers of project directors on the same questions and running regressions similar to those of Table 10, we find that project directors are somewhat more likely to report faculty resistance—although not extraordinarily more—and that such resistance has significant weights for Bilingual and Federal Title III programs, but not for the other programs Some of the typical faculty problems on Bilingual are documented in Vol III Some Federal Title III projects involved administrative or schoolwide changes in schedules and integrated curricula that can provoke faculty resistance

Table 10

COMPARISON OF IMPLEMENTATION PROBLEMS FOR DIFFERENT FEDERAL PROGRAMS

Problems during Implementation		Regression Coefficients for Difficulty of Implementation (standard error)					
		(1) All Programs in Change Agent Study	(2) State Title III	(3) Federal Title III, Section 306	(4) Bilingual, Title VII	(5) Federal and State Vocational Education	(6) Right-To-Read
Substance of Innovation	Goals not sufficiently defined	.18** (.07)	.26** (.09)	21 (.24)	.18 (15)	-.36 (.23)	-.17 (.20)
	Techniques complicated or unclear	16** (.07)	.13 (09)	43* (25)	.10 (.17)	51* (.26)	.08 (.17)
	Teachers unfamiliar with materials and methods	.08 (.06)	.01 (08)	-.00 (20)	-.21 (.15)	.27 (.21)	.41** (.14)
Deficiencies of Prior Planning	Inadequate space, equipment, or materials	27** (.06)	2[illegible]** (.08)	.29 (.18)	.32** (.16)	30 (.20)	3[illegible]** (.14)
	Unanticipated requirements	.25** (.08)	26** (.10)	-.03 (.24)	.17 (.20)	30 (.34)	.39* (.19)
	Unrealistic goals or schedule	24** (.08)	19* (11)	.33 (.27)	.3[illegible]* (.19)	15 (.29)	.15 (.37)
	Teachers already overloaded	.31** (.06)	32** (09)	.65** (21)	.38* (.18)	26 (.22)	.26* (.15)
Institutional Problems	(Leadership or management)	.08 (.08)	.09 (.12)	.11 (.34)	-.21 (.21)	.13 (.29)	.01 (.27)
	Faculty or staff resistance	10 (.08)	12 (.11)	.16 (32)	-.17 (.19)	.36 (.26)	- 28 (.23)
	Parental or community opposition	39** (10)	30* (.13)	-- --	-.02 (.29)	1.00** (.41)	.66* (.26)
	Delay or reduction in funding	.19* (.08)	.13 (.12)	05 (.33)	.22 (17)	.16 (.23)	.19 (.16)
	Other problems	.05 (.25)	- 43 (.43)	.20 (.72)	.45 (.65)	.82 (.49)	-- --
	No problems	- 26* (1[illegible])	32* (17)	-.25 (.35)	-.46 (.32)	.03 (.35)	-.09 (.25)
	Constant	1.98 (.06)	2.08 (.08)	1.75 (.16)	2.26 (.18)	1.54 (.20)	1.95 (.15)
	R^2/adjusted R^2	.25/.24	.24/.21	.46/.35	.35/.23	.42/.30	42/.3[illegible]
	Number of responses	681	391	57	83	75	75

Note: An asterisk (*) indicates significance at the .10 level, and a double asterisk (**) indicates significance at the .05 level.

when we compare the various federal programs.[12] The final category of delay or reduction in funding also affected the difficulty of implementation, as one would expect.

Thus far, the analysis has treated problems arising in projects independent of their source of funding. We now turn to comparisons of the effects of problems on the difficulty of implementation for the various federal change agent programs.

State Title III

Because federal change agent programs have distinct guidelines, requirements, and substantive priorities, we expect that the local innovative projects might well have implementation problems that reflect their funding source. Thus, the locally initiated, highly competitive State Title III projects might be expected to avoid severe problems resulting from unclear or unfamiliar techniques, simply because their techniques were locally chosen. The data shown in col. 2 of Table 10 support this expectation: State Title III teachers who reported complicated, unclear, or unfamiliar techniques were not significantly more likely to encounter implementation difficulties as a result of this problem.

By contrast, the problem of unclear goals was a significant source of difficulty for teachers in State Title III projects. The initial goals of these projects tended to be ambitious or ambiguous. The ambiguity may have stemmed from the competitiveness of Title III awards, which may have elicited vague grantsmanship claims in proposal writing. The overly ambitious goals may have reflected the opportunity provided by Title III for districts to take a chance on highly innovative and complex projects. But a lack of goal specificity can later create confusion and conflict. The freedom of LEAs under noncategorical programs such as Title III may thus cut two ways. It may reduce potential implementation problems arising from the selection of unclear techniques, but it may increase future stress if goals are ambiguous and overly ambitious.

Table 10 shows that prior planning deficiencies created significant problems for State Title III teachers. Teacher overload, with a coefficient of .32, impeded implementation, even in locally conceived projects. An advantage of local project initiation may be the potential for gaining broad institutional support of projects that focus on central problems of the LEA. Yet if teachers feel too burdened by existing reponsibilities, they may be unable or unwilling to support any innovation. Other planning problems, especially inadequate facilities (.20) and unanticipated requirements (.26), were important sources of difficulty. An ability to correct these problems promptly once they are discovered could be of great value to the implementers of a new project.

Although faculty resistance had a small (.12) and unstable relation to implementation difficulties, Table 10 indicates that parental opposition increased (by .30) the severity of the difficulties. It is notable that problems of communication—such as parental opposition, lack of goal clarity, or unanticipated requirements—proved more significant than technique or funding problems (both with insignificant .13 coefficients). In a diverse program such as Title III, the issues of group dynamics and cohesion seemed persistently relevant to the implementation of change.

[12] Leadership or management problems were not listed in the original survey question, but were coded from the "Other problems" category. This omission undoubtedly caused an underestimate of the problems of leadership or management.

Federal Title III

Federal Title III projects differed from State Title III projects in their mean funding levels and target group sizes, although both were designed and organized by LEAs. Proposals for Federal Title III support typically requested large-dollar grants to be spent on programs aimed at a large number of students. In addition, Federal Title III was the most likely of all change agent programs to focus on school organization changes.[13] This systematic difference between the programs may account for the different kinds of implementation problems they faced.

Column 3 of Table 10 shows that the problem of complicated or unclear techniques was significantly related (.43) to difficulties for Federal Title III funded projects. Despite the local initiation of the project, it appears that the broad scale of operations for relatively large and expensive projects may have interfered with the teachers' clear understanding of new techniques. Other substantive issues—goal definition and unfamiliarity—were small and insignificant as problems. Projects that attempted schoolwide organization change may have had simple goals (e.g., an "integrated curriculum") but very unclear techniques.

Teacher overload was the only large (.65) source of difficulty in the prior planning of Federal Title III projects. The scope, in students and expenditures, of these innovations may have made it impossible to mesh the project with the workload of all project teachers. Teachers who reported this problem apparently found it to be a major obstacle to implementing the new program.

Since the thorniest problems in Federal Title III seem to be related to the substantial scale of some of the projects, it is easy to assume that reducing average project size would be the proper antidote. The data do not support this solution. Federal Title III projects had considerably fewer problems that were significantly related to difficulty with implementation than other programs. The institutional support, momentum, and overhead provided by large grants may be an administrative and planning benefit that tends to outweigh the difficulties of large project size. Because a substantial amount of the variance in implementation difficulty for Section 306 projects is jointly explained by problems arising from understanding techniques and from teacher overload, considerable advantages may accrue from attempts to increase the interaction between project managers and the many teachers participating in the project.

Bilingual, Title VII

Bilingual projects were among the most difficult to implement, as the high constant term (2.26) in col. 4 of Table 10 suggests. Inadequate materials (.52), teacher overload (.38), and unrealistic goals or schedule (.32) all contributed significantly to project difficulty. These problems, particularly those of obtaining bilingual curriculum materials and qualified staff, may have stemmed from the relative newness of interest in bilingual education. But they also may reflect the complex and highly ambitious nature of changes attempted by some bilingual projects.

Vocational Education

Column 5 of Table 10 shows that only two problems encountered by teachers

[13] See Sec. II and App B

were significantly related to the difficulty of implementing Vocational Education projects. These problems, complicated or unclear techniques and parental or community opposition, account for most of the variance explained in implementation difficulty (R^2 .42). Their large effect requires an explanation based on the setting, rather than on the substance, of career education projects.

The analysis of fieldwork conducted for Vocational Educational projects (see Vol. III) suggests that these projects rarely enjoyed support from the local district. Because little serious proposal development was required by the enabling legislation, vocational projects were often treated as grants in aid. Moreover, many projects were initiated as a result of minority group demands (in the Model Cities cases) or the desires of a small group of professionals to increase vocational activities. Typically, neither situation was conducive to gaining district-level support for the resulting project

In this unstable situation, innovations may have been vulnerable to dissension and poorly targeted techniques. Projects may have deteriorated in part because participating teachers lacked incentives to try to make them succeed. This failure may not be inherently related to career education, but to the situation in which such projects were initiated.

There is an odd corollary to this vulnerability. When technique and community problems were not encountered, project teachers did not report implementation difficulties simply because little change was demanded of them. We shall return to these hypotheses in Sec. IV.

Right-To-Read

Right-To-Read demonstration projects emphasize prescribed management strategies and diagnostic/prescriptive approaches to reading achievement. The way LEAs dealt with these packages may have determined how difficult implementing the project was in practice. First, Table 10 shows that the substantive problem of teacher unfamiliarity with materials was a serious source of difficulty for Right-To-Read projects, and for no other programs. If teachers objected to, failed to understand, or could not use the packaged reading curricula and instruments provided for them, the project could become extremely frustrating. This finding suggests that staff training may have been inappropriate in nature or deficient in amount. This is relevant to a thesis advanced in Vol. III—local material development may be an important ingredient in the adaptation process that accompanies serious change efforts.

Second, the general problem of prior planning was quite strongly related to implementation difficulties. Unanticipated requirements (.39), inadequate materials (.34), and teacher overload (.26) were all sources of difficulty. Taken together, these factors suggest that the rational planning model implicit in these projects may retard the flexibility necessary to deal with day-to-day problems.

Finally, when parental or community opposition was present, it could substantially impede implementation (as indicated by the coefficient of .66). The importance of reading instruction in the educational mission of schools makes reading a very salient policy area for parents. If they disapproved of or misunderstood the Right-To-Read approach—perhaps interpreting it as remedial in intent—teachers may have encountered stiff and continuing resistance to the project.

Summary

The problems that most seriously affected implementation stemmed from two sources. First, innovation is intrinsically a disruptive process. Problems attributable to inexperience of project participants in planning for change and adapting to its demands were bound to arise. Second, projects encountered difficulties that reflected the selection mechanisms, administrative guidelines, and substantive priorities of the federal programs. In particular:

1. State Title III projects experienced difficulties because of insufficiently defined goals and inadequate prior planning.
2. Federal Title III projects had top-down problems of complicated or unclear techniques and problems of requiring more additional work than teachers could handle.
3. Title VII Bilingual projects lacked bilingual materials and staff.
4. Vocational Education projects experienced difficulties gaining support within the district and within the community.
5. Right-To-Read projects had difficulties of implementation that arose from the teachers' unfamiliarity with prescribed materials and methods, and from adaptation requirements that were not anticipated by the program management strategy. When parental opposition existed, Right-To-Read projects experienced considerable difficulty.

Thus, the patterns of difficulty associated with the implementation of different federal programs demonstrated that the management strategies have subtle influences beyond the initiation stage. Insofar as federal change agent programs affect initial project design, they also may create specific barriers that local innovations must overcome.

IV. IMPLEMENTATION OUTCOMES: CLASSROOM LEVEL

We have argued so far that differences between federal programs were partially played out in project design choices and problems encountered during project implementation. To what extent did these differences also affect implementation outcomes? And if these differences in programs had only marginal effects, what other factors account for the variation in implementation outcomes?

To answer these questions, many evaluations of educational innovations have implicitly assumed a naive input/output view of change. The treatment—namely, either the educational technology or the federal change agent program—is considered a potentially significant input to the "black box" of the school system from which come outputs, usually measured as student outcomes. This approach has not proved very useful for two reasons. First, variations in student outcomes have not been consistently related to variations in treatments, once nonschool factors are held constant. Second, because of its atheoretical character, the evaluation literature does not permit us to generalize from particular project assessments or even to specify the elements of the black box that have been ignored.

This section begins to unpack the black box. We will analyze the effects on implementation outcomes (as previously defined) of both the treatment and the elements that are usually ignored—implementation strategies and institutional setting.

GROSS COMPARISON OF PROGRAM AND TREATMENT ON IMPLEMENTATION OUTCOMES

To what extent did the differences between the federal change agent programs result in differences in the implementation outcomes of innovative projects?[1] Table 11 compares the mean of the implementation-outcomes scores of projects funded by the various federal change agent programs.[2] Aside from the difficulty of implementation, the federal programs did not differ substantially from one another on percentage of goals achieved, change in teacher behavior, or extent of implementation as laid out.[3]

This finding suggests that federal change agent programs had approximately equal effects on implementation, despite their different management strategies. A simple and yet appropriate (as we shall later argue) explanation for equivalent program effects is that the policy common to these programs had limited influence

[1] Federal programs implicitly or explicitly serve many objectives in addition to the ones considered in this quantitative analysis or in the larger Rand study. Our comparisons are thus limited and should be treated cautiously by the reader.

[2] The absolute value of these numbers is probably biased, as previously explained. However, if we assume for the sake of this section that projects on all the programs are biased in the same way (a reasonably plausible assumption) the comparisons made above are appropriate.

[3] Section III compared the change agent programs in terms of problems arising during implementation and the consequent difficulty of implementation.

Table 11

PROGRAM COMPARISON ON IMPLEMENTATION OUTCOMES

Federal Program	Average Score (standard errors)			
	Percentage of Goals Achieved	Teacher Change	Difficulty of Implementation	Implementation as Laid Out
Title III (State and Federal)	69.9 (1.3)	3.02 (.05)	2.47 (.04)	3.50 (.03)
Right-To-Read	70.1 (3.0)	3.10 (.12)	2.47 (.10)	3.60 (.08)
Title VII, Bilingual	71.3 (2.9)	3.02 (.11)	2.74 (.10)	3.57 (.07)
Vocational Education (State and Federal)	75.4 (3.3)	2.82 (.13)	2.10 (.11)	3.51 (.08)
R^2	.00	.00	.04	.00
Significance of F-statistic (3503)	.49	.44	.00**	.65
Significance of T-test that Title III ≠ Right-To-Read	.95	.54	.98	.27
Title III ≠ Bilingual	.66	.98	.01***	.43
Title III ≠ Vocational	.12*	.16	.00***	.95
Right-To-Read ≠ Bilingual	.78	.62	.05**	.80
Right-To-Read ≠ Vocational	.24	.12*	.01***	.45
Bilingual ≠ Vocational	.35	.26	.00***	.60
Range of dependent variable	0-100	1-4	1-4	1-4

NOTE: An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level; and a triple asterisk (***) indicates significance at the .01 level. Coefficients of programs are, of course, all significantly different from zero but not from the overall average of all projects.

on implementation—factors other than federal policy affected implementation in major ways.

Because the change agent policy common to the programs had limited influence, each separate program could affect project implementation only marginally Within this latitude of marginal effects, some significant differences between programs could be discerned.

The significant differences between the programs revealed by Table 11 involved Vocational Education. Projects funded by Vocational Education programs had the highest average reported percentage of goals achieved and Title III the lowest, although the difference between the two is barely significant. Yet Vocational Education projects were, on the average, least likely to result in teacher change; moreover, they were reportedly the easiest to implement, particularly when compared with the program with the most difficult projects, Bilingual. These gross comparisons suggest that Vocational Education projects achieved the highest percentage of their goals because they were not attempting major innovations. Most such projects simply added career enrichment materials to the curriculum.[4]

Besides the apparent differences between Vocational Education and the other programs, the data of Table 11 indicate that differences between the other federal change agent programs did not by themselves explain the variations in project outcomes. This is not surprising, for these comparisons did not take into account the differences among project characteristics within the same program. Accordingly, it makes sense to compare the effects on implementation outcomes of the various educational methods within the federal programs.

Table 12 presents a multiple regression analysis of the effects on the four outcomes of variations in educational methods (or treatments) for projects within the various change agent programs. The first row shows the average outcomes for Title III projects (holding within-program variations in educational methods at a constant value of zero), followed by five rows that display the regression coefficients or effects of varying levels of educational treatment for Title III projects. Ignoring the absolute estimates of the average outcomes for each program, the regression coefficients of each method within each program represent the amount of change in implementation outcomes that an increase in one unit (a standard deviation) of the level of an educational method would induce.[5] For example, the significant 1.7 coefficient of Title III classroom organization methods indicates that for each unit increase of

[4] See App. B for quantitative evidence on this point.

[5] The "coefficients" of the federal programs represent the mean implementation-outcome score for the level of educational methods at their *mean* value (which is zero standardization). For example, 69.7 percent is the average perceived success score for Title III projects when the level of behavioral modification, enrichment, etc. are average. For such programs as Right-To-Read, whose projects tend to have high levels of behavioral modification, intensive staffing, and to some extent administrative changes, average success is probably better computed at higher levels of the use of these methods The following table computes the average success scores based on different levels of method employment to show the sensitivity of these average scores:

	Level of Method Used on All Methods		
Program	Average	1 Standard Deviation Above Average	2 Standard Deviations Above Average
Title III	69.7	70.5	71 3
Right-To-Read	85.6	78 3	71.0
Bilingual	64.0	85.3	106.6
Vocational	75.1	84 0	92.0

Table 12

PROGRAM-METHOD COMPARISON ON IMPLEMENTATION OUTCOMES

Educational Methods by Program	Regression Coefficients[a] and Standard Errors			
	Percentage of Goals Achieved	Teacher Change	Implementation as Laid Out	Difficulty of Implementation
Title III	69.7 (1.3)	3.02 (.05)	3.51 (.03)	2.45 (.04)
Behavioral modification	1.0 (1.2)	-.03 (.05)	.02 (.03)	-.11*** (.04)
Enrichment	-1.7* (1.2)	-.02 (.05)	-.05* (.03)	.04 (.04)
Classroom organization	1.7* (1.2)	.12*** (.05)	-.00 (.03)	.07** (.04)
Intensive traditional staffing	-.6 (1.3)	.08* (.05)	.04 (.03)	.12*** (.04)
Administrative changes	.6 (1.4)	.04 (.05)	.02 (.04)	.13*** (.04)
Right-To-Read	85.6 (8.9)	3.40 (.34)	3.33 (.23)	2.86 (.29)
Behavioral modification	-4.4 (3.5)	-.00 (.13)	-.02 (.09)	-.18* (.11)
Enrichment	15.0 (5.6)	.06 (.22)	-.08 (.15)	.17 (.19)
Classroom organization	-5.6 (5.1)	-.17 (.20)	.15 (.13)	.14 (.17)
Intensive traditional staffing	-3.5 (7.1)	-.22 (.28)	.34** (.18)	-.30 (.24)
Administrative changes	-8.8* (4.1)	-.32** (.16)	-.05 (.11)	-.23** (.14)
Bilingual, Title VII	64.0 (4.7)	2.79 (.18)	3.54 (.12)	2.78 (.15)
Behavioral modification	1.9 (3.4)	.18 (.13)	-.10 (.09)	.08 (.11)
Enrichment	6.9 (6.7)	.34 (.26)	.07 (.17)	- 15 (.22)
Classroom organization	.8 (4.9)	.04 (.19)	-.08 (.13)	.13 (.16)
Intensive traditional staffing	8.2* (5.4)	.08 (.21)	.09 (.14)	-.00 (.18)
Administrative change	3.5 (3.2)	.13 (.12)	-.10 (.08)	-.08 (.10)
Vocational Education	75.1 (7.2)	2.50 (.28)	3.25 (.19)	2.00 (.24)
Behavioral modification	.6 (3.6)	.16 (.14)	.06 (.09)	.06 (.12)
Enrichment	-1.1 (5.5)	.29 (.21)	.18 (14)	.15 (.18)
Classroom organization	1.9 (4.0)	.24* (.15)	.11 (.10)	.40*** (.13)
Intensive traditional staffing	10.4** (4.5)	.26* (.17)	.24** (.12)	-.02 (.15)
Administrative changes	-2.9 (5.6)	-.10 (.22)	-.25** (.14)	-.24 (.19)
R^2	.06	.06	.04	.13
Significance of F-test statistic (23,483)	.11*	.12*	.65	.00***
Signifi nt (.10) T-tests on differences of program constants	RTR>T3 RTR>BIL	T3>VOC RTR>VOC RTR>BIL	None	BIL>T3 T3>VOC RTR>VOC BIL>VOC

NOTE: An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level; and a triple asterisk (***) indicates significance at the .01 level.

[a]The general form of the estimating equation is $a_i P_i + b_{ij} P_i E_j$, where P_i is the ith program, E_j is the jth educational method, and a_i and b_{ij} are coefficients. Coefficients of programs (which are dummy variables) are, of course, all significantly different from zero but a more relevant comparison is with the average of all projects.

classroom organization activities, Title III projects reported a 1.7 percent higher percentage of goals achieved.

In terms of variations of treatments within the federal programs, Table 12 reveals an important marginal effect. For Title III, classroom organization methods were positively related to teacher change and difficulty of implementation as well as to percentage of goals achieved. However, Title III enrichment methods were negatively related to perceived success and negatively related to implementation as laid out (probably because of the diffuseness of Title III enrichment projects). Intensive traditional staffing on Title III projects not only was significantly related to increased difficulty of implementation but also positively related to the amount of teacher change (but whatever the nature of this change may have been, intensive traditional staffing did not increase the percentage of goals achieved on Title III projects).[6] Schoolwide administrative changes increased difficulty of implementation but did not affect other outcomes.

These findings can be interpreted by recalling the nature of the Title III program. Since Title III innovations were locally initiated and competitively chosen, they included a wide mixture of projects, ranging from straightforward enrichment activities to complex attempts to alter classroom organization. The Title III projects involving sustained efforts in classroom innovations were difficult to implement but more likely to be successful in terms of both teacher change and percentage of goals achieved. Yet numerous Title III projects that engaged, for example, in simple enrichment or in staff development unrelated to classroom activities did not appear to have achieved their goals. The diversity in the scope of Title III projects thus seems matched by uneven outcomes. In short, the Title III management strategy may have yielded high risks but high returns.

Besides these significant differences in treatments within Title III, the overall results suggest that neither differences between programs nor variations of educational methods within programs explain much of the variation in project outcomes. (Note in Table 12 the low level of R^2 and the level of significance for the overall F-test for each outcome, excepting difficulty of implementation.) Thus, these gross input/output comparisons of program and treatments need to be supplemented by other factors that influence the outcomes of innovations.

FACTORS AFFECTING IMPLEMENTATION OUTCOMES

The most important broad hypotheses in this report are that the institutional setting and project characteristics relevant to implementation have major effects on the implementation outcomes of innovative projects. Table 13 presents evidence that supports these hypotheses.

In particular, Table 13 reports the results of a multiple regression analysis in which the teachers' perceived success rating of a project (the percentage of goals achieved) is considered to depend on project characteristics (i.e., project resources, educational methods, and implementation strategy), on elements of the institutional setting (i.e., organizational climate, school characteristics, and teacher character-

[6] The findings in Vol III's analysis of staff development projects funded by Title III are consistent with and provide an interpretation for these results. Namely, although teachers were changed by staff development, these projects were not always tied to ongoing classroom activities.

Table 13

FACTORS AFFECTING PERCEIVED SUCCESS

Independent Variables		Standardized Regression Coefficients for Percentage of Goals Achieved		
		(1) All Projects	(2) All Projects in Elementary Schools	(3) Title III
Project Characteristics				
Resources	Funding	.06[a]	.06	-.05
	Number of students served	.06	.06	.03
	Funding per student	.02	.06	.04
Educational methods	Behavioral modification	.08**	.05	.07*
	Enrichment	-.08	-.06	-.09*
	Classroom organizational change	-.06	-.09*	-.09*
	Intensive traditional staffing	-.03	.02	-.13**
	Administrative change	.06	.00	.06
Implementation strategy	Percentage of planning	.06	.05	-.02
	Staff training time	-.00	-.06	.04
	Value of meetings	.11***	.12**	.12**
	Teacher not participating in implementation decision	-.10**	-.13**	-.15***
	Teacher free to alter project design	.03	.01	-.03
	Materials not developed locally	.01	.01	-.09*
	Project located in special unit	-.00	.04	.07
	Project covers high and elementary schools	-.12***	-.13**	-.14**
	Overall teaching change required	-.06	-.02	-.11
	Change in specific teaching technique required	-.07	-.03	-.07
	Extra effort required (principal's view)	.00	-.02	.03
Institutional Setting				
Organizational climate	Extra effort (teacher's view)	.09**	.05	.09*
	Morale of teachers at school	.24***	.26***	.21***
	Support from superintendent	.07*	.02	.15**
	Support from principal	.10**	.11**	.13**
	Support from faculty	.06*	.05	.04
School characteristics	Number of students in school	.06	.00	.01
	Percentage of black students in school	.12***	.07	.13**
	Percentage of Spanish students in school	-.01	-.02	.08
	Elementary school	.11**		.14**
Teacher characteristics	Teacher experience	.05	.06	.10**
Federal Programs				
	Right-To-Read	-.08*	-.07	
	Bilingual, Title VII	.01	.01	
	Federal Vocational Education	.06	.00	
	State Vocational Education	.00	-.01	
R^2/adjusted R^2		.21/.15	.19/.11	.28/.19
Number of observations		309	248	289

NOTE. An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level; and a triple asterisk (***) indicates significance at the .01 level.

[a]Funding would be positively significant if the federal programs were not in these regressions. The effects of other variables remain essentially unchanged when federal programs and educational methods are removed from the analysis.

istics), and on the federal program supporting the project. The table displays standardized regression coefficients (beta weights) for three situations. all projects in the sample, projects in elementary schools, and projects funded by Title III. Each coefficient represents the effect of its factor on percentage of goals achieved, statistically taking into account the other factors in the analysis.

Before detailing the findings suggested by Table 13, a general observation is in order. As Sec. I warned, this analysis must be treated cautiously, taking due note of weaknesses in both measurement and in our ability to specify the variables and their relationships in the best possible way. Yet even being cautious and discounting the exactness of the estimated effects of the factors, the evidence provides a convincing test of the importance of the institutional setting and implementation strategies.

Institutional Setting and Organizational Climate

Table 13 shows that the variables included under the category "Organizational Climate" had consistently significant effects on the success of a project as perceived by teachers. We will investigate the evidence for this finding in detail and consider the other institutional characteristics as control variables.

All three columns of Table 13 show that the morale of teachers at a school, the support of principal actors, and the teachers' willingness to put in extra effort significantly affected the percentage of goals achieved whether considered individually or combined as overall indications of organizational climate. In short, innovative projects were not "teacher-proof." Their successful implementation seemed to involve adaptation to the organizational environment and required commitment of participants and support from the school and the LEA.

We defer until Vol. III analyses and case studies of *how* organizational climate shapes adaptation of the project to its setting and thus determines its prospects for success. However, a sense of some of the systematic influences on the relationship of organizational climate to perceived success can be gained by a variety of statistical comparisons.

The positive coefficient of "elementary school" in Table 13 indicates that elementary school projects were perceived as significantly more successful than junior or senior high school projects. Because the organizational characteristics of elementary schools differ from those of junior and senior schools, it is reasonable to ask whether the effects of organizational climate on success were different for these different types of schools. Comparison of col. 1 with col. 2 of Table 13 shows that organizational climate mattered significantly for elementary schools, as it did for schools in general. Moreover, the differences in the coefficients of the support variables for elementary school projects (as compared with all projects) appear to reflect differences between elementary and secondary schools. Namely, high school and junior high school teachers are usually members of relatively large and visible schools that are considerably more bureaucratized than elementary schools; thus, on one hand, the superintendent may have more importance to the secondary school staffs, and, on the other hand, high school teachers may require mutual reinforcement from other teachers.[7] For elementary school teachers, the superintendent may

[7] It is not unusual to hear elementary school people, including administrators, complain of a "high school bias" on the part of school district officials.

be remote, the teacher tends to be isolated in the classroom, and support from the principal may assume considerable importance for project implementation.

To detect whether the importance of organizational climate (and other variables as well) was limited to projects funded by one federal program as contrasted with others, the sample of Title III projects was analyzed separately with the findings shown in col. 3 of Table 13. The pattern of significant coefficients shows that interpersonal relationships within the organization affected perceived success for Title III projects and, more generally, for projects in all the federal programs. Support from the superintendent seemed particularly important for Title III projects. This result reflects the highly competitive, locally generated nature of the initiation and support stage . the Title III program. Title III projects do not have their focus and funding opportunities already established and justified by federal program priorities; instead, they must seek the superintendent's support for goals, means, and priorities within the district; the evidence suggests that without such support the chances of effective implementation were lessened.

We can better understand the role of organizational climate, implementation strategies, and other factors by analyzing and comparing their effects for all four implementation outcomes. Table 14 presents the results of considering percentage of goals achieved, teacher change, difficulty of implementation, and implementation as laid out to be dependent on project characteristics, institutional setting, and federal programs. Tables 15 and 16 display, respectively, the results of parallel analyses for projects in elementary schools and for projects funded by Title III. The patterns of significant coefficients across these tables demonstrate the importance of organizational climate, as shown by the following detailed discussion of particular effects of the independent variables comprising our measurement of organizational climate.

Morale and Extra Effort. Focusing on the organizational climate variables for all projects in Table 14, we see that extra effort by the teacher not only increased perceived success but increased the amount of change in teachers' behavior in a major way (.26 is the largest single effect in the table). Moreover, extra effort on the teacher's part is strongly related to difficulty of implementation; that is, we infer teachers worked harder on more difficult projects and changed more.

The findings on morale shown in Table 14 give further insight into these interpersonal dynamics. The higher the school's morale, the higher the project's percentage of goals achieved and the higher the fidelity of the implementation to the initial plans. Yet higher morale also was associated with an ease of implementation and, most important, with a lack of teacher change. This seemingly counter-intuitive finding is not difficult to understand when one recognizes that change in a school setting hurts.

As the case material will illustrate, it was not unusual—perhaps it is the norm—for "innovative" projects to have the ideology of change without the reality. In these instances, project participants often believed they were engaged in an interesting and useful departure from their standard practices. But because their implementation strategies did not demand or elicit actual change in a teacher's relationship to the student, to other teachers, or to administrators, morale was higher and the project was implemented as initially laid out. Yet there were exceptional projects that demanded teacher change and adaptation of the organization to the project.

Table 14

FACTORS AFFECTING IMPLEMENTATION ALL PROJECT

Independent Variables		Standardized Regression Coefficients for Implementation Outcome Measures			
		Percentage of Goals Achieved	Teacher Change	Difficulty of Implementation	Implementation as Laid Out
Resources	Funding	.06	.03	-.07	-.01
	Number of students served	.06	-.09**	-.05	.06
	Funding per student	.02	.04	-.04	.04
Educational Effects	Behavioral modification	.08*	.03	-.08**	.01
	Enrichment	-.08	.00	-.03	-.08
	Classroom organizational change	-.06	.02	.05	-.03
	Intensive traditional staffing	-.03	-.04	.05	.05
	Administrative change	.06	.04	.02	-.01
Implementation Strategy	Percentage of planning	.06	-.03***	-.02**	.04
	Staff training time[a]	-.00***	.13***	.09	-.06***
	Value of meetings[a]	.11	.12	.06	.19
	Teacher not participating in implementation decision	-.10**	-.04	.04	-.08**
	Teacher free to alter project design	.03	-.02	-.10**	-.05
	Materials not developed locally	.01	.01	-.06	.02
	Project located in special unit	-.00	-.01	.02	.03
	Project covers high and elementary schools	-.12***	.06***	.00	-.09**
	Overall teaching change required	-.06	.14	.08*	-.12**
	Change in specific teaching technique required	-.07	.10**	.07	-.06
	Extra effort required (principal's view)	.00	.05	.13***	.02
Institutional Setting					
Organizational Climate	Extra effort (teacher's view)	.09**	.26***	.21***	.16***
	Morale of teachers at school	.24***	-.06*	-.11***	.11***
	Support from superintendent	.07*	-.07**	-.05	.11**
	Support from principal	.10**	.02	-.12***	.08*
	Support from faculty	.06*	.03	-.09**	.02
School Characteristics	Number of students school	.06	.01	.12**	.03
	Percentage of black students in school	.12***	.09**	-.12***	.03
	Percentage of Spanish students in school	-.01**	-.01**	-.05	-.00
	Elementary school	.11**	.09**	.03	-.07
Teacher Characteristics	Teacher experience	.05	-.02	-.08**	.01
Federal Programs					
	Right-To-Read	-.08*	-.09**	.02	.00
	Bilingual, Title VII	.01	.09**	.12**	.04
	Federal Vocational Education	.06	.05	-.01	.05
	State Vocational Education	.00	.01	-.01	-.02
R^2/Adjusted R^2		.21/.15	.23/.18	.26/.21	.16/.10
Number of observations		509	509	509	509

Note: An asterisk (*) indicates significance at the .15 level, a double asterisk (**) indicates significance at the .05 level, and a triple asterisk (***) indicates significance at the .01 level.

[a] The interaction of staff training time and value of meetings has the following beta weights, with the rest of the table substantively the same:

Success	Change	Difficulty	Implementation
.14[a]	.14[a]	.10[a]	.14[a]

Table 15

FACTORS AFFECTING IMPLEMENTATION: ELEMENTARY SCHOOLS

Independent Variables		Standardized Regression Coefficients for Implementation Outcome Measures			
		Percentage of Goals Achieved	Teacher Change	Difficulty of Implementation	Implementation as Laid Out
Project Characteristics					
Resources	Funding	.06	.02	-.06	.04
	Number of students served	.06	-.12**	-.07	.04
	Funding per student	.06	.01	-.04	.05
Educational methods	Behavioral modification	.05	.08	-.05	-.01
	Enrichment	.06*	.02	-.04	.14**
	Classroom organizational change	.09*	.05	.12**	-.07
	Intensive traditional staffing	.02	-.01	.04	.05
	Administrative change	.00	.05	.02	-.01
Implementation strategy	Percentage of planning	.05	.02	-.03	.06
	Staff training time	.06**	.06***	.17***	-.09***
	Value of meetings	.12**	.15***	.05	.18***
	Teacher not participating in implementation decision	-.13**	.03	-.04	-.07
	Teacher free to alter project design	.01	.01	.07*	-.08
	Materials not developed locally	.01	.00	-.01	.01
	Project located in special unit	.04	-.06	-.03	.00
	Project covers high and elementary schools	-.13**	.12**	.10**	.10*
	Overall teaching change required	.02	.18***	.09	-.06
	Change in specific teaching technique required	.03	.13**	.13**	-.02
	Extra effort required (principal's view)	-.02	.07	.11**	.02
Institutional Setting					
Organizational climate	Extra effort (teacher's view)	.05	.27***	.26***	.23***
	Morale of teachers at school	.26***	-.10**	.12***	.12**
	Support from superintendent	.02	-.10**	-.04	.05
	Support from principal	.11**	.05	-.13**	.17***
	Support from faculty	.05	.07	-.02	.00
School characteristics	Number of students in school	.00	.04	-.01	-.03
	Percentage of black students in school	.07	.07	-.06	-.01
	Percentage of Spanish students in school	-.02	.04	.01	-.11*
Teacher characteristics	Teacher experience	.06	-.01	-.04	-.01
Federal Programs					
	Right-To-Read	-.07	-.12**	.01	-.03
	Bilingual, Title VII	.01	.17**	.09	.09
	Federal Vocational Education	.00	-.06	-.03	.07
	State Vocational Education	-.01	-.04	-.04	.01
R^2/adjusted R^2		.19/.11	.25/.17	.32/.25	.20/.12
Number of observations		348	348	348	348

NOTE: An asterisk (*) indicates significance at the .15 level, a double asterisk (**) indicates significance at the .10 level, and a triple asterisk (***) indicates significance at the .01 level

Table 16

FACTORS AFFECTING IMPLEMENTATION: TITLE III PROJECTS

Independent Variables		Standardized Regression Coefficients for Implementation Outcome Measures			
		Percentage of Goals Achieved	Teacher Change	Difficulty of Implementation	Implementation as Laid Out
Project Characteristics					
Resources	Funding	-.06	.03	-.03	.15**
	Number of students served	.03	.00	-.08	.19**
	Funding per student	.04	.12**	.01	.09
Educational methods	Behavioral modification	.07	-.07	-.11**	.05
	Enrichment	-.09*	.01	-.00	-.09
	Classroom organizational change	-.09*	.01	-.01	-.01
	Intensive traditional staffing	-.13**	-.09*	.13**	.05
	Administrative change	.06	-.03	.11**	.04
Implementation strategy	Percentage of planning	-.02	.03	.02	.06
	Staff-training time	.04	.18***	.07	-.07
	Value of meetings	.12**	.11**	.09*	.16***
	Teacher not participating in implementation decision	-.15***	-.07	.08*	-.11**
	Teacher free to alter project design	-.03	.04	-.06	-.06
	Materials not developed locally	-.09*	.05	-.07	-.06
	Project located in special unit	.04	-.02	.01	.04
	Project covers high and elementary schools	-.14**	.03	.06	-.22***
	Overall teaching change required	-.11	.09	.19***	-.13*
	Change in specific teaching technique required	-.07	.06	.12**	-.04
	Extra effort required (principal's view)	.03	.11**	.09*	.03
Institutional Setting					
Organizational climate	Extra effort (teacher's view)	.09	.26***	.20***	.11*
	Morale of teachers at school	.21***	-.04	-.09*	.04
	Support from superintendent	.15**	-.10*	-.01	.17***
	Support from principal	.13**	.05	-.14**	.09*
	Support from faculty	.04	.05	-.02	-.04
School characteristics	Number of students in school	.01	.02	.09	-.17**
	Percentage of black students in school	.13**	.08	-.17***	.08
	Percentage of Spanish students in school	.08	-.00	-.08	.00
	Elementary school	.14**	.11**	.02	-.08
Teacher characteristics	Teacher experience	.10**	-.12**	-.07	-.00
R^2/adjusted R^2		.28/.19	.35/.28	.28/.20	.18/.09
Number of observations		289	289	289	287

NOTE: An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level, and a triple asterisk (***) indicates significance at the .01 level.

Such change requirements aroused conflicts, lowered morale, but did, in fact, provoke teacher change.

These relationships between morale and extra effort were perhaps even more pronounced for elementary schools, as Table 15 indicates. For Title III projects (see Table 16), the same tendencies exist in the data, but the findings are weaker. In particular, the effects of extra effort and morale on the fidelity of implementation are significantly lower. We interpret these results as reflecting programmatic characteristics of Title III. Namely, many locally conceived Title III projects had a tendency to submit proposals that were broad and diffuse; thus, Title III projects were more likely to deviate from their initial plans during implementation.[8]

Support from Major Actors. The patterns of coefficients across Tables 14, 15, and 16 show that the principal was especially crucial to implementation. The variable "Support from principal" had its strongest effects in elementary schools, where, of course, the administrator is a dominant figure.

In particular, the quantitative results of Table 15, along with our field studies, suggest a hypothesis about the role played by principals in elementary schools. Insofar as they supported an innovation, they *facilitated* its implementation (thus, the coefficient of support from principal for implementation as laid out is a positively significant .17, and the coefficient for difficulty of implementation is a negatively significant -.13). The principals' opposition to projects sharply increased the prospects for failure, whereas their active or even passive support was necessary for perceived success (thus, the coefficient of support from principal for percentage of goals achieved is a positively significant .11). Yet the evidence of a weak and not significant effect on teacher change suggests that either (1) principals tended to support innovations that did not involve major change attempts or (2) their ability to influence staff behavior was limited.[9] In short, the principal seemed to serve as either a facilitator or an inhibitor of change.

Turning next to the superintendent's role, Table 14 shows the support from superintendents positively affected the fidelity of implementation and the percentage of goals achieved but was negatively associated with teacher change and with difficulty of implementation. The strong negative effects of superintendents occurred primarily in elementary schools (compare Table 14 with Table 15). It may be the case that in the relatively few situations in which superintendents took a direct interest in elementary school projects, the projects were less difficult and less likely to produce change. However, a positive influence of superintendents occurred for Title III projects (compare Table 14 with Table 16). As we hypothesized earlier, superintendents may be more likely to concern themselves with, and have more commitment to, the locally initiated Title III projects.

The different parts played by superintendents and principals during implementation are not surprising in light of the organizational structure of school districts. The organizational remoteness of superintendents may mean they can provide only a generalized support that makes the school district receptive to innovations; such receptivity may be essential to the implementation of Title III projects. Elementary school principals appear to be "gatekeepers" of change, either facilitating or inhibit-

[8] See Sec III for an extended discussion of this point.

[9] Several empirical studies of school systems have observed the limited influence of principals and other administrators on the behavior of teachers in their classroom.

ing implementation. Teachers themselves seem "isolated" in their classrooms, and alterations in their behavior may result less from the authority or influence of administrators than from their own commitment to change.

Project Characteristics

Of the three components comprising project characteristics, Tables 14 through 16 indicate that implementation strategies—the explicit or implicit design choices made to implement the project—had the most consistently significant effects on implementation outcomes. We will next examine the detailed results for implementation strategies with brief discussions of the effects of project resources and educational methods.

Implementation Strategies. Almost independently of the educational technology or method involved, implementers of innovations have considerable freedom in putting their projects into practice. The choices listed in Tables 13 through 16 (and discussed in Sec. II) reflect, though do not exhaust, the major strategies suggested by the literature and experience. Each implemented project develops its own strategic mixture. Thus, to investigate an individual project, it is appropriate to observe its characteristic implementation strategy or syndrome. However, for statistical purposes, we need to analyze the strategic elements separately. The following material discusses the effects on implementation outcomes of each strategic choice in turn but defers synthesizing the results until the conclusion.

Planning. Beginning with the first listed element of implementation strategies, the percentage of the project's budget spent in planning and project design was not significantly related to implementation outcomes in Tables 14 through 16. Projects varied considerably in the amount of planning they did, and it would appear that the extremes of virtually no planning and of almost all planning in the first year or two were not characteristic of effectively implemented projects.[10] But, in any event, the *amount* of planning may be less important than whether the *quality* of planning matched the needs of the project. That is, planning can assume different models of change (as discussed earlier, a technological, a rational, or an adaptive model). Unless the implicit planning model is congruent with the realities of project implementation, we hypothesize that teacher change and other goals will not be advanced.

Staff Training. The more staff training (i.e., the time project teachers spent in training) the more likely was teacher change, particularly in Title III projects (see Tables 14 through 16). But the amount of staff training by itself did not significantly increase perceived success and tended toward decreasing success in elementary school innovations (see Table 15).

Our fieldwork experience suggests an explanation for this discrepancy between change and perceived success. Many projects, including staff development projects funded by Title III, do not seem to have linked training in new methods to application in the classroom. For example, pullout or pre-service training may not have been able to anticipate day-to-day activities during implementation. More important, staff training that is not integrated with other strategic components that reinforce the teacher's attempts to implement a newly learned approach may have

[10] This suggests that a nonlinear relationship might be used in future analysis.

little lasting effect. We will return to this hypothesis when we consider the interactive effect of training along with staff meetings.

Meetings. The positive significance of staff *meetings* for all the implementation outcomes, for all levels of schools, and for projects on all federal programs is clearly shown by Tables 14 through 16.[11] This finding is particularly important in light of the strong dependence of implementation on organizational climate. Regular and frequent meetings can facilitate communications and coordination and also enhance morale and the teachers' commitment to the projects, when teachers believe that the meetings contribute to the essential activities of the project.

Meetings-Training Interaction. The value of meetings operating in conjunction with other elements of implementation strategy can be examined statistically by analyzing "interactions." In particular, preliminary analysis shows that although the amount of staff training time by itself is not significant for perceived success or fidelity of implementation, its interaction with meetings increases both perceived success and fidelity, as well as marginally enhancing teacher change (see footnote a to Table 14). This result reinforces the hypothesis suggested earlier: Pre-service training, including technical assistance by consultants and outsiders, may be less effective than in-service and ongoing training linked to regular and frequent meetings of the project staff.

Participation. Considering the emphasis we have placed on involvement and participation, the next finding is to be expected: If teachers felt they did not participate in day-to-day decisions as the project was implemented, implementation was more difficult, and the chances of success, of fidelity to the project design, and of teacher change were reduced (see Tables 14 through 16 under the variable "Teacher not participating in implementation decision").[12] This result was particularly strong for Title III projects, perhaps because of their local initiation.

Flexibility. Project design flexibility would seem a priori to be a desirable trait. We operationalized this flexibility (in gross terms) by measuring the freedom of project directors, principals, and teachers to alter the project design. None of the measures produced significant and stable results, although teacher flexibility had somewhat stronger effects than the others and is therefore shown in the tables. This statistical result may be due to measurement error; or it may be that flexibility did not affect implementation outcomes; or it may be that flexibility should not be considered by itself (i.e., there is a specification error) but rather must be treated as part of complex leadership relationships on the project. We were unable to measure such leadership characteristics in the first year of the study. Project leadership and flexibility remain areas in which additional research is needed.

Local Material Development. The development of materials locally by project participants is shown by the case studies to have a considerable effect on implementation. Unfortunately, our measurement of this variable is simply whether a project did or did not develop its own materials (as reported by the project director). This measurement is contaminated by the tendency of projects to "reinvent the wheel;" that is, most projects tend to adapt even prepackaged material to their own setting. Consequently, our operational measure is probably more accurate for projects that

[11] The operational variable used in the analysis is the value of meetings as reported by teachers This variable is highly correlated (.71) with the frequency of meetings

[12] This variable is a dummy variable, with "Teacher not participating" coded as 1 and "Teacher participating" coded as 0

accepted prepackaging in toto and, in this sense, did not develop their own materials. Given these definitions, not developing local materials (i.e., using prepackaged materials without adaptation) was not significantly related to implementation outcomes, except for Title III projects where it decreased perceived success (see Tables 14 through 16). A fuller discussion of this subject is deferred until Vol. III.

Projects Located in Special Units. Projects that were primarily located in special units outside of classrooms tended to be "pullout" projects in which either selected students or a whole class spent one class period, once a week, in the project's laboratory or resource center. Although the statistical data are not significant, the effects of the pullout projects seem to depend on whether they were intended for remedial purposes (e.g., in reading or math in elementary schools) or for enrichment (e.g., career education often in junior or senior high schools). The enrichment units tended to be implemented as laid out and positively affected the percentage of goals achieved; the remedial laboratory was often difficult to implement. In either case, projects not located in the classroom usually did not engage the teacher in the project and were thus less likely to result in changes in teachers' behavior (see Table 15).

Project Coverage. Of the 104 projects in the Rand sample that served high schools, 65 also served elementary schools.[13] These broad projects included some Title III, Right-To-Read, and Vocational Education projects. Such broad project coverage had a strong negative effect on the effective implementation of projects, particularly those funded by Title III (see Tables 13 and 16).

These projects seemed to have had severe management and administrative problems resulting from the attempt to integrate similar goals and treatments across different types of schools. For example, some reading projects spanning school levels promoted complex and ambitious plans for diagnostic and prescriptive methods. Although some of these projects did produce significant change teacher behavior at the elementary level, where teachers view reading as one of the central teaching tasks (see Table 15), they may not have gained the necessary commitment of high school teachers. The net result was the apparent failure of the project to realize its high expectations.

Change or Effort Required of Teachers. In addition to staff training and meetings, the implementation strategies most likely to increase teacher change involved those requiring change. Tables 14 through 16 indicate that this important finding

[13] The dispersion of projects in the Rand sample for the different school levels was

Types of Schools Served	Number of Projects in Rand Sample
Both elementary and high schools, or both elementary and junior high	97
Elementary schools, but no high schools, no junior highs, and no out-of-school or adult programs	106
High schools and/or junior highs, but no elementary schools or preschools	57
Other combinations of school types, including, for example, exclusively nonpublic or exclusively out-of-school and adult programs	18
Total	278

held whether the required change involved a specific teaching technique (e.g., on a Right-To-Read project) or an overall change in teaching style (e.g., in an open-classroom project). Projects requiring teacher change and extra effort were difficult to implement and generally did not adhere to the initial project design. Perhaps because of their ambitious nature, they tended—although the estimates are not significant—to have a negative effect on the achievement of project goals.

Mutual Adaptation Strategy. Thus far we have discussed the findings for the effects of implementation strategies item by item.[14] However, each project employed its own combination of strategic choices that defined its particular implementation strategy. Although we cannot statistically analyze individual combinations, the data do suggest characteristics of an implementation strategy that might be more likely to result in high levels of teacher change and achievement of project goals. In particular, frequent and regular staff meetings, staff training held in conjunction with meetings, and project requirements placed on teachers to alter their behavior appear to be elements that worked together so that project participants could adapt to the project and vice versa. This combination seemed to comprise key components of an implementation strategy that might be called a *mutual adaptation* strategy. We hypothesize that a mutual adaptation strategy may be characteristic of projects that result in significant change. This hypothesis will be further investigated in the case studies of Vol. III.

Project Resources. The resources of projects were measured in terms of (1) the absolute level of funding in the year of the maximum grant from all sources, (2) the number of students served by the project, and (3) the funding per project student. Aside from some exceptions to be noted, Tables 14 through 16 show that these measures did not have strong effects on implementation outcomes.

The apparent irrelevance of project resources for most implementation outcomes may be the result of the way the variables were measured. For example, rather than using the maximum per year grant, the average per year grant might be used. (See Sec. II for a discussion.) Or rather than the linear specification of the variables, a more complicated expression might better capture the effect of resources. For example, it could be argued that low levels of funding or very high levels of funding diminish the chances for effective implementation, but that projects in the range of $100,000 to $150,000 have increased chances of being effective. Or it may be that, within the range of grant variation involved in the federal demonstra-

[14] As indicated previously, the list of strategies is not exhaustive. Some possible strategies (e.g., how students should be approached in order to implement a project) were not measured. Other strategies were measured but could not be incorporated into the analysis for technical or measurement reasons. For example, one implementation strategy involved incentives offered to the project staff. The survey did not measure such incentives as professional rewards or increased status, which seem effective in motivating commitment (see Vol. III). We did gather data on whether the staff was paid in part or in full for training on the project. Preliminary analysis indicates that these money incentives had no significant influence on the effective implementation of a project or on changes in teacher behavior. The variables for training paid in part or in full were not entered into the multivariate analysis shown in Tables 13 through 16 because of multicollinearity problems. However, numerous multiple regressions not detailed in this report support the above conclusion, as do the following pairwise correlations:

	Percentage of Goals Achieved	Teacher Change
Training paid for in part	.03	−.00
Training paid for in full	.05	.02

Number of observations = 509.

tion projects, differences in funding did in fact have little effect. In lieu of further analysis, the latter hypothesis should be seriously entertained, namely, that variations in funding above a minimum level did not affect implementation outcomes.

Large target-group size projects did significantly reduce the chances for teacher change, particularly in elementary schools (see Table 15). In addition, the more concentrated the funding was on Title III projects, the more likely was teacher change. (See Table 16.) Finally, Title III projects that had high levels of funding and served large numbers of students—a combination implying high initial investment in such capital expenditures as computers or schoolwide resource centers—were likely to be implemented as laid out, perhaps because little change of the organization was required, and thus adaptation of the project did not occur.

Educational Methods. Earlier in this section we examined the effects on implementation outcomes of variation in educational methods within each federal change agent program. We found that differences in the level of the methods explained only a small percentage of the variation in implementation outcomes. The analyses shown in Tables 14 through 16 test a similar hypothesis but with the addition of controls for implementation strategies, project resources, and institutional setting variables. Again, variation in the level of educational methods as measured by factor analysis scores did not strongly affect implementation outcomes. In addition to measurement errors, this finding may be faulty because of a statistical artifact. Because educational methods were weakly linked with other design choices and with federal programs, the estimates of their separate effects mav be somewhat inaccurate (see App. B). Even if these problems were more significant than we believe they are, there seems little doubt that differences in the educational method or technology cannot account for the variation in implementation outcomes by itself, that is, without reference to the institutional setting and implementation strategies.

FEDERAL PROGRAMS

For all the reasons mentioned earlier in this section, we must be cautious in weighing the net effect on implementation outcomes of one federal program relative to others. We have analyzed the effect on implementation outcomes of federal change agent programs by themselves and then in conjunction with variations in the level of educational methods within programs. Although some useful distinctions were drawn, the differences between the programs explained little of the variation in implementation outcomes.

The analysis involved in Tables 14 through 16 takes the next step of introducing, and thus controlling for, project and institutional characteristics. The results indicate that, other things being equal, Right-To-Read projects and Bilingual, Title VII projects were less likely to produce teacher change than Title III projects, and that Bilingual, Title VII projects were relatively difficult to implement. However, perhaps the most important point suggested by the tables is how little the knowledge of federal sponsorship helps in predicting project implementation outcomes. In short, the variation between programs was less important than the variation between projects' institutional setting and implementation strategies.

SUMMARY OF MAJOR FINDINGS AND HYPOTHESES

1. The effective implementation of innovative projects was primariiy dependent on a supportive institutional setting and on an implementation strategy that fostered the mutual adaptation of the staff to the project's demands, and of the project's design to the reality of its setting.
2. Projects funded by the same federal program showed considerable variation in their implementation strategies and institutional settings. These within-program variations affected project implementation more significantly than did the differences between federal programs.
3. Projects using similar educational methods or technologies varied considerably in their implementation strategies and institutional settings. The variations affected project implementation more significantly than did the differences between the educational methods or technologies themselves.
4. Superintendents, who tend to be organizationally remote, provided a generalized support that may have made schools receptive to innovations; such receptivity may be essential to Title III projects. Elementary school principals appear to have been "gatekeepers" of change, either facilitating or inhibiting implementation.
5. The following elements of implementation strategies promoted teacher change:

   a. Staff training.
   b. Frequent and regular meetings.
   c. Staff meetings held in conjunction with staff training.
   d. The quality and amount of change required by the project.

   The following elements of implementation strategies inhibited perceived success or teacher change:

   a. The lack of the above elements.
   b. Teachers not participating in day-to-day implementation decisions.
   c. For Title III projects, the lack of local material development.

   The following elements of implementation strategies were not significantly related to implementation outcomes:

   a. The *quantity* of planning.
   b. Participants' freedom to alter the basic project design on difficult projects.
   c. Part or full pay for training.

6. Elementary school projects were more effectively implemented than junior or senior high school projects and were more likely to produce teacher change.
7. Within the range of variation of differential funding considered here, a project's funding level did not have significant effects on teacher change or perceived success. Projects that serve most of, or the entire, student body of elementary schools were unlikely to produce teacher change. The more concentrated were the resources of Title III projects, the more likely was teacher change.

V. EXPECTED CONTINUATION: DISTRICT LEVEL

The federal demonstration projects provide "seed money" to local school districts in the hopes that such extra funds will stimulate the adoption and spread of innovative practices. In the first year of this study, we examined the "trial" period of the innovation during which the project was initiated and implemented with financing, at least in part, by federal funds. But a major test of the impact of these funds is whether successful projects can take root after the termination of federal funds, that is, whether successful innovations are *continued* by the LEA and result in enduring changes in local educational practices.

Continuation is a difficult question to assess and analyze. Indeed, our first-year research suggests that the effects of educational innovations need to be measured in a variety of ways for different levels of the school organization. For example, innovative projects can produce change in teachers' classroom behavior and activities, can affect the standard operating practices and educational methods within schools, and can alter districtwide priorities and procedures. Because of these diverse and complex possibilities, it is difficult to evaluate the extent to which these changes are continued after the cessation of federal funds. Moreover, the various outcomes may be "continued" in partial and unanticipated ways. Thus, innovative classroom practices can be continued by an individual teacher independently of the formal continuance of the project or, indeed of the awareness of school officials. Such changes can be both enduring and significant, and thus need to be weighed as part of the project's long-run effect.

Continuation will be the focus of the second phase of Rand's overall research. However, during the 1973-74 survey and case studies of projects in their last year of federal funding, we did gather information about *expected* continuation. This information allowed us to conduct preliminary analyses of continuation and to formulate hypotheses for the second phase in which we will observe projects after federal funding has ended. Volume III examines the incorporation of project elements at the school or individual level. This section analyzes the district continuation decision.[1]

We expect the project's success or failure during its implementation stage to affect a LEA's decision about continuation. But political and economic factors as well as internal organizational pressures and constraints may also influence the choices made about the project's future. This section explores some of these complex relationships in order to establish preliminary findings and working hypotheses for additional research.

We describe below the survey items used to measure continuation and project

[1] Several studies of Title III continuation were used as a basis for many of the hypotheses investigated for the various federal programs Although this study has a different focus, some of the results are comparable. Among these studies are Jerome B Brightman, "The Continuation Rate of Three-Year ESEA Title III Projects," *A Report to the President's National Advisory Council*, December 15, 1971; Norman E. Hearn, "Innovative Educational Programs A Study of the Influence of Selected Variables upon Their Continuation Following the Termination of Three-Year ESEA Title III Grants," Ph.D. diss., George Washington University, Washington, D C, 1969, and Anthony N Polemeni, "A Study of Title III Projects after the Approved Funding Periods," Ph D. diss., School of Education, St. John's University, Jamaica, New York, 1969

outcomes at the district level. Then we compare these outcomes for the various federal change agent programs to determine whether the variation in the expected continuation of projects was related to the differences between the programs. Following these program comparisons, we present and test explicit hypotheses relating political, economic, and organizational factors to continuation.

MEASURES OF PROJECT OUTCOMES AT DISTRICT LEVEL

We previously argued that implementation outcomes at the classroom level were best measured by the responses of teachers to a series of questions. However, the continuation decision is primarily a district decision, and studies have found that the superintendent is the principal actor in making this decision.[2] Therefore, we relied on superintendents' answers as the best measure of expected continuation.[3]

To complement the analysis of continuation, we also used measures of the superintendents' perception of project success and of the difficulty of implementing the project.[4] The reader should be warned that the superintendents' responses in these areas correlated weakly with those of other actors, perhaps because superintendents are concerned with broader priorities. Hence, the superintendents' views

[2] See Brightman (1971) and Hearn (1969).

[3] Although the survey asked a number of questions, responses to the following question will be used in the analysis:

Do you expect this project will be expanded, continued at the present level, cut back, or not continued at all after termination of federal funds?

Expanded	25.39%
Continued at the present level	26.45%
Cut back	40.74%
Not continued at all	7.40%

Number of answers = 220.

[4] The specific questions and frequency of responses were

Overall, when you take into account the goals the project started with and the resources it had, what proportion of its goals would you say the project achieved?

Mean = 55.7%
Median = 65%
Standard deviation = 33%

Overall, how difficult do you feel that this project has been to implement, very difficult, moderately difficult, a little difficult, or not at all difficult?

Very difficult	13.16%
Moderately difficult	44.74%
A little difficult	28.42%
Not at all difficult	13.68%

Number of answers = 221.

[5] Averaging the answers of teachers on a project (maximum was four teachers at two schools in the Rand sample) and averaging the answers of principals on a project (maximum was two), we obtained the pairwise correlations of the various outcome measures (including continuation to be defined subsequently) shown below for teachers, principals, and superintendents

of success and fidelity of implementation need to be analyzed differently than Sec. IV's analysis o. teacher responses.

In addition to the limitation on the analysis implied by the use of *expected* continuation, several other qualificati ns should be recognized. Some projects reported as likely to be continued may not be. Moreover, some projects that are initially continued may be phased out several years later.[6] Therefore, our figures for continuation using the measure of expected continuation are likely to be inflated However, given sample limitations, the relative, rather than the absolute, level of continuation is our primary concern.[7]

Another limitation was discovered during the pre-testing of the survey in November 1973. We found that superintendents, as well as other participants of projects in their last year of federal funding, had begun to decide on continuation, but only in broad terms. They seemed fairly certain about the general question of continuation, but not about such important details as future budget allocations and future staffing levels. Therefore, the measurement of expected continuation was a gross measure, lacking the precision that the next phase of this study plans to attain.[8]

PROGRAM COMPARISONS ON CONTINUATION

To what extent did the differences between federal change agent programs explain the variation in expected continuation and other project outcomes? To examine this question, we conducted a statistical analysis similar to the program comparisons done for implementation-classroom level outcomes presented in the preceding section.

Table 17 displays the results of compari. the federal programs on their aver-

	Teacher Averages				Principal Averages				Superintendent	
	Dif.	Change	Imp.	Goals	Imp.	Dif.	Contin.	Goals	Dif	Goals
Teacher averages										
Dif.										
Change	.26									
Imp	−.03	.24								
Goals	−.17	.35	.60							
Principal averages										
Imp	−.10	.19	.58	.59						
Dif.	.27	.16	.14	.02	.01					
Contin	.07	−.02	−.02	−.06	−.08	−.04				
Goals	−.18	.18	.37	.53	.57	−.09	.22			
Superintendent										
Dif.	.20	−.03	−.23	−.13	−.19	−.00	.06	−.10		
Goals	−.02	.11	.35	.34	.35	−.00	−.04	.38	−.21	
Contin	−.00	.10	.19	.31	.29	.11	.18	.25	.02	.15

[6] See Brightman (1971) and his computation of a "real" continuation rate

[7] We expect relative levels to be less affected by these overestimates than absolute levels Nonetheless, given the above-mentioned problems, the results must be treated cautiously.

[8] For the sake of statistical analysis, we will use the variable as if it were continuously, rather than categorically, measured with 1 not continued, 2 cut back, 3 continued at present level, and 4 expanded.

age outcomes for the projects in the sample. For the sake of comparison, the teachers' average responses on percentage of goals achieved and difficulty of implementation are presented next to the superintendents' average answers. Discounting the absolute values of these figures, the data suggest a general observation about the relative results: There was comparatively little difference between the programs in the average outcomes of their projects measured in the above terms. This finding parallels similar results for implementation outcomes. Again we suspect that program differences cannot be adequately assessed without taking into account such elements as the educational methods employed on a project or its funding level or the size of the school district.

Before introducing some of these elements, Table 17 reveals several marginal differences between the federal programs that illuminate the differential effects of their distinctive management strategies:

1. Vocational Education projects were the least likely to be continued even though superintendents viewed them as accomplishing a high percentage of their goals. This finding is consistent with the inferences we drew from the classroom-level data, namely, that Vocational Education projects seemed to achieve a high percentage of their goals because they were not attempting major innovations but simply added career enrichment materials to the curriculum. The superintendent data suggest that these add-on projects were the least likely to be continued by the district when the federal funds are terminated.[9]
2. Bilingual, Title VII projects were viewed as the most difficult to implement and as having achieved the lowest percentage of their goals. Nonetheless, their expected continuation was not significantly lower than the average of projects funded by the other programs. (Subsequent analysis shows that Bilingual projects tended to have high expected continuation, once other factors are controlled.) Our field studies suggest an explanation for this disparity between the uneven past performance of Title VII projects during the trial period and their likely continuation: Local constituencies have mobilized support or created demand for bilingual education within many school districts and state agencies and thus produced pressure for a local and state commitment to deal with their problems.[10]
3. Superintendents reported Right-To-Read projects as relatively the easiest to implement and somewhat more likely to be continued than Vocational Education projects. Subsequent analysis suggests that projects with educational goals that are more central or important to district educational concerns are more likely to be continued. Thus, Right-To-Read projects concerned with the core task of reading may have generated more commitment than enrichment-type Vocational Education projects.[11]

[9] It is interesting to note that teachers found the Vocational Education projects markedly less difficult to implement than the superintendents reported. Could it be that superintendents felt the projects were easier than they cared to admit?

[10] Note the differences between the teachers' and the superintendents' assessments. Superintendents appeared to accord less success to Bilingual projects, perhaps because they are more concerned with broader political issues.

[11] Note the discrepancy between the teachers' perception of the difficulty of Right-To-Read projects and the superintendents' view that these projects were the easiest to implement From the standpoint of high-level administrators, the packaged management alternatives and the noncompetitiveness of the Right-To-Read grants might have been quite attractive; unfortunately, these advantages were often dysfunctional at the classroom level

Table 17

PROGRAM COMPARISONS ON CONTINUATION

Federal Program	Average Scores (standard errors)				
	Expected Continuation	Percentage of Goals Achieved		Difficulty of Implementation	
	Superintendent	Superintendent	Teacher	Superintendent	Teacher
Title III (State and Federal; n = 135)	2.78 (.08)	75.0 (1.5)	69.9 (1.3)	2.64 (.07)	2.47 (.04)
Right-To-Read (n = 15)	2.87 (.24)	68.7 (4.5)	70.1 (3.0)	2.13 (.22)	2.47 (.10)
Title VII, Bilingual (n = 18)	2.61 (.22)	63.3 (4.2)	71.3 (2.9)	2.83 (.20)	2.74 (.10)
Vocational Education (Federal, State; n = 18)	2.28 (.22)	74.4 (4.5)	75.4 (3.3)	2.56 (.20)	2.10 (.11)
Significance of F-statistic (3182)	.16	.04**		.11*	
Significance of T-test that					
Title III ≠ Right-To-Read	.73	.59		.03**	
Title III ≠ Bilingual	.48	.01***		.38	
Title III ≠ Vocational	.03**	.90		68	
Right-To-Read ≠ Bilingual	.44	.38		.02**	
Right-To-Read ≠ Vocational	.07**	.35		.16*	
Bilingual ≠ Vocational	.29	.06**		.28	
Range of dependent variables	1-4	0-100		1-4	

NOTE: An asterisk (*) indicates significance at the .15 level, a double asterisk (**) indicates significance at the .10 level, and a triple asterisk (***) indicates significance at the .01 level.

4. The results for Title III projects are difficult to interpret. Superintendents viewed them as more difficult to implement than Right-To-Read projects, as more successful than Title VII projects, and as more likely to be continued than Vocational Education projects Various explanations of these gross comparisons could be offered. But considering the diversity of educational methods and activities encompassed by Title III, interpretations would be more accurate after additional elements are introduced into the analysis.

We can elaborate these general findings by analyzing the effects of variation in educational methods within each federal change agent program Table 18 presents the results of a multiple regression analysis designed to examine these effects.[12]

The introduction of within-program variations helps to explain somewhat more of the variation in project outcomes but not much more. Nonetheless, several informative findings do emerge.

[12] See Sec IV for a discussion of the statistical structure of the parallel analysis for implementation outcomes

Table 18

PROGRAM-METHOD COMPARISONS ON CONTINUATION: SUPERINTENDENTS' RESPONSES

Educational Methods by Program	Regression Coefficients and Standard Errors		
	Expected Continuation	Percentage of Goals Achieved	Difficulty of Implementation
Title III	2.77 (.08)	75.3 (1.6)	2.67 (.08)
Behavioral modification	-.07 (.08)	-.5 (1.5)	-.09 (.08)
Enrichment	-.09 (.08)	.6 (1.5)	.05 (.08)
Classroom organization	.22*** (.08)	.3 (1.5)	.21*** (.07)
Intensive traditional staffing	.06 (.08)	1.0 (1.5)	.09 (.07)
Administrative changes	.07 (.08)	-1.4 (1.6)	.05 (.08)
Right-To-Read	2.85 (.42)	57.6 (8.0)	2.12 (.40)
Behavioral modification	.01 (.22)	-2.3 (4.1)	.02 (.21)
Enrichment	.15 (.29)	-3.2 (5.6)	-.07 (.28)
Classroom organization	-.08 (.3[illegible])	1.3 (6.7)	.13 (.33)
Intensive traditional staffing	.19 (.44)	17.8** (8.5)	-.15 (.42)
Administrative changes	.47 (.38)	7.0 (7.2)	-.06 (.36)
Bilingual, Title VII	2.45 (.33)	53.4 (6.3)	2.99 (.31)
Behavioral modification	-.60*** (.26)	-6.5 (4.9)	.05 (.24)
Enrichment	.58 (.44)	14.8** (8.4)	-.48 (.42)
Classroom organization	-.62** (.36)	-18.1*** (6.8)	.60** (.34)
Intensive traditional staffing	.63* (.39)	17.2** (7.4)	-.19 (.37)
Administrative changes	-.05 (.22)	.8 (4.2)	.05 (.21)
Vocational Education	2.23 (.38)	79.7 (7.3)	2.58 (.36)
Behavioral modification	.24 (.22)	-2.9 (4.3)	.26 (.21)
Enrichment	.25 (.27)	-.7 (5.1)	-.17 (.25)
Classroom organization	.37* (.23)	8.6** (4.4)	-.26 (.22)
Intensive traditional staffing	.11 (.30)	5.9 (5.7)	-.13 (.28)
Administrative changes	.03 (.31)	-.2 (5.8)	.05 (.29)
R^2/adjusted R^2	.18/.07	.17/.05	.13/.00
F-statistic overall test (23, 162)	1.59**	1.42**	1.02
Significant (.10) T-tests on differences of program constants	None	Title III > RTR Title III > BIL VOC > RTR VOC > BIL	BIL > RTR

NOTE: An asterisk (*) indicates significance at the .15 level, a double asterisk (**) indicates significance at the .10 level, and a triple asterisk (***) indicates significance at the .01 level. Coefficients of programs are, of course, all significantly different from zero, but a more relevant comparison is with the average of projects when the variation of the level of educational methods is ignored.

1 Title III projects with high levels of classroom organization changes were more likely to be continued than other Title III projects, even though they were viewed as more difficult to implement and no more successful. This finding suggests a hypothesis to be tested shortly—classroom organization change projects were likely to have had the commitment of the district and thus were likely to be continued independently of their perceived success during implementation.
2. The superintendents' attitudes toward the continuation of Right-To-Read projects may have depended more on the reading focus and programmatic characteristics of Right-To-Read than on the specific level of educational methods employed on individual projects. The same result—and inference—held for Vocational Education (with the exception of classroom organization changes, which were seldom used in Vocational Education projects).
3 The expected continuation and perceived success of Bilingual projects depended on the mix of methods employed. High levels of behavioral modification instruments and of classroom organization changes were seen as difficult, relatively unsuccessful, and less likely to be continued. In contrast, intensive use of traditional staffing and enrichment tended to contribute to perceived success and to expected continuation.

In sum, despite some important marginal effects, neither the type of federal change agent program nor the type and level of use of educational methods greatly influence expected continuation. Next we will identify other factors that might affect continuation.

IDENTIFYING POSSIBLE FACTORS AFFECTING EXPECTED CONTINUATION

The last stage of the innovative process is incorporation, the process by which the practices, activities, or behavior developed during project implementation become part of the standard procedures in the classroom, school, or district. Undoubtedly, the most immediate sense of incorporation occurs in the changes in teachers' behavior brought about by participation in an innovative project. For example, a teacher involved in classroom organization methods may come to assimilate individualized instruction practices. Such individual change lasts beyond the life of any special project.

However, individual teacher change in school settings tends to be isolated. Teachers, particularly in elementary schools, have little influence on administrative decisions that structure the school and its educational and bureaucratic practices; yet they operate behind "closed doors" and thus have considerable freedom to follow their own teaching practices. This "culture of schools" inhibits the diffusion of individual change from one teacher to another in the same school and certainly across school lines or district boundaries.

Consequently, we would not expect projects concerned with the development of staff to stimulate additional change beyond their original location unless school administrators and LEA officials supported the innovative project.

In the political-economic context of the LEA, the test of support generally comes

when the funding for special projects is about to run out. It is then that a decision must be made as to whether the project in some form or another should be *continued.*

This is not to say that continuation is solely determined by economic considerations. Resources matter, of course. But within the same overall budget, districts can juggle their priorities. The importance of the funding decision on continuation reflects a political-organizational reality: Administrative decisions tend to be timed on budget planning cycles. The end of the temporary federal funding for an innovative project forces the LEA to assess its priorities—forces a decision about continuation.

A simple conceptualization of the nature of this decision will help identify factors that might affect continuation. We conceive of the decision to continue an innovation as a function of four general considerations—the likelihood of its future success, the importance of the educational need served by the project, the resources required by the project relative to district resources, and the organizational-political forces inhibiting or promoting the innovation.

Each of these theoretically important considerations was measured using survey and census data. The remainder of this section defines their meaning and discusses the variables used as their operational indicators for statistical purposes. To give the reader a sense of the tendencies in the data, Table 19 displays pairwise correlations between expected continuation and these variables. Pairwise correlations can be misleading, however, because of multiple interrelationships among variables. Therefore, we will next analyze multivariate relationships between these variables and continuation.

Estimated Success of an Innovation

In deciding on the future prospects of an innovation, superintendents may draw on information about the innovation's implementation during the trial period of federal funding. One source of such information might be evaluation reports. However, our fieldwork experience suggests that superintendents may not pay much attention to evaluation reports. They seem instead to rely on formal and informal discussions with project participants. We used this insight about the communications network in school systems to develop a measure of the superintendent's perception of a project's success that was uncontaminated by his opinion of the importance of the project.[13]

In particular, we assumed that the superintendent's perception of success (measured by his report on the percentage of the project's goals achieved) depended on the principals' and teachers' perception of implementation outcomes. Because more than one principal, as well as several teachers, could have been involved in an innovative project, we assumed that the superintendent subconsciously integrated the responses of these different individuals—who not infrequently disagreed—by averaging the principals' responses, averaging the teachers' responses, and weigh-

[13] The superintendent's answer to a question about the success of a project may be inextricably related to his view of the project's importance (as well as to his own characteristics) Therefore, we would introduce statistical errors (a simultaneity bias) into the analysis if we were to use both variables as explanatory variables for a project's continuation Instead, our "measurement" of project success is an estimate of the superintendent's answer about success, one that is based on variables that can be assumed to be unrelated (or exogenous) to the superintendent's perception of importance or his personal characteristics

Table 19

PAIRWISE CORRELATIONS OF VARIABLES WITH EXPECTED CONTINUATION

Explanatory Factors		All Projects	Title III Projects
Project Considerations			
	Perceived success (superintendent)	.15	.08
	Perceived difficulty (superintendent)	.02	.03
	Centrality	.15	.12
	Funding level	-.09	-.02
	Number of students served	-.02	-.02
	Funding per student	-.13	-.17
	Project covers high and elementary schools	-.23	-.24
	Project is special unit	-.07	
	Percentage of project budget for planning	.15	
	Project not locally developed	-.07	
Institutional Characteristics			
Setting	School district enrollment (log)	.24	.34
	Percentage of population black.	-.12	-.0[illegible]
	Percentage of population Spanish	.14	.1[illegible]
	Percentage of population with $25,000 income	.11	.13
	Percentage of population poor	-.11	-.19
	SMSA[a] (rural versus urban)	-.06	
	Local expenditure per pupil		
	State expenditure per pupil		
	Adequacy of finances (superintendent's view)		
External forces	Extent of social-political difficulties	-.18	-.11
	Difficulty from test scores	.18	.24
	Difficulty from community	.11	.20
	Community supports innovations		
	Community criticizes innovations		
	School board consensus	-.05	
Internal characteristics	Initiate projects if additional resources	-.14	-.20
	Initiate projects if can be continued	.29	.21
	Propensity to adopt innovations	.32	.38
	Project supported by principals	.25	.31
	Superintendent's tenure	.22	.26
Educational Methods			
	Behavioral modification	-.10	-.10
	Enrichment	-.15	-.13
	Classroom organizational change	.23	.28
	Intensive traditional staffing	-.05	-.04
	Administrative change	.12	.03
Federal Programs			
	Right-To-Read	.05	
	Bilingual, Title VII	-.04	
	Federal Vocational Education	-.02	
	State Vocational Education	-.15	
	Title III	.10	
Number of observations		122	88

[a]Standard Metropolitan Statistical Area.

ing the disagreement between people at the same level.[14] We call the resulting measure the estimated success of the project as perceived by the superintendent.

Educational Needs

Innovative projects are designed to serve educational needs and priorities within the district. A cynical view of school district decisionmaking holds that projects are continued or not regardless of their educational value; a naive view places full weight on educational value. The facts undoubtedly lie somewhere between these extremes. To estimate the importance of educational needs for a project's continuation, we used the concept of *centrality* (see Vol. I) or how close the goals of a project are to the major educational objectives of the district.[15] For example, a superintendent may consider a remedial math project to be more central than a project comprised of field trips to the zoo. (See Table 19 for the bivariate correlation between centrality and expected continuation.)

Resources

It is a truism to say that a district cannot continue a project unless it can afford to do so. Schools are always limited in their resources. Yet within budgetary limits they can manipulate priorities. Moreover, some innovations are aimed at *replacing* existing activities, and thus their incremental cost to the district may be small relative to their accounting cost. The relationship between the absolute cost of a project and its continuation is an important but unresolved issue, one we will be examining subsequently.

The *ideal* measure of cost would involve computations of project incremental cost relative to the district's discretionary or slack funds. Unfortunately, we could

[14] Statistically, we predicted the superintendent's perceived success by estimating the following equation:

Superintendent: Percentage of Goals Achieved =

$$
\begin{aligned}
a &+ b_1 \text{ (ave. principal \% goals achieved)} + b_2 \text{ (ave. principal difficulty of impl.)} \\
&+ b_3 \text{ (ave. principal impl. as laid out)} + b_4 \text{ (var. principal \% goals achieved)} \\
&+ b_5 \text{ (var. principal difficulty of impl.)} + b_6 \text{ (var. principal impl. as laid out)} \\
&+ b_7 \text{ (ave. teacher \% goals achieved)} + b_8 \text{ (ave. teacher change)} \\
&+ b_9 \text{ (ave. teacher difficulty of impl.)} + b_{10} \text{ (ave. teacher impl. as laid out)} \\
&+ b_{11} \text{ (teacher variance \% goals achieved)} \\
&+ b_{12} \text{ (teacher variance teacher change)} \\
&+ b_{13} \text{ (teacher variance difficulty of impl.)} \\
&+ b_{14} \text{ (teacher variance impl. as laid out)}
\end{aligned}
$$

This equation forms the first stage of a two-stage least-squares estimation in which the above independent variables are instruments and the superintendent's perceived success is endogenous.

[15] The specific question asked of superintendents and the frequency of their responses were:

How would you rate this project in terms of how close its goals are to the major educational objectives of this district? Would you say very close, moderately close, or not very close?

Very close	79%
Moderately close	20%
Not very close	1%

Number of answers = 186.

not measure these elusive quantities. As surrogates, we have used, in preliminary analysis, data on

1. The project resources: its level of funding in its biggest year, the funding level relative to the number of students served by the project, and the spread of the project over grade levels.
2. Demographic characteristics associated with (among other factors) economic slack or the lack of it: district size, percentage of minorities in the district, percentage of wealthy and percentage of poor in the district, and the district's urbanness.
3. Rough measures of district finances: local expenditure per pupil, state expenditure per pupil, and the adequacy of the district's financial situation, as reported by the superintendent (see Table 19).

Appendix C examines the effects of many of these variables on the district's propensity to innovate.[16]

Organizational-Political Forces

Volume I argued that bureaucratic and political forces within school districts can either inhibit or promote innovations. In the instance of the continuation decision, an innovative project necessarily creates a set of constituencies within, and occasionally outside of, the district. Participants can become psychologically committed to the project, moreover, they can come to see their self-interest involved in whether a project is continued. Detractors and supporters form de facto pressure groups. Although we could offer many specific hypotheses related to the importance of organizational-political forces, this section can measure few of them, and we thus limited the statistical analysis to a small number of significant effects.

The survey asked superintendents about *external* political-social forces and about *internal* organizational characteristics. The measurements of external forces included the superintendent's assessment of the extent of social-political difficulties in the district, specific difficulties arising from student test scores and with the community, the community's attitude toward innovations and its general tendency to criticize the district, and whether the school board was in general agreement or divided over district goals. (See Table 19 for bivariate correlations with continuation.)

The survey did not delve directly into internal organizational relationships—for example, the locus of decisionmaking or the nature of authority relationships (see Vol. I)—but asked several questions that attempted to tap broad characteristics. One series of questions dealt with identifying which items from a list of 22 common educational innovations were adopted by the district. The responses to these questions were fashioned into a scale of the district's propensity to adopt innovations, which was used to test the following hypothesis: The higher the propensity of a district to adopt innovations, the more likely it will be to continue a project. The positive correlation of .32 shown in Table 19 tends to support this hypothesis, at least in the bivariate case.[17]

[16] Although the analysis of the district's propensity to innovate offers several significant findings, it is somewhat extraneous to the key questions raised in this volume. It was appended because of its importance in selecting district characteristics for the above analysis.

[17] This hypothesis will not be further tested by multivariate means in this volume because of multicollinearity problems. For a detailed discussion of the district's propensity to innovate, see App. C.

We also asked questions about the initiation of special projects of the type funded by federal change agent programs. Based on earlier studies and on our fieldwork, we hypothesized that there are two general attitudes toward initiation: at one extreme, an *opportunistic* attitude in which special projects were treated as add-ons and would only be initiated if resources from outside the district were available (e.g., a zoo project); at the other extreme, a *problem-solving* attitude in which funding was sought for projects that were intended by the district to attack priority needs (e.g., remedial math) and that were thus slated for continuation *before the project's implementation.* The hypothesis to be tested is obvious—opportunistically initiated projects are unlikely to be continued, whereas projects initiated with the expectation of continuation are likely to be continued.[18]

Considering the bureaucratic importance of principals in the operation of the school district, we asked project directors the extent to which principals, as well as other actors, supported the project. We will test the hypothesis that such support is necessary to continuation. (Table 19 indicates a positive correlation of .25.)

The final variables related to continuation were superintendents' characteristics. Of a variety of personal characteristics, our preliminary analysis suggested that the superintendent's tenure had significant and positive effects for adoption of innovations (Possible reasons for this effect are discussed in App. C) We anticipate a similar relationship for continuation.

PREDICTING EXPECTED CONTINUATION

Table 20 presents the results of a multivariate statistical analysis designed to test many of the hypotheses proposed in the preceding section.[19] Expected continuation as reported by the superintendent is the dependent variable regressed on the independent variables previously defined with the coefficients shown in standardized form in Table 20. In broad terms, the results indicate that the district's decision to continue a project was based on the superintendent's weighing of four general concerns—the project's past success, the centrality or importance of the educational need served by the project, the resources required by the project, and the organizational-political forces inhibiting or promoting the innovation.

In particular, Table 20 shows that the following detailed hypotheses proved statistically significant:

1 The higher the perceived success, the more likely the project was to be continued.

[18] These variables are listed in Table 19 under the respective names "Initiate projects if additional resources" and "Initiate projects if can be continued " The bivariate correlations of 14 and .29 support the above hypotheses

[19] The advantage of multivariate regression analysis is that the effect of each explanatory factor on the dependent variable is computed statistically for all the other factors in the equation However, if the explanatory factors are highly interrelated, the procedure loses some of its accuracy Therefore, we could not test a number of the hypotheses discussed in the preceding section.

The statistical procedure whose results are shown by Table 20 is two-stage least squares The first stage was used to estimate the superintendent's perceived success for a project, as discussed earlier R^2 and the T-statistics for this procedure have somewhat different meanings than in ordinary least-squares regression. See P. Dhrymes, *Econometrics*, Harper & Row, New York, 1970 Because the estimates from this two-stage procedure are sensitive to our assumption about how the superintendent's perception of success is calculated, Table 21 presents regression results that compare the effects of the factors with and without estimated project success included. The calculations excluding estimated success use ordinary least squares

Table 20

FACTORS AFFECTING CONTINUATION: ALL PROJECTS AND TITLE III PROJECTS

Explanatory Factors		Standardized Regression Coefficient for Effects on Expected Continuation	
		(1) All Projects	(2) Title III Projects
Project Considerations			
	Perceived success (estimated)	.36**	.32**
	Centrality	.23**	.18
Resources	Funding level	-.18**	-.14**
	Funding per student	-.18**	-.28**
	Project covers high and elementary schools	-.21	-.24
Institutional Characteristics			
Setting	School district enrollment (log)	.25**	.24**
	Percentage of population black	-.13**	-.07
	Percentage of population Spanish	.10	.21**
	Extent of political-social difficulties	-.08	-.02
	Difficulty from student test scores	.23**	.20*
Decision-making	Initiate projects if additional resources	-.07	-.07
	Initiate projects if can be continued	.25***	.22**
	Project supported by principals	.15**	.16*
	Superintendent's tenure	.14**	.20**
Educational Methods			
	Behavioral modification	- 02	.01
	Enrichment	.02	.04
	Classroom organizational change	.11	.15*
	Intensive traditional staffing	-.07	-.12
	Administrative change	-.02	.01
Federal Programs			
	Right-To-Read	-.03	
	Bilingual, Title VII	.11	
	Vocational Education	-.13*	
R^2 (based on 2-stage least squares)		.44	.45
Constant		-3.02**	-2.77**
Number of observations		122	88

NOTE: An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level; and a triple asterisk (***) indicates significance at the .01 level.

Table 21

FACTORS AFFECTING CONTINUATION: MODELS I, II, AND III

Explanatory Factors	Standardized Regression Coefficients		
	Model I: Without Effects of Success, Educational Methods, Program	Model II: Without Effects of Educational Methods and Programs	Model III: All Factors
Project Considerations			
Perceived success (estimated)		.36**	.36*
Centrality	.32***	.21**	.23**
Resources: Funding	-.14**	-.12*	-.18**
Resources: Funding per student	-.20***	-.17**	-.18**
Resources: Project covers high and elementary schools	-.27***	-.24***	-.21**
Institutional Characteristics			
Setting: School district enrollment (log)	.27***	.22**	.25**
Setting: Percentage of population black	-.20***	-.17**	-.13**
Setting: Percentage of population Spanish	.13*	.10	.10
Setting: Extent of political-social difficulties	-.10	-.07	-.08
Setting: Difficulty from student test scores	.22***	.28***	.23**
Decision-making: Initiate projects if additional resources	-.08	-.06	-.07
Decision-making: Initiate projects if can be continued	.20***	27***	.25***
Decision-making: Project supported by principals	.19***	.11	.15**
Decision-making: Superintendent's tenure	.15**	.17**	.14**
Educational Methods			
Behavioral modification	--	--	-.02
Enrichment	--	--	.02
Classroom organizational change	--	--	.11
Intensive traditional staffing	--	--	-.07
Administrative change	--	--	-.02
Federal Programs			
Right-To-Read	--	--	-.03
Bilingual, Title VII	--	--	.11
Vocational Education	--	--	-.13*
R^2	.46	.40	.44
Number of observations - 122			

NOTE: An asterisk (*) indicates significance at the .15 level; a double asterisk (**) indicates significance at the .10 level; and a triple asterisk (***) indicates significance at the .01 level.

2. Projects that were central to the educational goals of the district were more likely to be continued.
3. The more expensive the project, the less likely was its continuation. (This finding will receive further analysis during the second phase of this study; the results may be sensitive to whether projects having large capital expenditures absorb that capital (e.g., in the form of a resource center or a computer) and thus do not need to be "continued.")
4. The larger the district, the more likely was project continuation. (Appendix C suggests possible explanations for this finding.)
5. The higher the percentage of blacks in the district population, the less likely was continuation. (This finding was not significant for our sample of Title III projects.)
6. The higher the percentage of Spanish-speaking people in the district, the more likely was continuation. This positive effect of percentage of Spanish on continuation reflected the likely continuation of Bilingual projects whether funded by Title VII or Title III
7. General political-social difficulties were not significant (perhaps due to poor measurement), but difficulty from student test scores—a sensitive indicator of community pressure—was positively related to continuation.
8. Districts that initiated projects with the intention of continuing were likely to continue their projects, all other things being equal (e.g., resources and success). Such previous intention may be indicative of a problem-solving approach on the part of the district.
9. Projects supported by principals were likely to be continued.
10. The more tenure the superintendent had in the district, the more likely projects were to be continued. (The superintendent knows the political-bureaucratic "ropes" See App. C for further discussion.)

In addition to the above hypotheses, Table 20 also presents results for the various educational methods and the federal change agent programs. The earlier analysis of program comparisons and variations of the level of use of educational methods within the federal programs did not control for other explanatory factors. The results after controlling are generally consistent with the earlier findings.

Of the various educational methods, the only significant factor is classroom organization change. Although the effect is only marginally significant, it suggests a commitment within some LEAs to pursue a type of innovation that replaces rather than adds on to standard teaching practices. (The negative tendency for intensive staffing suggests that teacher aides and assistants paid for by federal funds might not be continued on local funds.)

The federal change agent program comparisons also reinforce the earlier findings. Vocational Education, whose projects were judged by superintendents among the most successful, had a negative effect on continuation (relative to the average Title III projects). Since the analysis of Table 20 controls for such factors as estimated project success, project cost, and project importance, the low continuation likelihood of Vocational Education appears to have been attributable to the program itself and the way its projects were perceived by the district. An explanatory hypothesis suggested earlier is that many of these projects were viewed as temporary add-ons and were not accorded high priority in the district.

In contrast, although Title VII projects were seen to be among the least successful and the most difficult to implement, they tended to have a positive effect on continuation.[20] This finding, considering the various explanatory controls, lends support to the interpretation that bilingual education had developed local demand for its continuation with or without federal funding.

Right-To-Read projects had about the same continuation likelihood as the average of Title III projects. The data of Table 20 suggest that the continuation of these projects primarily depended on explanatory variables other than the program itself. Thus, the continuation of Right-To-Read projects may have been particularly contingent on their perceived success during the trial period and on the political pressures in the district for improved student test scores. The effect of explanatory factors on the expected continuation of Title III projects is shown in col. 2 of Table 20. The results are similar to those analyzed for all projects, except for several expected differences. The continuation of Title III projects depended more than the average of all projects on the type of educational method (classroom organization changes were positive), on the superintendent's tenure (the importance of the superintendent's support for locally initiated Title III projects was previously hypothesized), on funding (more concentrated funding was negative), and on percentage of Spanish-speaking population (which reflects the commitment to Title III, Bilingual projects).

SUMMARY

The picture that emerges from our analysis of a school district's decision to continue projects is encouraging. Superintendents appear to have been making careful choices within their political-economic constraints. If a project was seen as central, successful, had the support of the staff, and was not too expensive, it was likely to be continued. Such projects were often initiated as the result of the need to solve a problem within the district and often replaced traditional teaching activities with new departures (e.g., classroom organizational changes). Projects initiated in an opportunistic fashion often became add-ons and disappeared with the termination of federal funds.

[20] The shift coefficient for Bilingual would be higher and significant if the control variable "Percentage of population Spanish" were not included in the analysis. Note that percentage of Spanish is significant in the analysis of Title III projects, where it is virtually a surrogate for Title III, Bilingual projects

VI. CONCLUSIONS

As one component of a larger study of change agent projects, this report has examined only selected aspects of the highly complex problem of innovation. We have, using statistical analyses of survey data, described and identified factors affecting the implementation outcomes of innovative projects. In particular, we addressed three questions:

- To what extent did the differences between the federal change agent programs affect implementation outcomes and continuation?
- Which characteristics of innovative projects significantly affected implementation and continuation?
- Were differences in institutional settings related to variations in implementation and continuation, and, if so, which institutional characteristics had significant effects?

This section reviews the findings in general terms and places them into a somewhat broader perspective.

Before discussing the general results, it is appropriate to remind the reader of several limitations of the analysis. This was an exploratory study; there were methodological problems, and caution needs to be exercised in interpreting the results. Accordingly, this section reviews findings about which we feel the most confident. One particular methodological decision should be recalled—namely, the comparisons of federal programs dealt with the implementation and continuation of projects sponsored by the programs. The federal change agent programs have goals other than the ones assessed here. Finally, this volume complements the case study materials reported in Vol. III, and thus the two volumes should be read in concert. Volume IV synthesizes the findings of these quantitative and qualitative approaches and, moreover, offers policy conclusions that are beyond the purview of this report.

FEDERAL PROGRAM EFFECTS

The management strategies and substantive priorities of the federal change agent programs differ in important ways. These strategies range from the noncategorical, locally initiated Title III program to the categorical and somewhat prescriptive Right-To-Read; from the state administration of Title III State Plan and the state portion of Vocational Education, Part D, to the federal administration of Title III, Section 306, Right-To-Read, Title VII (Bilingual), and the federal portion of Vocational Education. However distinctive these strategies seem to be, the differences between the federal programs accounted for little of the variations in projects.

The federal programs exercised influence primarily on the initial design of innovations. Each of the categorical programs not only succeeded in getting districts to try projects in their substantive areas but also might have induced higher levels of intensive staffing, enrichment activities, behavioral modification techniques, and schoolwide administrative changes than would otherwise have been attempted without federal funds. The locally initiated, noncategorical, and competitive Title III

programs have resulted in a wide diversity of innovations, some of which are ambitious change efforts, whereas others appear peripheral to the district's perceived priorities.

Another differential but unintended effect of the federal programs involved difficulties in implementing innovations. Each program appeared to generate problems that reflected its particular selection mechanisms, guidelines, substantive priorities, and expectations. Thus, Vocational Education projects seemed to experience difficulties gaining support within the district and within the community, whereas Bilingual projects gained support but were the most difficult to implement both because they lacked bilingual materials and staff and tended to have unrealistic goals and timetables for change. Right-To-Read's prescribed materials and methods appeared to result in adaptation requirements that were not anticipated by these prescribed plans. In contrast, State Title III projects experienced difficulties associated with ambiguous and overly ambitious goals.

These contrasting strains of limited leverage on project design accompanied by intrinsic implementation problems suggest that federal policy may face implicit tradeoffs in using the policy instrument of differential funding. Because understanding the nature of these tradeoffs requires an analysis of the process of implementation and its relationship to initiation, we defer further discussion until Vol. IV.

Whatever intended or unintended consequences the different federal management strategies may have had on project initiation, these differences appeared to have little effect on project implementation. The gross comparisons of the average project outcomes reveal few important differences between projects sponsored by the different programs. This finding suggests two conclusions. First, the differences between the programs did not prove significant because their common policy instrument of differential funding did not have a major influence on implementation. Second, factors other than federal policy account for most of the variance in project outcomes, and these factors were only marginally influenced by current federal policy.

Volume IV suggests some policy implications from the above conclusions. Next, we will consider factors other than federal policy that affected implementation.

PROJECT CHARACTERISTICS AFFECTING IMPLEMENTATION

Many project evaluations focus on educational treatments and attempt to relate them to student outcomes. These efforts may be misguided. Educational treatments, defined solely in terms of their technology or method, were only weakly related to implementation outcomes because other elements of project design had stronger effects. The analysis showed that a project's implementation strategy significantly affected implementation. This finding is subject to measurement errors and the difficulty of reliably measuring diverse educational techniques. Nonetheless, we can safely conclude that federal policy, as well as local designers and evaluators, should concern itself with fostering appropriate implementation strategies.

In addition to establishing the importance of implementation strategies, the quantitative analysis suggests characteristics of an implementation strategy (i.e., a particular mix of strategic choices) that might be more likely to result in high levels

of teacher change and achievement of project goals. In particular, frequent staff meetings, staff training held in conjunction with meetings, and project requirements placed on teachers to change their practices seemed to be elements that worked together so that project participants could adapt to the project and vice versa. We hypothesize that this implementation strategy, which might be called a mutual adaptation strategy, may be characteristic of innovations that result in significant change.

Volume III provides a more detailed understanding of how and why a mutual adaptation strategy works in practice. However, the quantitative evidence does suggest that the significance of a mutual adaptation strategy may be in the project's interaction with its institutional setting, as originally hypothesized in Vol. I.

EFFECTS OF INSTITUTIONAL SETTING

The analysis clearly establishes the importance of the institutional setting for the outcomes of an innovative project. Although only some local characteristics were measured—and these in gross terms—the setting explained more variation in project outcomes than any other factor.

The major significant variables associated with the institutional setting reflected organizational climate. We found that a supportive setting facilitated teacher change and the achievement of project goals. In light of this result, the importance of a mutual adaptation implementation strategy becomes apparent. It aids the local school organization's adaptation to the project and vice versa. Generally speaking, the conclusion, which receives further attention in Vol. III, is that the effective implementation of innovative projects depended primarily on a supportive institutional setting and on an implementation strategy that fostered the mutual adaptation of the staff to the project's demands and of the project's design to the reality of its setting.

The dominant importance of the institutional setting for project outcomes suggests an explanation of why the federal policy instruments employed by the change agent programs may have had so little effect. To affect outcomes in major ways, federal policy would have had to influence the motivations of local innovators more strongly than it has. Perhaps federal policy could develop such leverage by providing incentives that promote a supportive institutional setting or by awarding grants only to those LEAs that make the necessary commitment. These issues will be considered in Vol. IV.

CONTINUATION HYPOTHESES

An important measure of the effectiveness of federal change agent policy involves continuation—the extent to which project activities are continued by the LEA in whole or in part after federal funding ends. Our analysis of continuation was limited for several reasons. First, we studied projects in their last years of federal funding and thus could only examine expected continuation. The next phase of Rand's research will focus on projects after the withdrawal of federal support. In addition, the quantitative analysis of continuation was concerned with the district

level rather than with the classroom level. Volume III treats continuation from the standpoint of the extent to which individual teachers incorporated project activities. Finally, the measurement problems inherent in this exploratory study limited the analysis of continuation. In short, we view the findings as hypotheses to be tested in the next phase of research.

Despite the above reservations, the data provide strong evidence that superintendents weigh four general concerns in reaching a decision about continuation: the project's "success" during implementation, the centrality or importance of the educational needs served by the project, the resources required by the project, and the organizational-political forces inhibiting or promoting the innovation. Federal policy leverage in any of these areas seems limited but may be particularly ineffectual in influencing local organizational-political concerns. The challenge for designers of federal policy is thus clear even though the solutions are not. These themes will be examined in Vol. IV and in the final reports of Rand's research on the educational change agent programs.

Appendix A

SURVEY DESCRIPTIONS, SURVEY SAMPLING DESIGN, AND SAMPLE REPRESENTATIVENESS

This appendix outlines the instruments used for the nationwide survey of change agent projects, describes the survey sample design, and examines its representativeness compared with the population of all school districts.

SURVEY DESCRIPTIONS

Thirteen data-gathering instruments were administered in the survey:

Core Questionnaires

1. Superintendent (60 minutes)
2. Federal program manager (60 minutes)
3. Project director (90 minutes)
4. Principal (60 minutes)
5. Teacher (40 minutes)

Supplements

6. Title III (administered to project director only; 15 minutes)
7. Bilingual (administered to project director, principal, teacher; 15 minutes)
8. Right-To-Read (administered to project director, principal; 15 minutes)
9. Vocational Education—project director (15 minutes)
10. Vocational Education—principal (15 minutes)
11. Vocational Education—teacher (15 minutes)

Information Sheets (self-administered)

12. District information sheet (filled out by superintendent's office)
13. Project information sheet (filled out by project director)

A list of the topics covered in each instrument follows:

1. Superintendent Questionnaire

   A. General questions
      - District financial situation
      - School board role
      - Administrative structure of district
      - Educational climate (including recent controversies)
      - Use of federal funds in district
      - Attitude toward innovation
      - Non-specially funded innovations
      - Federal versus state funding

B. Project-related questions

(If district had two projects in sample, this set of questions was asked about both projects. In the few largest districts with more than two sample projects, Rand selected two projects to ask the superintendent about.)

Origins of project
Effects on district image
Centrality to district goals
Community reactions
Role of project director
Perceived success of project
Dissemination
Continuation

C. Personal background

D. Checklist of previous innovations in district

2. Federal Program Manager Questionnaire

A. General questions
Comparison of four federal programs (Title III, Title VII, Right-To-Read, Vocational Education, Part D)
State versus federal funding
District use of federal funds
Non-specially funded innovations

B. Project-related questions

(If district had two projects in sample, this set of questions was asked about both projects. In the few largest districts with more than two sample projects, the federal program manager was asked about the same two projects as the superintendent.)

Origins of project
Implementation
Conflicts
Dissemination
Continuation
Perceived success

C. Personal background

3. Project Director Questionnaire

A. Project-related questions
Origins of project
Planning
Implementation
Selection of project sites
Staff training

Use of funds
Goals and techniques of project
Conflicts
Technical assistance
Community involvement
Support of district administration
Dissemination
Perceived success/reasons for
Relations with federal/state project officer
Evaluation
Continuation

B. Personal background

4. Principal Questionnaire

A. General questions
School characteristics
School-community relations
Attitude toward innovation

B. Project-related questions
Origins of project at school
Teacher selection and training
Goals and techniques of project
Principal's role in project
Conflicts
Community involvement in project
Dissemination (within and outside school)
Perceived success/reasons for
Effects on school
Continuation

5. Teacher Questionnaire

A. General questions
Attitude toward innovation
School morale and principal role

B. Project-related questions
History of personal participation in project
Training
Role of teachers in various aspects of project
Implementation in the classroom
Perceived success of project and effects on students
Continuation

C. Personal background

6. Title III Supplement

Project classification (for fieldwork screening)

Use of community resources
IVD (Identification, Validation, Dissemination) instrument
Fourth-year continuation/dissemination

7. Bilingual Supplement

Linguistic background of students
Project goals
Teacher training
Classroom language use

8. Right-To-Read Supplement

Previous reading programs
Effectiveness of various elements of Right-To-Read strategy
Effectiveness of Right-To-Read planning procedure
Reading curriculum components

9. Vocational Education Supplement: Project Director

Concept of career education
Project techniques
Project funding
Role of funding agency
Evaluation
Dissemination
Effects of project

10. Vocational Education Supplement: Principal

Concept of career education
Teachers' attitudes
Project techniques and resources
Effects of project

11. Vocational Education Supplement: Teacher

Concept of career education
Project techniques
Effects of projects
Attitudes toward project director and principal

12. District Information Sheet

Size of student population and number of schools
District annual expenditures by category
Sources of revenue (local, state, federal)
Teacher salaries
Current federal projects in district

13. Project Information Sheet

Names and characteristics of schools involved in project

Number and types of students served
Project staffing
Sources of project funding
Project expenditures by category

Respondents Who Serve More Than One Role

In some cases, respondents may combine two or more roles—for example, superintendent and federal program manager, or project director and principal. In that case, the following rules applied for questionnaire administration:

1. If the superintendent was also
   - *Federal program manager*, NORC[1] administered a combination superintendent/federal program manager questionnaire.
   - *Project director*, Rand decided whether NORC should administer a project director or superintendent questionnaire.
   - *Principal*, NORC administered a principal questionnaire.
   - *Teacher*, NORC administered a superintendent questionnaire.
2. If the federal program manager was also
   - *Project director*, NORC administered a project director questionnaire.
   - *Principal*, NORC administered a principal questionnaire.
   - *Teacher*. NORC administered a federal program manager questionnaire.
3. If the project director was also
   - *Principal*, NORC administered a combination principal/project director questionnaire.
   - *Teacher*, NORC administered a project director questionnaire.
4. If the principal was also a *teacher*, NORC administered the principal questionnaire.
5. If the superintendent was also both *federal program manager* and project director or *federal program manager and principal*, NORC in each case administered a combination superintendent/federal program manager questionnaire.

SURVEY SAMPLE DESIGN

Projects of six types from four programs are represented in the change agent sample as shown in Table A-1.

The sampling was accomplished in two stages: a sample of 18 states from the contiguous 48 states was followed by the selection of projects within states. *The*

[1] National Opinion Research Center.

general objective of the state sample was to obtain a sample that was broadly representative of region, level of educational funding, and intensity of educational management at the state level. Subject to these criteria, the selection of states was weighted according to population of persons (and hence roughly according to number of Title III projects) so that the state sample could provide an adequate pool from which to select projects. In addition to the 224 projects, project directors from other projects in the preselected districts were interviewed whenever the opportunity arose (increasing the sample of projects by 69).

Table A-1

CHANGE AGENT PROJECTS: SAMPLE SIZE

Programs	Sample Size		
	Prese-lected	On-Site Selection	Total
1. ESEA[a] Title III, state administered	132	44	176
ESEA Title III, federally administered	18	--	18
2. ESEA Title VII	25	16	41
3. VEA[b] Part D, state administered	14	2	16
VEA Part D, federally administered	10	--	10
4. Right-To-Read	25	7	32
Total	224	69	293

[a]Elementary and Secondary Education Act.

[b]Vocational Education Amendments.

Title III projects were selected from among all 18 states. For the other programs, subsets of about ten states were chosen; this permitted selection of at least two projects per state and therefore some chance of identifying between-state differences in these smaller samples. *In selecting projects, the guiding objective was to obtain samples that represented the diversity of projects across a number of criteria of analytic interest.* In other words, the selection was to provide projects in school districts that were large, small, urban, rural, of varying concentrations of different racial-ethnic groups, and of varying socioeconomic status.

The two stages of sampling differ sharply with respect to "sampling philosophy." The first stage is probabilistic, except for a modification that will be described in the next section. The second stage freely employs judgment methods when it is necessary to represent diverse attributes with small samples.

In the remainder of this section, the population of eligible projects is specified; the sampling procedures for states and for projects are explained; and other aspects of the sample design are discussed.

The Population of Eligible Projects

At the time of Rand's pre-sampling data collection activities, the Office of Education files contained project abstracts for nearly all State Title III projects as of July 1972. From these files, coders completed a summary form for each project that included information on its geographical location, size, funding, start date, orientation, and target group

Not all Title III projects fell within the charter of this study. Projects that met any of the following criteria were excluded:

- All first-year projects.
- All projects with yearly funding of less than $10,000.
- All projects that served only pre-school or post-high school populations.
- All projects that were solely resource centers.
- All projects that only involved curriculum development.
- All projects that solely relied on home visits.

Applying these criteria reduced the population of projects in the 48 states from 1730 to 1085. These 1085 projects thus comprised the sampling population of eligible Title III projects for the study.

In several respects, the sampling population is not the same as the target population. For example, some small fraction of project directors probably failed to submit abstracts to OE. Many projects that began in the fall of 1972 were omitted because funding began after the July deadline. On the other hand, some projects in the files had since terminated; they were dealt with by replacement sampling. The problem of projects inadvertently omitted from the sampling population remains, but is significant only to the extent that their experience may systematically differ from that of the included projects.

The project populations for the other three programs were obtained from lists provided by program directors within OE. Projects in the other programs had to meet the same criteria for eligibility as were specified for Title III. In some cases, there were additional criteria.

The Sample of States

Measure of Size. The measure of size (MOS), or weighting criteria, for the selection of states was total state population according to the 1970 Census. On this basis, six states (California, Illinois, New York, Ohio, Pennsylvania, and Texas) fell into the sample with certainty. The MOSs for California and New York were actually almost twice certainty. For this reason, state selection probabilities were calculated under the temporary assumption that the sample size would be 20:

$$\text{Selection probability, state A} = \frac{(20)(\text{population, state A})}{(\text{population, 48 states})}.$$

Before allocating states into strata and constructing the sampling frame, probabilities for the two large states were diminished by one (1.0). This adjustment assured that 18 discrete states would be chosen (e.g., that California would not be selected twice).

Stratification. The states were stratified by three separate factors to obtain balanced representation by region, level of educational funding, and intensity of educational management at the state level. In each case, the stratification was defined so that the sum of the adjusted MOSs of states in all strata was roughly equalized. In other words, strata containing California and New York each represented approximately 30 million persons; all other strata represented approximately 20 million persons.

The nine *regional strata* are depicted in Fig. A-1 [illegible] is labeled with its respective MOS.

To obtain stratification by *level of educational funding* (elementary and secondary), states were ranked according to expenditure per pupil (dollars per average daily membership collected by the National Education Association for the 1971-72 school year). This list was then divided into nine strata, equalizing as closely as possible on MOS.

As a surrogate variable for *intensity of educational management* at the state level, the following ratio was computed for each state:

$$\frac{\text{Total expenditures for SEA administration}}{\text{Total school expenditures for state}}$$

(Data for the numerator were collected by OE for 1969 and 1970. Denominator data were collected by the Advisory Commission on Intergovernmental Relations for 1969.) States were then ranked and divided into strata in the same manner as for the educational funding stratification.

Sample Selection. A three-dimensional sampling frame was employed, with each dimension corresponding to a stratification factor. For each stratification factor, there were nine strata, or levels. The result can be characterized as a $9 \times 9 \times 9$ matrix with 729 cells. States were allocated among the cells of the matrix according to their respective strata locations. The result was 46 occupied cells and 683 unoccupied cells (two cells accommodated two states each). The problem was to select two occupied cells from each row, each column, and each file of the matrix, and to do so with probabilities equal to the combined state selection probabilities in each cell.[2] The 18 states thus selected are listed below:

[2] The algorithm for accomplishing this was presented by Jessen [1] under the label of Probability Lattice Sampling, Method 2.

Briefly, the task involves arbitrarily designating a "feasible set" of possible samples, each sample satisfying the marginal constraints (i.e., two cells from each row, column, and file). Selection probabilities are designed to each successively designated sample in accordance with certain decision rules. When the sum of selection probabilities thus assigned totals 1.0, the feasible set is complete and no more samples should be designated. The decision rules guarantee that the sum of sample selection probabilities for all samples containing any particular cell is equal to the respective cell probability. After the feasible set is complete, one of the samples is selected probabilistically, observing the assigned probabilities. If any cell in the selected sample contains more than one state, one state is selected with probabilities proportional to state MOS. The result is a sample that observes the marginal constraints, but in which states have been selected with probabilities proportional to state population.

This procedure was modified somewhat in its actual implementation. Empirical research has suggested that in the set designation process, the sets first designated tend to contain fewer aberrant cells than samples subsequently designated [2]. It is also more difficult to maintain the marginal constraints in the later samples. In other words, samples tend to be less representative as set designation proceeds. To take advantage of this procedural artifact in the change agent sample, feasible set designation was terminated after the sum of sample selection probabilities totaled .5.

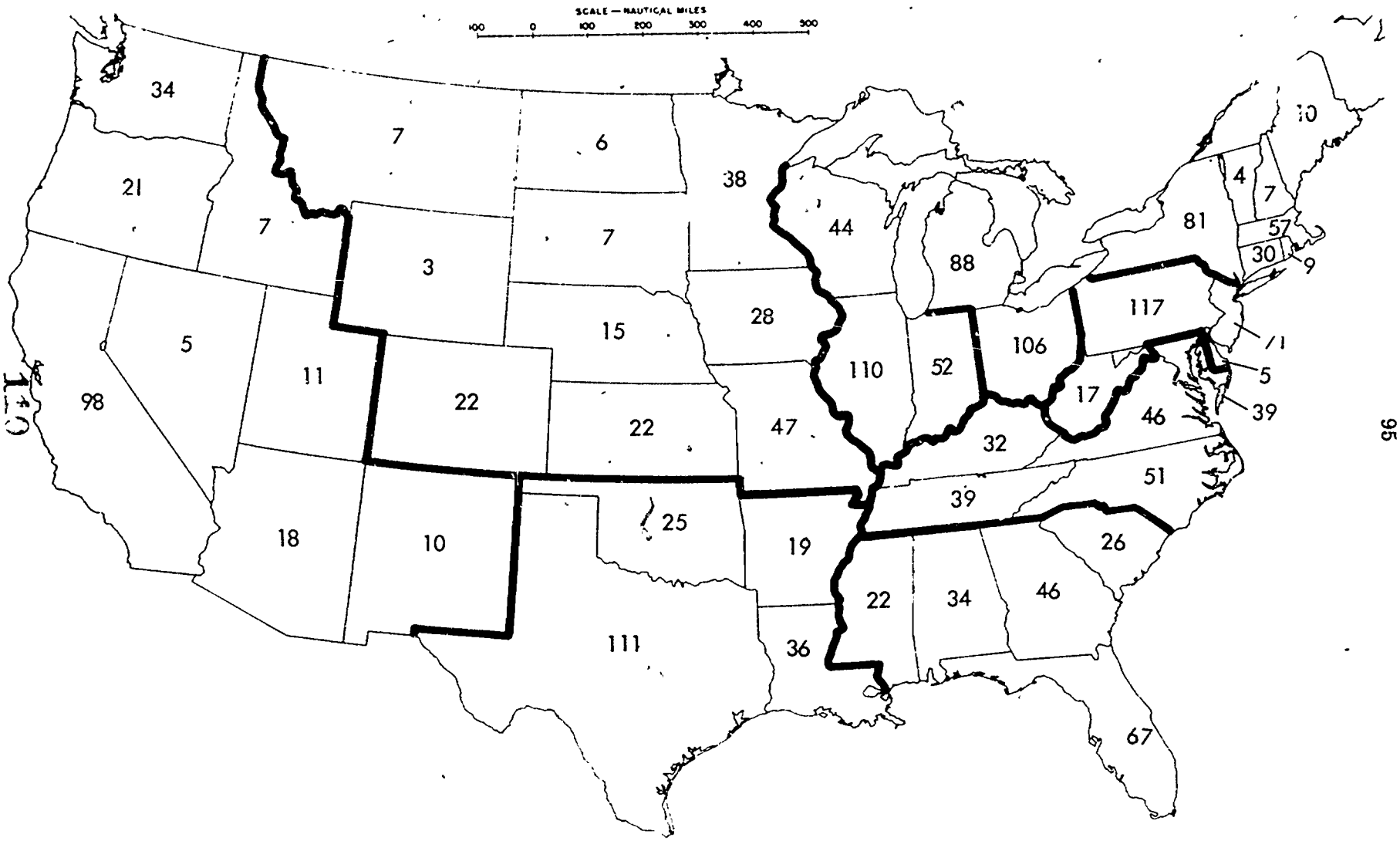

Fig. A-1—Regional strata and state measure of size

Arkansas, California, Colorado, Florida, Georgia, Illinois, Kentucky, Massachusetts, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, Washington, Wisconsin.

Selection of Projects within States

In general, a factorial design might proceed as follows. For each program, factors (i.e., variables) that influence project effectiveness and for which data are readily available are identified. Two or more levels are designated for each factor. By combining factors and their respective levels, a matrix is formed that has as many dimensions as there are factors. Projects are selected from each cell of the matrix. Thus, the resulting sample may not be probabilistically representative of the total population of projects, but it will represent the diversity within that population with respect to the factors that have been identified. Although the factorial arrangement of the sample observations is more difficult to achieve in a survey situation than in the usual experimental one, it can be done approximately;[3] when done it will provide for more efficient analysis of not only main effects of factors but also of various factor combinations, or interactions. In view of the smallness of the samples employed in the change agent study, the factorial approach seems particularly well suited.

The procedure described in the foregoing paragraph was formally implemented for the Title III projects where the population size was large and the sample size relatively large. For other categories, where both samples and project populations were small, selection was more informal and somewhat judgmental, but the overriding criterion was still to obtain samples that represented the diversity within the respective populations.

The factors dealt with explicitly in the sample design are those for which data were readily available. These factors tend to be of demographic and economic nature, and therefore perhaps not directly manipulable by federal policy. The basis for selecting the design factors, however, was to ensure representation for different levels of the more policy-relevant factors. Conventional procedures of analysis can be used on the sample data to study the effects of the other factors. In essence, the effects of the design factors will have been "balanced out" and should therefore improve the effectiveness of analysis.

Title III, State Administered. One hundred thirty-two state-administered Title III projects were selected in six samples. The first was a sample of nine "management" oriented projects drawn from a sampling frame encompassing all 18 states. The second was a sample of 63 "classroom" oriented projects from another frame encompassing all 18 states. These two samples combined provided four projects from each state; data from these samples will provide a basis for generalizing behavior across states, and for identifying general between-state differences. There were additional samples from each of four large states, with 15 projects each. The additional intensive sampling was required in order to enable more detailed analyses of behavior for which between-state differences cannot be accommodated by

[3] Since some cells in the universe of projects may not be occupied by projects, for whatever reason, it is not possible to achieve a perfectly balanced sample. This causes complications both in setting up the design and in the analysis. However, they can be dealt with by various techniques Adjusting boundaries on levels where factors are continuous to obtain a better "filling of cells" is one measure. Use of "missing data" techniques in the analysis is another.

simply adding an additional variable to the functional form. In such cases, it may be difficult to pool data across states, so it is desirable to have a few states with sufficient sample sizes to support state-specific analyses.

Thus, six sampling frames were required: two frames encompassing all 18 states, which overlapped four state-specific frames. The six frames were each constructed according to the factorial approach noted above. A data file was assembled for each of the projects in the sampling population, drawing from Bureau of the Census data aggregated at school district level. The variables in the file were examined to determine which might be used as control factors in the sample selection. The primary basis for the determination was the usefulness of the variable in partitioning the projects into groups that are of interest from the standpoint of analysis Correlation matrices of the potential factors were also examined to ensure that chosen factors would not be overly redundant. The chosen factors are listed in Table A-2 along with the number of levels for each factor for each of the six samples.

Table A-2

NUMBER OF LEVELS FOR STATE TITLE III SAMPLING FACTORS

Item	18-State Sample		Intensive Sampling			
	Management	Classroom	California	Illinois	New Jersey	New York
District enrollment	3	4	3	3	4	2
Urban/rural per capita income	3	3	3	3	3	--
Race (percentage black)	--	4	--	--	--	--
Sample size	9	63	15	15	15	15

Of the 674 identified eligible projects in the 18 states, 80 were designated as being management oriented. These 80 were distributed among the cells of a two-way matrix, using the Enrollment-Urbanity and Income factors; nine projects were sampled from this frame.

The remaining 594 classroom projects were distributed among the cells of a 3 $\times$ 4 $\times$ 4 matrix using all three factors. From the 41 occupied cells of this matrix, 63 projects were sampled in the following manner. First, subject to the quota of four projects per state (including management projects), two projects were selected at random from each cell containing over 20 projects, and one project was selected from all other cells; this resulted in 47 selections. Next, state quotas were filled by random draws, beginning with the most sparse states; insofar as possible, care was taken not to exceed two selections for any cell, and to make only one selection for any cell from a given state. The result was a sample of 72 projects, with four projects from each sampled state; 63 of the 72 were classroom identified projects distributed fairly evenly over a 3 $\times$ 4 $\times$ 4 factorial with seven empty cells; nine of the 72 were management identified projects distributed over a 3 $\times$ 3 factorial with one empty cell.

The more intensive sampling in four states (California, Illinois, New Jersey, and New York) proceeded as follows. For each state, classroom projects were allocated among the cells of a two-dimensional matrix, using the Enrollment-Urbanity and the Income factors. After noting where the four projects already selected fell in the matrix, 15 additional projects were sampled so that the total 19 were evenly distributed over the matrix. As with the 18-state sample, the sample size for each cell was somewhat arbitrary, although roughly proportional to cell size; selection within cells was random. Note in Table A-2 that the frame for New York is more properly characterized as simple stratification rather than factorial; this is because of the dominance of New York City. It should be observed that the projects in the New York City stratum were further stratified by borough.

The sampling population of 674 projects was not the same as the target population, and for this reason many projects in the original sample of 132 were found to be ineligible on closer inspection. Twenty dealt with mentally or physically handicapped children, and another ten failed the eligibility criteria for other reasons. On verifying our selections with State Title III coordinators, we learned that an additional 30 projects had been terminated. Replacements were selected for the ineligible sample projects in such a manner as to maintain the state quota and, insofar as possible, to maintain the distribution across the cells of the sampling frame. This effort was hampered because the need to rush information to the fieldwork subcontractor necessitated making replacements in several iterations rather than in a single operation. For some states, the replacement pool was soon depleted, but we were able to obtain from State Title III coordinators lists of existing second-year projects that had been excluded from the 1972 annual report to USOE, the source of the original sampling list.

Title III, Federally Administered. Eighteen projects were selected from among those federally administered Title III projects with yearly funding exceeding $50,000. This funding floor effectively limits selection to categories of projects that have been identified by USOE Title III officers as being of prime concern, at least from the standpoint of time consumption. Eliminated are SWRL[4] curriculum implementation projects and reading readiness projects.

Nine states were selected from the 18 sample states, using regional stratification: California, Florida, Illinois, Missouri, New Jersey, New York, Pennsylvania, Texas, and Washington.

The federally administered Title III projects in these states were allocated among the cells of a 3×3 matrix, using the Enrollment-Urbanity and Income factors. A sample of 18 projects was sampled such that each cell was represented at least once, and each of the nine states was represented twice. Four replacement projects were subsequently required, but this was accomplished without altering the sample structure.

Title VII, Bilingual. Of the 18 sampled states, only eight contained more than two Title VII projects; the Title VII sampling was restricted to these eight: California, Colorado, Massachusetts, Michigan, New Jersey, New York, and Texas.

The allocation of sample projects among the eight states was roughly proportional to the sampling population distribution. The sample was also allocated among

[4] Southwest Regional Laboratory for Educational R&D.

target language groups roughly proportional to their incidence in the sampling population:

Mexican-American	12
Other Spanish language	8
Indian	3
French/Portuguese	3
Chinese	4
Total	30

The number of distinct projects was 25, since some were trilingual. For the Spanish language projects, a spread was obtained over different degrees of urbanization. For the other projects, the sampling populations were too sparse to permit further sample control.

VEA, Part D: Vocational Education. It was intended to select 25 VEA, Part D projects in ten states. The following sample characteristics were desired: ten federally administered projects, representing districts that are large and small, urban and rural, and some in Model Neighborhoods; 15 state-administered projects, with at least one from each state, and all concentrating on the Career Education component (the federally administered projects all have this concentration); no projects that operate exclusively in high school years. Given these sampling constraints, the selection of states was more a process of elimination. Even so, only 14 distinct districts were obtainable for the state-administered projects. The selected states were Arkansas, California, Georgia, Kentucky, Missouri, New Jersey, New York, North Carolina, Ohio, and Washington.

Right-To-Read. Project *sites* for the Right-To-Read program are designated as either Impact Site, Transition Site, or Expansion Site. The so-called Impact *projects* include at least one of each site type, and other projects generally have only one site. Only 12 of the 18 sampled states contained Impact projects. Two of these 12 were eliminated at random to provide the ten states for the Right-To-Read sample: California, Georgia, Illinois, Massachusetts, Missouri, New Jersey, New York, Ohio, Wisconsin, and Texas.

One Impact project and one single-site project were selected from each of ten states. Additional single-site projects were selected from California and Texas to bring the total to 25 projects.

Sample Summary

Distribution of sampled projects for all programs across all states is shown in Table A-3.

Sampling Schools and Teachers

For each project selected for the study we sampled two schools (if more than two existed) and two project teachers within each school.

When the project director was first notified of the impending survey, he was asked to list the schools served by the project, ranked according to their entry into the program. When more than two schools participated in the project, a random sample of two schools was drawn from the list.

Table A-3

DISTRIBUTION OF PRESELECTED SAMPLE PROJECTS BY STATE[a]

State	Title III		Right-To-Read	Title VII	Vocational Education		Total
	State	Federal			State	Federal	
Arkansas	4	--	--	--	1	1	6
California	19	2	4	6	2	1	34
Colorado	4	--	--	2	--	--	6
Florida	4	2	--	2	--	--	8
Georgia	4	--	2	--	1	1	8
Illinois	19	2	2	--	--	--	23
Kentucky	4	--	--	--	2	1	7
Massachusetts	4	--	2	3	--	--	9
Michigan	4	--	--	2	--	--	6
Missouri	4	2	2	--	1	1	10
New Jersey	19	2	2	2	2	1	28
New York	19	2	2	4	1	1	29
North Carolina	4	--	--	--	1	1	6
Ohio	4	--	2	--	2	1	9
Pennsylvania	4	2	--	--	--	--	6
Texas	4	2	5	4	--	--	15
Washington	4	2	--	--	1	1	8
Wisconsin	4	--	2	--	--	--	6
Total	132	18	25	25	14	10	224

[a]Table 2 in the text shows the distribution of both the preselected projects and the projects selected on-site.

The selection of project teachers in each sampled school was conducted on-site by the NORC interviewers using the so-called Kish Table technique. That is, teachers were listed in alphabetical order (or some other arbitrary order); then the interviewer pre-tabulated random numbers that were keyed to the total number of teachers listed.

REPRESENTATIVENESS OF SURVEY AND FIELDWORK SAMPLES

This section uses census variables to characterize the survey and fieldwork samples used in the change agent study. To examine the representativeness of the samples, it compares the survey sample with the total population of U.S. school districts, and compares the fieldwork sample with the survey.[5] There were two reasons for comparing the sample with all districts rather than with all districts that have or had funding under the federal demonstration programs: The latter population changes from year to year, and the costs of characterizing it were prohibitive.

The sampling of change agent projects was accomplished in two stages: A

[5] There were 18,655 operating school districts in the United States in the fall 1969 [3].

sample of 18 states from the contiguous 48 was followed by the selection of projects within states. The general objective of the state sample was to obtain a sample broadly representative on three dimensions: region, level of educational funding, and intensity of educational management at the state level. For the selection of projects, the guiding objective was diversity of school districts—large and small districts, urban and rural, varying racial-ethnic concentrations.

Several criteria were used to determine eligibility of projects for the sample. The one most likely to affect the representativeness of the sample may be the requirement that the project have a yearly funding level of at least $10,000, which would bias the sample to some degree toward larger districts. Because of the weighting criteria used in selecting the 18 states, six states fell into the sample with certainty: California, Illinois, New York, Ohio, Pennsylvania, and Texas. Because as a group they contain most of the largest metropolitan areas, we expect our survey sample to be biased to some degree toward larger school districts.

For the fieldwork sample, five fieldwork teams, each focusing on one area of innovation, selected projects from 23 school districts for in-depth study in the areas of career education, bilingual education, classroom organization, staff development, and reading. The districts chosen for each of the five areas vary over organizational, financial, and political conditions, allowing observation of the effects of such variables on the particular innovation.

The Survey Sample

Census Characteristics. As our data source we used the 1970 Census School District Data Tape which contains the usual census-type variables organized by school districts. We used six variables to describe the sample: total population of the district, public school enrollment, proportion of the population in the district that is urban, proportion that is black, and two income variables—the proportion of families with incomes in 1969 of $25,000 or more and the proportion of families below the poverty level in 1969.

From a priori considerations, we used logarithms of both total population and school enrollment. Transformations for some of the other variables may be suggested by the statistics for the survey sample. Such transformations may be useful in modeling innovativeness of school districts.

All of the data analysis treated New York City separately. All of New York City is one school district, and statistics on the data tape are all aggregated to the whole city. However, the city is divided into what are called community school districts, which operate with a certain degree of autonomy. Our survey of change agent projects included 9 of the 32 community school districts, and data for these 9 community districts were not on the census tape. Data for some of the six variables we used are available from the New York City Board of Education, and will be discussed later. But in the discussion immediately following, we are excluding New York City. Our sample, then, consisted of 186 school districts.

Transformed (to natural logarithms) values are used for population and enrollment, and untransformed proportions for the other four variables. The means for the logs of population and enrollment are 10.580 and 8.990, respectively, corresponding to population and enrollment values (i.e., exponentiating the mean logs) of about 39,000 and 8000, respectively. Log enrollment ranges from 5.790 to 13.394, corre-

sponding to an enrollment range of 327 to about 650,000. The log transformations for both population and enrollment produce variables that are very symmetrical and nearly normal in distribution, as indicated by the near equality of mean and median, and by the measures of skewness and kurtosis. More summary statistics for these two variables are given in Table A-4; histograms are in Tables A-5 and A-6.

The proportion of the population of a school district that is urban covers the complete range from 0 to 1 in our survey sample of school districts, with a mean proportion urban of .740. The median proportion urban, however, is .931, implying some skewness to the left in the distribution. As seen in the histogram in Table A-7, just over 40 percent of the districts are between 98 and 100 percent urban. Still, about 15 percent of the districts are below 20 percent urban. Additional summary statistics for proportion urban are in Table A-4.

The statistical behavior for proportion black in the 186 survey sample school districts is similar to that for proportion urban, on the opposite end of the range. Just over 40 percent of the districts have less than 2 percent black. The mean and median proportions black are, respectively, .105 and .052, with a range of 0 to .583 (these are proportions black in the total population of the school districts, not black enrollments in the districts or individual schools). Additional summary statistics and a histogram are in Tables A-8 and A-9, respectively.

Finally, we consider the two income variables: proportion of families over $25,000 income and proportion of families below the poverty level. Their means are, respectively, .046 and .107. They are both somewhat skewed to the right, with a few extreme values. Proportion over $25,000 has a maximum of .359, but only 8 percent of the districts are over .100. Similarly, the proportion of families in poverty is as high as .469, but only 10 percent of the districts are over .200. (See Tables A-8, A-10, and A-11.) Both income variables are rather sharply peaked, especially the proportion over $25,000, which is between .02 and .05 for half of the districts.

For an indication of relations among these six variables in the sample, see Table A-12.

The shape of the distribution for proportion of families over $25,000 suggests a possible transformation for use in the modeling of innovativeness. A square root transformation, for example, sharply reduces the kurtosis. It also brings the mean and median much closer together. Square root transformations on proportion poor, proportion black, and proportion urban have similar effects, although not as dramatic as with proportion above $25,000.

We now consider how these sample statistics compare with national averages for these variables.

Representativeness. Although our sample was not chosen to be representative of all school districts, we would like to know the distributions of the six variables for all school districts in the United States in order to get a sense of how this change agent sample deviates from the total district population.

We used estimates of the national means for the six variables, gathered from a variety of sources. They are national aggregate figures, not means over school districts, and we must rely on the sample itself for variance-covariance estimates. From Ref. 4 we have national means for proportion of population that is urban in 1970 of .735, and for proportion black .111. From Ref. 5 we have estimates for proportion of families over $25,000 income in 1969 of .063, and for proportion poor

Table A-4

SURVEY SAMPLE SUMMARY STATISTICS: LOGS OF SCHOOL DISTRICT POPULATION, ENROLLMENT, AND PROPORTION OF POPULATION URBAN

SURVEY SAMPLE OF SCHOOL DISTRICTS 6. 06/21/74 PAGE 3

FILE NONAME (CREATION DATE = 06/21/74)

VARIABLE LOGPOP LOG OF SCHOOL DISTRICT POPULATION

MEAN	10.580	STD ERROR	0.111	MEDIAN	10.406
STD DEV	1.516	VARIANCE	2.297	KURTOSIS[a]	0.027
SKEWNESS	0.460	RANGE	7.874	MINIMUM	7.163
MAXIMUM	15.037				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE LOGENRL LOG OF SCHOOL DISTRICT ENROLLMENT

MEAN	8.990	STD ERROR	0.108	MEDIAN	8.855
STD DEV	1.477	VARIANCE	2.181	KURTOSIS[a]	0.043
SKEWNESS	0.415	RANGE	7.604	MINIMUM	5.790
MAXIMUM	13.394				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE PCURB PROPORTION OF POPULATION THAT IS URBAN

MEAN	0.740	STD ERROR	0.025	MEDIAN	0.931
STD DEV	0.346	VARIANCE	0.120	KURTOSIS[a]	0.057
SKEWNESS	-1.220	RANGE	1.000	MINIMUM	0.0
MAXIMUM	1.000				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

[a]The measure of kurtosis in all the tables in this report was calculated as

$$\frac{1}{N}\sum_{i=1}^{n}[(x_i - \bar{x})/s]^4 - 3.$$

Thus, positive values indicate a distribution more peaked than the normal distribution, and negative values indicate a distribution flatter than normal.

Table A-5

SURVEY SAMPLE HISTOGRAM: LOG OF SCHOOL DISTRICT POPULATION

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                          6.                    06/21/74        PAGE

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   LOGPOP     LOG OF SCHOOL DISTRICT POPULATION

      CODE
            I
      1.00  *********** (     11)   5.9 PCT
            I    LESS THAN 8.5
            I
            I
      2.00  ************************************************************ (     59)  31.7 PCT
            I    8.5 TO 9.999
            I
            I
      3.00  ************************************************ (     50)  26.9 PCT
            I    10 TO 10.999
            I
            I
      4.00  ******************************************** (     44)  23.7 PCT
            I    11 TO 12.499
            I
            I
      5.00  ********************** (     22)  11.8 PCT
            I    12.5 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.....
            0         10        20        30        40        50        60        70        80        90
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-6

SURVEY SAMPLE HISTOGRAM: LOG OF SCHOOL DISTRICT ENROLLMENT

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                          6.                    06/21/74        PAGE

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   LOGENRL    LOG OF SCHOOL DISTRICT ENROLLMENT

      CODE
            I
      1.00  **************** (     15)   8.1 PCT
            I    LESS THAN 7
            I
            I
      2.00  ************************************************************ (     59)  31.7 PCT
            I    7 TO 8.499
            I
            I
      3.00  ************************************************** (     51)  27.4 PCT
            I    8.5 TO 9.499
            I
            I
      4.00  ****************************************** (     42)  22.6 PCT
            I    9.5 TO 10.999
            I
            I
      5.00  ******************** (     19)  10.2 PCT
            I    11 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I...
            0        10        20        30        40        50        60        70        80        90
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-7

SURVEY SAMPLE HISTOGRAM: PROPORTION OF POPULATION URBAN

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                          6.                    06/21/74        PAGE   10

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   PCURB      PROPORTION OF POPULATION THAT IS URBAN

      CODE
            I
      1.00  *************************** (     27)  14.5 PCT
            I    LESS THAN .2
            I
            I
      2.00  ******************** (     19)  10.2 PCT
            I    .2 TO .599
            I
            I
      3.00  ************************************** (     38)  20.4 PCT
            I    .6 TO .899
            I
            I
      4.00  ************************** (     26)  14.0 PCT
            I    .9 TO .9799
            I
            I
      5.00  ************************************************************************ (     76)  40.9 PCT
            I    .98 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0        10        20        30        40        50        60        70        80        90       100
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-8

SURVEY SAMPLE SUMMARY STATISTICS: PROPORTIONS OF POPULATION BLACK WITH INCOME ABOVE $25,000 AND BELOW POVERTY INCOME

SURVEY SAMPLE OF SCHOOL DISTRICTS 6. 06/21/74 PAGE 4

FILE NONAME (CREATION DATE = 06/21/74)

VARIABLE PCBLK PROPORTION OF POPULATION THAT IS BLACK

MEAN	0.105	STD ERROR	0.010	MEDIAN	0.052
STD DEV	0.134	VARIANCE	0.018	KURTOSIS	1.952
SKEWNESS	1.579	RANGE	0.583	MINIMUM	0.0
MAXIMUM	0.583				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE FATCATS PROPORTION OF FAMILIES WITH INCOME ABOVE $25000

MEAN	0.046	STD ERROR	0.003	MEDIAN	0.036
STD DEV	0.043	VARIANCE	0.002	KURTOSIS	17.438
SKEWNESS	3.422	RANGE	0.359	MINIMUM	0.0
MAXIMUM	0.359				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE PCPOOR PROPORTION OF FAMILIES BELOW POVERTY INCOME

MEAN	0.107	STD ERROR	0.005	MEDIAN	0.090
STD DEV	0.073	VARIANCE	0.005	KURTOSIS	5.232
SKEWNESS	1.873	RANGE	0.452	MINIMUM	0.017
MAXIMUM	0.469				

VALID OBSERVATIONS - 186
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

Table A-9

SURVEY SAMPLE HISTOGRAM: PROPORTION OF POPULATION BLACK

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                          6.                    06/21/74        PAGE

FILE  NONAME   (CREATION DATE = 06/21/74)

* VARIABLE   PCBLK      PROPORTION OF POPULATION THAT IS BLACK

      CODE
            I
      1.00  ************************************************************************** (     75)  40.3 PCT
            I    LESS THAN .02
            I
            I
      2.00  ****************** (     17)   9.1 PCT
            I    .02 TO .0499
            I
            I
      3.00  ************************** (     25)  13.4 PCT
            I    .05 TO .0999
            I
            I
      4.00  ******************************** (     31)  16.7 PCT
            I    .1 TO .1999
            I
            I
      5.00  ************************************** (     38)  20.4 PCT
            I    .2 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I....
            0        10        20        30        40        50        60        70        80        90
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-10

SURVEY SAMPLE HISTOGRAM: PROPORTION OF FAMILIES WITH INCOME ABOVE $25,000

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE   13

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   FATCATS    PROPORTION OF FAMILIES WITH INCOME ABOVE $25000

     CODE
            I
     1.00   ************************************************************************ (     37)  19.9 PCT
            I    LESS THAN .02
            I
            I
     2.00   ************************************************************************************************ (     49)  26.3 PCT
            I    .02 TO .03499
            I
            I
     3.00   ************************************************************************************** (     42)  22.6 PCT
            I    .035 TO .04999
            I
            I
     4.00   ************************************************************************************** (     43)  23.1 PCT
            I    .05 TO .0999
            I
            I
     5.00   ****************************** (     15)   8.1 PCT
            I    .1 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0         5        10        15        20        25        30        35        40        45        50
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-11

SURVEY SAMPLE HISTOGRAM: PROPORTION OF FAMILIES BELOW POVERTY INCOME

```
SURVEY SAMPLE OF SCHOOL DISTRICTS                          6.                    06/21/74      PAGE   14

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   PCPOOR     PROPORTION OF FAMILIES BELOW POVERTY INCOME

     CODE
            I
     1.00   ************************** (     26)  14.0 PCT
            I    LESS THAN .04
            I
            I
     2.00   ************************************************ (     48)  25.8 PCT
            I    .04 TO .0799
            I
            I
     3.00   ******************************************************** (     56)  30.1 PCT
            I    .08 TO .11999
            I
            I
     4.00   ************************************** (     37)  19.9 PCT
            I    .12 TO .1999
            I
            I
     5.00   ******************** (     19)  10.2 PCT
            I    .2 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0        10        20        30        40        50        60        70        80        90       100
            FREQUENCY

VALID   OBSERVATIONS -       186
MISSING OBSERVATIONS -         0
```

Table A-12

SURVEY SAMPLE: RELATIONSHIPS AMONG SIX VARIABLES IN SAMPLE

FILE NONAME (CREATION DATE = 06/21/74)

- - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - - - - - - - - - -

	LOGPOP	LOGENRL	PCURB	PCBLK	FATCATS	PCPOOR
LOGPOP	1.0000 (0) S=0.001	0.9654 (186) S=0.001	0.6237 (186) S=0.001	0.2866 (186) S=0.001	0.0510 (186) S=0.489	-0.1789 (186) S=0.015
LOGENRL	0.9654 (186) S=0.001	1.0000 (0) S=0.001	0.6068 (186) S=0.001	0.2559 (186) S=0.001	0.0246 (186) S=0.739	-0.1534 (186) S=0.037
PCURB	0.6237 (186) S=0.001	0.6068 (186) S=0.001	1.0000 (0) S=0.001	0.0783 (186) S=0.288	0.2669 (186) S=0.001	-0.2890 (186) S=0.001
PCBLK	0.2866 (186) S=0.001	0.2559 (186) S=0.001	0.0783 (186) S=0.288	1.0000 (0) S=0.001	-0.1883 (186) S=0.010	0.4177 (186) S=0.001
FATCATS	0.0510 (186) S=0.489	0.0246 (186) S=0.739	0.2669 (186) S=0.001	-0.1883 (186) S=0.010	1.0000 (0) S=0.001	-0.4425 (186) S=0.001
PCPOOR	-0.1789 (186) S=0.015	-0.1534 (186) S=0.037	-0.2890 (186) S=0.001	0.4177 (186) S=0.001	-0.4425 (186) S=0.001	1.0000 (0) S=0.001

(COEFFICIENT / (CASES) / SIGNIFICANCE) (A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

.097. From Refs. 3 and 4 we have total population in 1970, total public school enrollment in fall 1969, and number of operating public school districts, from which we calculate log of population per district and log of enrollment per district as 9.926 and 7.777, respectively. We thus have significant overestimates of population, enrollment, and proportion poor—especially of population and enrollment. We have an underestimate for proportion of families above $25,000 income. Proportions urban and black are almost equal to the population estimates.

Using a multivariate generalization (the T^2-statistic) of the t-test, we test for equality of vector means between the sample and population. We find that the difference between the two vector means is statistically significant at the .001 level,[6] implying that the survey sample is not very representative of the total population.

It appears that the survey sample has significantly larger than average school districts. This is at least partly because of selection criteria that eliminated from consideration the very small school districts. The smallest in the sample has an enrollment of 327. In fact, more than one-third (36.9 percent) of all public school districts in fall 1969 had fewer than 300 students enrolled. But this accounts for only 1.5 percent of all students enrolled, so log of enrollment per district would increase only about .44 if we calculated the population mean only for districts with enrollments of more than 300 (enrollment figures are from Table 1 of Ref. 3). The difference between population and sample means would still be more than seven times the standard error of the estimate of the sample mean. In fact, even if we eliminate both population and enrollment, and run the test on just the other four variables, the difference between population and sample vector means is still significant at the .001 level.[7]

We should, of course, recall that our population means are not really means over all school districts; they are means calculated from aggregate data. To the degree that the means used here reflect the true population means over school districts, our survey sample is not very representative of school districts in general. Our districts are much larger both in population and school enrollment and have proportionately more poor families and fewer families who had incomes over $25,000. The sample seems representative on the whole in terms of proportion black and proportion urban, although these variables are both highly skewed in the sample.

New York City. As pointed out earlier, New York City is not included in the above analysis. Nine of the 32 community school districts within New York City are included in the survey sample. These districts are compared with city aggregates in Table A-13. The nine community districts included in the survey sample appear to be representative of city aggregates, at least on the three variables—population of school district, public school enrollment of the district, and proportion of population in the district that is black.

[6] For μ = the vector of population means, $\bar{x}$ = the vector of sample means, S = sample covariance matrix, N = the number of observations (in this case 186), and p = the number of variables (in this case six), the T^2-statistic is given by $T^2 = N(\bar{x} - \mu)' S^{-1}(\bar{x} - \mu)$. Then $[T^2_\alpha \cdot (N - p)]/(N - 1)p = F_{p,N-p}(\alpha)$. See, for example, Anderson [6]. In this case, $T^2 = 279.66$, $[T^2 \cdot (N - p)]/(N - 1)p = 45.35$, and the .999 point of $F_{6,120} = 4.04$.

[7] The formation is the same as before, except that now p = 4, and μ, $\bar{x}$, and S are reduced in size. For this case, $T^2 = 33.18$, $[T^2(N - p)]/(N - 1)p = 8.16$, and the .999 point of $F_{4,120} = 4.95$.

Table A-13

NEW YORK CITY COMMUNITY SCHOOL DISTRICTS COMPARED WITH CITY AGGREGATES

District	Population	Log (population)	Enrollment	Log (enrollment)	Proportion Black
2	587,850	13.284	21,507	9.976	.036
3	285,482	12.562	21,856	9.992	.281
4	127,463	11.756	21,379	9.970	.382
7	161,594	11.993	30,041	10.310	.358
10	314,782	12.660	27,693	10.229	.079
11[a]	291,618	12.583	26,648	10.190	.147
14	211,853	12.264	29,739	10.300	.167
24	337,814	12.730	23,085	10.047	.043
32	114,641	11.650	21,235	9.963	.261
Sample means	--	12.387	--	10.109	.195
Minimum	--	11.650	--	9.963	.036
Maximum	--	13.284	--	10.310	.382
NYC totals	7,892,267	--	1,116,711	--	.211
NYC district means[a]	--	12.416	--	10.460	--

[a]Logs of average district values.

The Fieldwork Sample

Census Characteristics. To describe the fieldwork sample, we use the six variables used above, with the addition of proportion Spanish language, that is, the proportion of the population in the school district for whom Spanish is the major language. Again, New York City will be considered separately. This leaves a sample of 22 school districts.

For the fieldwork sample, we find means for log of population and log of enrollment of 11.614 and 10.051, corresponding to population and enrollment levels, respectively, of about 110,000 and 23,000. These are both substantially higher than the means for the survey sample. Means and medians are again nearly equal, although the distributions for both log population and log enrollment are somewhat flatter for the fieldwork sample than for the survey sample. The enrollment range is also narrower—from 1362 to 650,000. (See Table A-14.)

The fieldwork sites are typically more urban than the survey sample sites. The mean proportion of the school district population that is urban is .902. But over two-thirds (68.2 percent) of the districts are at least 98 percent urban, and the median value is 99.8 percent urban. Only two of the 22 districts are below 60 percent urban, compared with 46, or 24.7 percent, of the survey sample. (See Table A-15.)

Proportions black and Spanish language are more similar for the two samples. Mean proportion black is .130, which is somewhat higher than the .105 mean for the survey sample but is within one standard error of the estimate of the (field sample) mean. The shapes of the distributions for the two samples are almost identical. Compare Tables A-8 and A-15. Mean proportions Spanish language are .053 for the

Table A-14

FIELDWORK SAMPLE SUMMARY STATISTICS: LOGS OF SCHOOL DISTRICT POPULATION AND ENROLLMENT

FIELD WORK SAMPLE OF SCHOOL DISTRICTS 6. 06/21/74 PAGE 3

FILE NONAME (CREATION DATE = 06/21/74)

VARIABLE LOGPOP LOG OF SCHOOL DISTRICT POPULATION

MEAN	11.614	STD ERROR	0.382	MEDIAN	11.618
STD DEV	1.791	VARIANCE	3.209	KURTOSIS[a]	-1.082
SKEWNESS	0.073	RANGE	6.408	MINIMUM	8.629
MAXIMUM	15.037				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- - - -

Table A-15

FIELDWORK SAMPLE SUMMARY STATISTICS: PROPORTIONS OF POPULATION URBAN, BLACK, AND WITH SPANISH AS MAJOR LANGUAGE

FIELD WORK SAMPLE OF SCHOOL DISTRICTS 6. 06/21/74 PAGE 5

FILE NONAME (CREATION DATE = 06/21/74)

VARIABLE PCURB PROPORTION OF POPULATION THAT IS URBAN

MEAN	0.902	STD ERROR	0.038	MEDIAN	0.998
STD DEV	0.178	VARIANCE	0.032	KURTOSIS[a]	2.057
SKEWNESS	-1.752	RANGE	0.635	MINIMUM	0.365
MAXIMUM	1.000				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE PCBLK PROPORTION OF POPULATION THAT IS BLACK

MEAN	0.130	STD ERROR	0.029	MEDIAN	0.103
STD DEV	0.137	VARIANCE	0.019	KURTOSIS[a]	1.956
SKEWNESS	1.433	RANGE	0.542	MINIMUM	0.0
MAXIMUM	0.542				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE SPNLAN PROPORTION WITH SPANISH AS MAJR LANGUAGE

MEAN	0.053	STD ERROR	0.016	MEDIAN	0.020
STD DEV	0.077	VARIANCE	0.006	KURTOSIS[a]	4.044
SKEWNESS	2.114	RANGE	0.307	MINIMUM	0.003
MAXIMUM	0.310				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

[a] See Table A-4.

fieldwork sample and .060 for the survey sample. The distributions are also very similar for proportion Spanish language across the two samples. For the field sample, proportion Spanish language ranges from .003 to .310, with a median of .020. Seven of the 22 have less than 1 percent Spanish language, and three have less than ½ percent. (See Table A-15.)

Family incomes are typically higher in the fieldwork districts, with both a higher proportion over $25,000 income and a lower proportion poor, than for the survey districts as a whole, but the differences in means are very small. The distributions are much flatter and cover a narrower range in the field sample. Proportion of families with incomes over $25,000, for example, ranges from .012 to .127, has a mean of .051, a median of .040, and a kurtosis measure almost equal to the value for a normal distribution in the field sample. The corresponding values for the survey sample are 0 to .359, .046, .036, and a kurtosis measure far from that of a normal distribution (in the direction of greater peakedness). (See Table A-16.)

Histograms for the above variables in the fieldwork sample are given in Tables A-17 through A-23.

Representativeness. The comparison of vector means between the survey and fieldwork samples is a more straightforward operation than the comparison between the survey sample and the population of all school districts. Here we have identical data for both samples, so we don't have to estimate population means from other sources, and we know the covariances for the population.

In testing for equality of vector means between the fieldwork and survey samples, we find that the differences are not significant at the 5 percent level.[8] The field sites, then, are roughly representative of the whole survey sample, at least on the seven variables considered, even though the field sites tend to be substantially larger and more urban school districts.

New York City. Of the nine community school districts in New York City that are included in the survey sample, one is in the field sample. It is very close to the average of the other eight in population and enrollment, and somewhat lower in proportion black. (See Table A-13.)

[8] Let μ = the vector of means for the survey sample, $\bar{x}$ = the vector of means for the fieldwork sample, Σ = the covariance matrix for the survey sample, N = the number of observations (in this case 22), and p = the number of variables (in this case 7). Then $N(\bar{x} - \mu)' \Sigma^{-1}(\bar{x} - \mu)$ is distributed as χ^2_p. See, for example, Anderson [6]. In this case, $N(\bar{x} - \mu)' \Sigma^{-1}(\bar{x} - \mu) = 12.183$, the .90 point of $\chi^2_7 = 12.0$, and the .95 point of $\chi^2_7 = 14.1$

Table A-16

FIELDWORK SAMPLE SUMMARY STATISTICS: PROPORTIONS OF FAMILIES WITH INCOME ABOVE $25,000 AND BELOW POVERTY INCOME

FIELD WORK SAMPLE OF SCHOOL DISTRICTS 6. 06/21/74 PAGE

FILE NONAME (CREATION DATE = 06/21/74)

VARIABLE FATCATS PROPORTION OF FAMILIES WITH INCOME ABOVE $25000

MEAN	0.051	STD ERROR	0.007	MEDIAN	0.040
STD DEV	0.033	VARIANCE	0.001	KURTOSIS[a]	0.056
SKEWNESS	1.009	RANGE	0.115	MINIMUM	0.012
MAXIMUM	0.127				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

VARIABLE PCPOOR PROPORTION OF FAMILIES BELOW POVERTY INCOME

MEAN	0.089	STD ERROR	0.011	MEDIAN	0.077
STD DEV	0.053	VARIANCE	0.003	KURTOSIS[a]	0.936
SKEWNESS	1.045	RANGE	0.215	MINIMUM	0.019
MAXIMUM	0.234				

VALID OBSERVATIONS - 22
MISSING OBSERVATIONS - 0 OR 0.0 PERCENT OF TOTAL

- -

[a] See Table A-4.

Table A-17

FIELDWORK SAMPLE HISTOGRAM: LOG OF SCHOOL DISTRICT POPULATION

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE    8

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   LOGPOP     LOG OF SCHOOL DISTRICT POPULATION

      CODE
            I
      2.00  ************************************************ (      5)  22.7 PCT
            I    8.5 TO 9.999
            I
            I
      3.00  ************************************** (      4)  18.2 PCT
            I    10 TO 10.999
            I
            I
      4.00  ************************************************ (      5)  22.7 PCT
            I    11 TO 12.499
            I
            I
      5.00  ************************************************************************************ (      8)  36.4 PCT
            I    12.5 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........
            0         1         2         3         4         5         6         7         8         9         1
            FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

Table A-18

FIELDWORK SAMPLE HISTOGRAM: LOG OF SCHOOL DISTRICT ENROLLMENT

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE    9

FILE   NONAME   (CREATION CATE = 06/21/74)

VARIABLE   LOGENRL    LOG OF SCHCOL DISTRICT ENROLLMENT

      CODE
            I
      2.00  ************************************************ (      5)  22.7 PCT
            I     7 TO 8.499
            I
            I
      3.00  ************************************************ (      5)  22.7 PCT
            I     8.5 TO 9.499
            I
            I
      4.00  ************************************** (      4)  18.2 PCT
            I     9.5 TO 10.999
            I
            I
      5.00  ******************************************************************************** (      8)  36.4 PCT
            I     11 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0         1         2         3         4         5         6         7         8         9         10
            FREQUENCY

VALID   OBSERVATICNS -        22
MISSING OBSERVATIONS -         0
```

Table A-19

FIELDWORK SAMPLE HISTOGRAM: PROPORTION OF POPULATION URBAN

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE   10

FILE   NJNAME   (CREATION DATE = 06/21/74)

VARIABLE   PCURB      PROPORTION OF POPULATION THAT IS URBAN

      CODE
            I
      2.00  ********** (      2)   9.1 PCT
            I     .2 TO .599
            I
            I
      3.00  ******************** (      4)  18.2 PCT
            I     .6 TO .899
            I
            I
      4.00  ****** (      1)   4.5 PCT
            I     .9 TO .9799
            I
            I
      5.00  ************************************************************************ (     15)  68.2 PCT
            I     .98 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........
            0         2         4         6         8        10        12        14        16        18        2
            FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

Table A-20

FIELDWORK SAMPLE HISTOGRAM: PROPORTION OF POPULATIO BLACK

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                                    06/21/74        PAGE   11

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   PCBLK      PROPORTION OF POPULATION THAT IS BLACK

      CODE
            I
      1.00  ************************************************************ (      6)  27.3 PCT
            I    LESS THAN .02
            I
            I
      2.00  ********************* (      2)   9.1 PCT
            I    .02 TO .0499
            I
            I
      3.00  ****************************** (      3)  13.6 PCT
            I    .05 TO .0999
            I
            I
      4.00  ************************************************************ (      6)  27.3 PCT
            I    .1 TO .1999
            I
            I
      5.00  ************************************************** (      5)  22.7 PCT
            I    .2 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0         1         2         3         4         5         6         7         8         9         10
            FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

Table A-21

FIELDWORK SAMPLE HISTOGRAM: PROPORTION WITH SPANISH AS MAJOR LANGUAGE

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE   12

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   SPNLAN     PROPORTION WITH SPANISH AS MAJR LANGUAGE

      CODE
             I
      1.00   ****************************** (      3)  13.6 PCT
             I    LESS THAN .005
             I
             I
      2.00   ************************************** (      4)  18.2 PCT
             I    .005 TO .00999
             I
             I
      3.00   ****************************** (      3)  13.6 PCT
             I    .01 TO .01999
             I
             I
      4.00   ************************************************************************ (      7)  31.8 PCT
             I    .02 TO .0999
             I
             I
      5.00   ************************************************ (      5)  22.7 PCT
             I    .1 OR ABOVE
             I
             I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
             0         1         2         3         4         5         6         7         8         9        10
             FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

Table A-22

FIELDWORK SAMPLE HISTOGRAM: PROPORTION OF FAMILIES WITH INCOME ABOVE $25,000

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE   14

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   FATCATS    PROPORTION OF FAMILIES WITH INCOME ABOVE $25000

     CODE
            I
     1.00   ******************** (      2)   9.1 PCT
            I    LESS THAN .02
            I
            I
     2.00   ********************************************************************** (      8)  36.4 PCT
            I    .02 TO .03499
            I
            I
     3.00   ******************** (      2)   9.1 PCT
            I    .035 TO .04999
            I
            I
     4.00   ********************************************************************** (      7)  31.8 PCT
            I    .05 TO .0999
            I
            I
     5.00   ****************************** (      3)  13.6 PCT
            I    .1 OR ABOVE
            I
            I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
            0         1         2         3         4         5         6         7         8         9        10
            FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

Table A-23

FIELDWORK SAMPLE HISTOGRAM: PROPORTION OF FAMILIES BELOW POVERTY INCOME

```
FIELD WORK SAMPLE OF SCHOOL DISTRICTS                    6.                    06/21/74        PAGE   15

FILE   NONAME   (CREATION DATE = 06/21/74)

VARIABLE   PCPOOR     PROPORTION OF FAMILIES BELOW POVERTY INCOME

      CODE
             I
      1.00   ****************************** (      3)  13.6 PCT
             I    LESS THAN .04
             I
             I
      2.00   ********************************************************************************** (      8)  36.4 PCT
             I    .04 TO .0799
             I
             I
      3.00   ********************************************************** (      6)  27.3 PCT
             I    .08 TO .11999
             I
             I
      4.00   ************************************** (      4)  18.2 PCT
             I    .12 TO .1999
             I
             I
      5.00   *********** (      1)    4.5 PCT
             I    .2 OR ABOVE
             I
             I.........I.........I.........I.........I.........I.........I.........I.........I.........I.........I
             0         1         2         3         4         5         6         7         8         9        10
             FREQUENCY

VALID   OBSERVATIONS -        22
MISSING OBSERVATIONS -         0
```

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Appendix B

PATTERNS OF ASSOCIATION AMO' G PROJECT CHARACTERISTICS

Section II described separately the three components of project design—resources, educational method, and implementation strategy. Yet such analytical separation somewhat distorts the reality of project design. Some implementation strategies were more likely to occur with particular educational methods than with others. For example, we might expect that a high degree of implementation flexibility would be associated with projects calling for high levels of classroom organizational change but not for behavioral modification methods. Similarly, it is reasonable to expect more concentrated funding for projects emphasizing behavioral modification than for projects mostly concerned with enrichment of many students. This appendix describes the patterns of associations or links among the educational methods, implementation strategies, project resources and focus, and federal programs.

In particular, the analysis describes the patterns or combinations of project resources and focus, implementation strategies, and federal programs that were associated in the Rand sample, and could be presumed likely to be more generally associated with the five underlying educational methods. Table B-1 presents measures of multivariate association and significance for the relationship between each project design choice and the degree of each educational method employed by the project. For each design choice, a standardized regression coefficient (beta weight) indicates the extent of the relationship between a project characteristic and an educational method when other characteristics are statistically controlled. The R^2 and F-statistic for each educational method measure the net extent of association between the method and the design choices.

Before describing the substantive results in detail, an overall statistical observation is in order. The statistics of Table B-1 suggest, on one hand, that there are significant linkages between educational method and implementation strategies and, on the other hand, that considerable variation remains to project designers in choosing the level of educational methods once other strategic choices have been made, and vice versa.

BEHAVIORAL MODIFICATION TECHNIQUES

The dimension of behavioral modification, like the other dimensions, ranges from very low values (which indicate the presence of no more behavioral modification techniques than are found in a traditional classroom) to very high ones (showing that a large component of behavioral modification techniques has been applied to the project school). The beta weights refer to the relative association and covariation between the behavioral modification observations and the implementation items across the whole range of each scale. A large, significant weight indicates that

Table B-1

PROJECT CHARACTERISTICS ASSOCIATED WITH EDUCATIONAL METHODS

Project Design Choices	Standardized Regression Coefficients for Educational Methods				
	(1) Behavioral Modification	(2) Enrichment	(3) Classroom Organizational Change	(4) Intensive Traditional Staffing	(5) Administrative Change
Resources					
Funding	.10*	.10*	.10*	.12*	.11*
Students	-.06**	-.01	-.16**	.04	-.13**
Funding per student	.12**	-.01	-.05	.07*	- 02
Implementation Strategy					
Percentage of planning	.05	.09*	.01	-.00	.18**
Staff training time	.6	-.15**	.17**	.15**	.03
Value of meetings	.01	.09*	.01	.10*	.00
Teacher not participating in implementation decision	.04	.02	-.12**	.02	02
Teacher free to alter project design	-.01	.10**	.10**	03	-.07*
Materials not developed locally	-.1[illegible]**	-.19**	-.03	.11**	-.12**
Project located in special unit	.08*	-.11**	.02	.13**	-.09*
Project covers high and elementary schools	-.04	.07	.00	- 03	.00
Overall teaching change required	.04	-.07	.07	-.06	08
Change in specific teaching technique required	13*	-.14**	.03	-.05	-.01
Extra effort required (principal's view)	-.09*	.01	.08*	-.05	- 04
School Characteristics					
Number of students in school	-.01	.07	.08*	-.00	.13*
Percentage of black students in school	.06	-.04	-.15**	.14**	-.11*
Percentage of Spanish students in school	.00	.03	-.09*	.10*	-.02
Elementary school	-.00	-.14**	.15**	.07	.02
R^2/adjusted R^2 [a]	.10/ 07	.17/.14	.16/.12	.17/.14	10/.07

NOTE: An asterisk (*) indicates significance at the .10 level; and a double asterisk (**) indicates significance at the .01 level.

[a]All equations are significant for the F-statistic (18,490). Although the number of observations is 509, the number of projects is 287. The classroom level is the unit of analysis for this table to allow for classroom and school variation in project design and implementation.

increasing levels of behavioral modification and the implementation item consistently occur together.

The strongest design choice linked to behavioral modification methods was that of concentrated, focused resources for project students. The positive weight for funding per student is large (.12) and significant. This reflects the relative concreteness and visibility of behavioral modification approaches, as well as the fact that special centers and materials have a maximum utilization level that cannot be stretched. In addition, it appears likely that in schools with a substantial behavioral modification innovation, students were clearly either "in" or "out" of the project—promoting targeting and focusing of resources on project students.

The association of total funding levels with behavioral modification was positively significant, but differs only slightly from the resource pattern for other methods. Overall, large budget projects tended to have more intensive components of whatever method they had selected. The significance of funding is thus present at the beginning of a project's life, when it can enable major new components of schooling to be introduced.

Particular implementation strategies that were linked to behavioral modification instruments were those appropriate to the simple substitution of one form of teacher-centered curriculum for another: Local materials development, a special unit for all or some project activities, specific teaching technique changes, and a minimum of extra required effort were consistent predicates to behavioral modification methods. All had sizable and significant weights, ranging from values of .08 to .15 (ignoring the coefficients' signs). Administrative techniques for initiating change, such as planning and meetings, were no more likely to be found in projects using behavioral modification instruments than in those not doing so. This probably reflects a tendency to view these projects as "self-winding" technocratic changes that take care of their own implementation (see Sec. III for a fuller discussion). For example, educational technology techniques (which load heavily on the behavioral modification factor and can be used as a behavioral modification instrument) may be seen as requiring little facilitation to achieve implementation. The consistent pattern of implementation for behavioral modification projects was, apparently, to concentrate them on selected students and to treat the new educational methods as discrete substitutes for specific traditional methods.

Table B-1 shows that no school characteristics—grades, school size, or ethnicity—had a significant relationship with behavioral modification innovations. That is, these new treatments were applied across the full spectrum of school types. School decisionmakers evidently did not choose behavioral modification methods more frequently for any particular group of students—indicating either the treatment's adaptability or its possible lack of sensitivity to target group characteristics.

ENRICHMENT TECHNIQUES

Although the enrichment dimension was not characterized by increasing concentration of resources for higher levels of enrichment (an extreme enrichment program may or may not spend many dollars per student), it shows the same weight for its association with aggregate funding as the other dimensions (.10). That is, the bigger the total grant, the bigger the amount of enrichment methods is applied. The

absence of a concentration effect may be due to the high school focus of these projects; the elementary school weight was a negative and very significant −.14. In some cases, lump-sum investments may benefit all students in a high school, independent of its size. Perhaps because high school students rotate among classes and typically use group facilities such as a speaker, a movie, or a group tour, it appears that enrichment projects' resources were not consistently targeted on a select group of participants. Other school characteristics (size and ethnicity) were not related to the extent of enrichment methods, again suggesting that broad and inclusive projects, to the extent allowed by the resource/treatment mix, were a pattern for enrichment.

Table B-1 indicates that several particular administrative implementation strategies were associated with high enrichment innovations. As enrichment components increase, so do planning activities, the value of staff meetings, teacher flexibility for adapting the project, and local materials' development. Equally significant weights link enrichment with an absence of staff training and an absence of special instructional units. Since enrichment activities generally imply an addition to standard curricula, usually applied by existing staff using existing methods, this implementation pattern is readily interpretable. Training was *not* required since teacher behavior was not altered. Nor were new instructional sites or activities added. Planning and materials development *were* required for substantial doses of enrichment since project activities had to be consciously designed, and the specific activities (e.g., field trips and "community resources" were common in this dimension) had to be laid out before students could experience them. For an innovation to be an "enriching" student experience, it must include substantial departures from everyday readings, lectures, and discussions—requiring preparation by teachers. To the extent that teachers' meetings could be successfully initiated and maintained, they were associated with higher levels of enrichment; it appears that teachers' meetings are fruitful sources of ideas for the design and presentation of enrichment activities.

The implementation of enrichment depended on each teacher's ability to integrate new materials and substance into existing curricula and workloads. The associations between increasing enrichment and teacher flexibility (.10), and an absence of specific teaching changes (−.14), show that enrichment projects were generally made to fit individual classroom situations, rather than altering traditional approaches. Such change can be one-way, a process in which the project mutates but local actors and organizations do not change (see Vol. III, Sec. III). In short, the high enrichment projects were generally characterized by integration into existing classrooms, but were not a stimulus for new teaching approaches.

CLASSROOM ORGANIZATIONAL CHANGE METHODS

Classroom organization innovations tended to be installed in a particular sort of setting: in elementary schools (beta = .15) that were large (school enrollment beta = .08), but in a very small number of individual classrooms (beta for number of project students = −.16). Table B-1 shows that smallness of project scope, when given as the number of participating students, consistently rises with increasing levels of classroom organization treatment.

This setting for change—typically one or two classrooms in a sizable elementary school—suggests that many innovative classroom projects may rely on experimentalism and voluntarism as the means of introducing new educational methods. When very complex and extensive departures from traditional schooling were begun, it seems that many implementing districts may have confined the change to a small (and possibly volunteer) group of project participants, rather than converting a whole school to innovative classroom practice at one time.

Classroom organization changes anchored in voluntarism and selective implementation appeared to have had a relative absence of black and Spanish-surnamed students from participating schools. If schools with substantial minority enrollments also tended to center their efforts on traditional "basic" school goals and to refrain from free-form educational alternatives, they were perhaps less likely to induce parents to volunteer their children—or teachers to volunteer themselves—for an unpredictable change from the security of current practice. Complex and relatively radical innovations may have proved an unattractive alternative in a school immersed in the problems of minority and multilingual education.

Classroom reorganizations were associated with extensive training; the largest weight for any characteristic of classroom projects is that for staff training time (.17). The training that accompanied a new organization of teacher-child relations in the classroom did not appear to bind or constrict teachers' freedom to alter project design (the beta for teacher freedom is .10) or their participation in implementation decisions (beta = −.12). Training affected implementation by means of linkages that were based on a pattern of flexibility, adaptation, teacher control, and very substantial amounts of extra teacher effort (the last-named effect, with a weight of .08, is the only significant, positive association of effort with any dimension of educational methods). While the R^2 of .16 suggests some but not much overall covariation of classroom organization methods with implementation characteristics, the remarkable pattern of associations clearly points to the difficult transition facing teachers who restructure their classrooms. The insignificance of such administrative tools as meetings reflects the relative isolation of elementary teaching, especially when the innovating teacher is in one of a small number of "new" classrooms in a particular school.[1]

INTENSIVE TRADITIONAL STAFFING METHODS

The dimension of intensive traditional staffing treatments was strongly associated with expenditures, concentration of expenditures, and selection of schools with substantially black and Spanish-surnamed students (see col. 4 of Table B-1). The traditional approach to educational problems through educational services is often deemed attractive by minority spokesmen. An additional incentive for minorities to prefer the intensive traditional approach may have been its use of paraprofessionals and parent volunteers and councils.

The dominant implementation strategies for intensive traditional staffing were those associated with specialization of teaching skills (staff training time and special

[1] However, preliminary analysis shows that the interaction of staff training and meetings was significantly related to high levels of classroom organization changes. See Sec. IV for a discussion of this point

units for a project) and the use of prepackaged materials. Specializing and using materials created for particular hard-to-solve learning problems are both well suited to individualized, prescriptive, or remedial teaching tasks. This top-down structured, training-intensive approach may have been effective in bringing the intensive traditional treatment to bear on target students, especially when personnel (such as paraprofessionals or parent volunteers) were not allowed or qualified to undertake major whole-child interventions.

The value of meetings among project staff, as shown in Table B-1, may take its importance from the need to integrate the activities of diverse, specialized instructional personnel involved in intensive traditional staffing.

ADMINISTRATIVE CHANGE METHODS

The dimension of administrative change methods is somewhat difficult to characterize; it includes heavy loading for such techniques as behavioral objectives, new management techniques, and new curricula. It appears to emphasize vigorous, broad policies for attacking persistent problems, with a strong component of administrative involvement and supervision.

Table B-1 indicates that high administratively directed change projects, such as the classroom organization approach, were characterized by a focus on a relatively small number of students in a relatively large school. However, implementation of the change strategy takes a completely different tack: Instead of training staff members, administrative change districts may have expended their project resources on planning by administrators; instead of freeing teachers to adapt projects to their own classrooms, teachers were enjoined not to make alterations in the project's design. Materials tended to be developed locally, but not necessarily by teachers.

In summary, projects high on the administrative change dimension were associated with top-down, administratively enforced changes—which, however, were carried out by individual teachers (the weight for special project units is −.09). Such an approach may be suited to the quick imposition of a new remedial reading and testing program, for instance; in cases where extensive administrative preparation but no classroom modifications were appropriate, administrative change methods and this pattern of implementation strategies could fit together.

Appendix C

SCHOOL DISTRICTS' PROPENSITY TO ADOPT INNOVATIONS

Our field experience strongly suggested that innovativeness depended on characteristics of the school district. Some school districts seemed more likely to innovate and to produce successful innovations than other districts. The literature on educational innovation often ignores the institutional setting, and studies that do analyze organizational aspects usually focus on the school but neglect the district.

This appendix presents a preliminary analysis of the propensity of school districts to adopt educational innovations. Aside from the importance of this topic in its own right, the analysis accomplishes two objectives. First, we suspect that the factors that affect the district's propensity to innovate will also affect initiation and continuation of special projects. Thus, this analysis is a source of hypotheses for Sec. IV. Second, the "innovativeness scale" developed here can be used directly in the analysis of continuation. Indeed, the scale is correlated .32 with continuation. However, due to the intercorrelations among the explanatory factors, innovativeness was not analyzed fully in Sec. IV.

MEASURING INNOVATIVENESS

Innovativeness is an elusive concept. Not only is there no agreed-on definition of innovativeness in the literature, but operational measurements differ widely. We view innovation as a change process involving various stages. Different concepts of innovation emphasize different stages in the change process. One concept deals with the invention of new techniques, strategies, or arrangements. The *invention* of educational strategies, methods, or technology is not the focus of this study. Rather we are concerned with the change processes initiated by the *adoption* of projects or programs that are new relative to the adopting school district (or units within the school district). Alternative definitions of innovation focus on two other aspects of change processes. First, innovation has been defined as the successful *implementation* of a project or program that is new in the district. Second, innovation has also been taken to mean that the introduction of a project or program produces a presumably improved *outcome*. Without begging the question of the extent to which adoption of a new program implies either its full implementation or significant outcomes, we shall measure the propensity of school districts to adopt "innovations" by summing up the number of widely discussed educational innovations tried by the district in the last decade.

Table C-1 presents a list of 21 "educational innovations."[1] Each superintendent of the school districts in our sample (n = 194) was asked to indicate for each

[1] Superintendents were also asked about the adoption of bilingual programs However, since such programs are only adopted in LEAs having significant non-English-speaking pupils, they are dissimilar from other educational innovations on the list used and hence were deleted.

Table C-1

SUPERINTENDENTS' RESPONSES TO LIST OF INNOVATIONS IN THE SCHOOL DISTRICT

Question: Here is a list of educational innovations that have been tried out in some school districts in the last decade. For each innovation, please circle the appropriate code to indicate whether it was never tried, tried but not now incorporated, or has been incorporated into current practice in your district.

Innovation	Never Tried (%)	Tried in District But Not Now Incorporated (%)	Incorporated into Current District Practice (%)	Number Not Answering
Programmed learning	19.21	28.25	52.54	17
Extended school year	72.88	3.38	23.72	17
Extended field trips	17.77	10.55	71.66	14
Team teaching	5.11	5.68	89.20	18
Nongraded or ungraded classrooms	15.08	10.05	74.86	15
Flexible scheduling	20.00	15.42	64.57	19
PSSC[a] Physics	29.82	14.03	56.14	23
Typing in elementary	57.71	18.85	23.42	19
Community school	54.71	7.65	37.65	24
Work/study program	9.09	3.41	87.50	18
Teacher corps	71.67	8.67	19.65	21
Student exchange	30.81	18.60	50.58	22
Educational TV	13.55	15.25	71.18	17
Simulation or gaming	26.90	19.29	53.80	23
Individualized instruction (method and/or materials)	0.56	5.08	94.35	17
Open classrooms	23.03	8.43	68.54	16
Program budgeting (PPBS)	52.80	13.48	33.70	16
Behavioral objectives	7.91	14.12	77.97	17
Alternative school	46.86	7.43	45.71	19
Special classes for the gifted	22.15	17.04	60.79	18
Needs assessment	10.11	15.17	74.72	16

NOTE: Number of observations = 194.

[a]Physical Sciences Study Committee.

innovation whether the school district had tried the new program and whether the program was currently incorporated into district practice. If fully implemented, some of these educational innovations (e.g., the extended school year) would require extensive changes in the administrative life of a school district; others, such as educational television, imply fewer organizational changes. Table C-1 indicates that such practices as team teaching, work/study program, and individualized instruction have been generally adopted by the districts in this sample, whereas other practices such as extended school year, teacher corps, and PPBS have not been as widely adopted.[2] The question this section asks is what aspects of the characteristics

[2] Responses to whether the programs were "tried in the district but not now incorporated" are ambiguous because a "yes" response could indicate either that the project was tried and rejected or is being tried and has not yet been incorporated. To avoid errors due to this ambiguity, the analysis categorizes the responses for each innovation into either "never tried" or "tried."

of school districts (and how they vary) explain the differences in their propensity to adopt innovations of the type indicated in Table C-1.

The analysis could proceed by considering each innovation separately as a function of theoretically plausible characteristics of the district and then comparing the results for each innovation. Because this procedure would be costly and might tend to be dominated by the specific substance of the list of educational innovations used here, we approach the measurement of the dependent variable by aggregating the individual measures. In particular, we employed the following five scales:

1. An unweighted sum of the responses to all the educational innovations where a zero score was given if the district had not tried the innovation and a score of one otherwise.
2. An unweighted sum of the responses to those innovations that primarily involve the student in the classroom and do not imply major administrative changes in the school or school district organization.[3]
3. An unweighted sum of the responses to those innovations that imply administrative or organizational changes in the school or school district.[4]
4. A weighted sum of the responses to those innovations that imply administrative or organizational changes in the school or school district.[5]
5. A weighted sum of the responses to all innovations using the weights of scale four.

The point of using these alternative scaling procedures is to explore several problems of validity in the construction of an innovation index. First, summing the various items tends to mask overly strong effects of the specific substance of each item. However, such aggregation necessarily makes the index abstract and thus should be interpreted as the propensity to adopt current educational innovations. Second, since the aggregation of all items might lose "too much" of the substance of the innovations, scales two and three separate the student-class-oriented innovations that do not imply administrative changes from those that do involve administrative alterations. Third, the various innovations undoubtedly differ in the ease with which they might be adopted; an equal weighting scheme assumes away these differences. Scales four and five represent a preliminary effort to weight the innovations and thus enable us to examine the sensitivity of the results to an equal weighting assumption. Table C-2 presents the statistical characteristics of the five innovativeness scales.

EXPLAINING SCHOOL DISTRICT INNOVATIVENESS

In "explaining" innovativeness here, we will not deal directly with internal processes or decisions within the school districts. We will try instead to explain the differences in the propensity to adopt innovations in terms of theoretically plausible

[3] The items included are programmed learning, extended field trips, PSSC physics, student exchange, educational TV, simulation or gaming, individualized instruction, and special classes for the gifted

[4] The items included are extended school year, team teaching, nongraded or ungraded classrooms, flexible scheduling, community school, work/study program, teacher corps, open classrooms, PPBS, behavioral objectives, alternative school, and needs assessment

[5] The following weights were used. three for alternative school, two for each of open classroom, nongraded or ungraded classrooms, and team teaching, and one for the remaining administrative items.

Table C-2

STATISTICAL CHARACTERISTICS OF INNOVATIVENESS SCALES

Scale	Mean	Median	Standard Deviation	Range
Sum of all innovations (unweighted)	13.9	13.9	3.5	0-20
Sum of student-class innovations	6.8	7.1	1.8	0-9
Sum of administrative innovations	7.1	7.2	2.2	0-11
Sum of administrative innovations (weighted)	9.8	9.9	3.2	0-15
Sum of all innovations (weighted)	16.6	16.8	4.5	0-24

characteristics of the district. Considerable empirical literature about the diffusion of innovation, particularly in the fields of agriculture, medicine, public bureaucracies, and economic firms, suggests that size, wealth, and the availability of resources may be related to the propensity of organizations to adopt innovations.[6] That is, larger and wealthier organizations often appear to adopt more innovations. This finding may seem contrary to our intuitive feeling that large organizations are "conservative" in nature; for school districts, the finding is perhaps even more counter-intuitive. Nonetheless, as the following analysis shows, factors related to size and wealth strongly affect school district innovativeness.

Table C-3 presents the results of a statistical analysis of the school district's propensity to adopt considered innovations, as determined by a variety of characteristics of the district. In particular, using ordinary least squares estimation procedures, the independent variables used to explain the variation in school district innovativeness represent five groups of factors that, on a priori grounds, might affect innovativeness.

- The first group consists of two measures of size: total LEA enrollment and number of students per school.
- The second group consists of four measures of the district's financial situation: the expenditure per pupil of the district measured in terms of the district's deviation from the state's average; the average expenditure per pupil of school districts in the district's state; the general financial situation of the district as assessed by the superintendent; and whether the district (according to the superintendent) has been forced to cut back on programs because of financial circumstances.
- The third group relates to the source of the district's revenues: the percentage of the district's revenue derived from state or federal sources measured in terms of the district's deviation from the state average.

[6] The findings in the literature about the importance and nature of the effects of size are somewhat mixed and in dispute.

Table

SCHOOL DISTRICT INNOVATIVENESS

Independent Variables	Regression Coefficients for Innovation Indices (standard error) (probability value)				
	All Innovations	Class Innovations	Administrative Innovations	Administrative Weight	All Weight
District enrollment (log)	1.49** (.168) (.00)	.697** (.101) (.00)	.790** (.113) (.00)	1.10** (.182) (.00)	1.80* (.226) (.00)
Pupils per school (residual)	-1.85** (.518) (.00)	-1.03** (.312) (.00)	-.827** (.348) (.02)	-1.19** (.561) (.04)	-2.22** (.697) (.00)
Expenditures per pupil/state average	.183 (.667) (.78)	-.073 (.402) (.86)	.256 (.448) (.57)	.664 (.722) (.36)	.592 (.900) (.51)
State average expenditure per pupil	-.0005 (.001) (.73)	-.0003 (.001) (.71)	-.0007 (.001) (.40)	-.0004 (.001) (.78)	-.0001 (.002) (.95)
Adequacy of district financial situation	.396* (.240) (.10)	.244* (.144) (.09)	.152 (.161) (.35)	.345 (.260) (.187)	.588* (.323) (.07)
Percent cutbacks in programs	-.890** (.416) (.03)	-.250 (.251) (.32)	-.640** (.279) (.02)	-.827* (.450) (.07)	-1.08* (.56) (.06)
Percentage of revenue from state/state average	-12[illegible]** (48.3) (.01)	-56.3* (29.1) (.06)	-64.9** (32.4) (.05)	-65.8 (52.2) (.21)	-122.* (65.0) (.06)
State average percentage of revenue from state	.036* (.021) (.09)	.005 (.013) (.67)	.030** (.014) (.03)	.030 (.023) (.19)	.036 (.028) (.21)
Percentage of revenue from federal/state average	6.60 (16.8) (.70)	3.96 (10.1) (.70)	2.64 (11.3) (.81)	16.1 (18.2) (.38)	20.0 (22.6) (.38)
State average percentage of revenue from federal	-.104 (.969) (.29)	-.015 (.058) (.80)	-.089 (.065) (.18)	-.057 (.105) (.59)	-.072 (.130) (.58)
Percentage of families with income $25,000	12.7** (5.55) (.02)	6.93** (3.35) (.04)	5.78 (3.37) (.12)	11.3* (6.01) (.06)	18.2** (7.47) (.02)
Percentage of poor families predicted from minority	-11.3** (5.11) (.03)	-8.35** (3.08) (.01)	-2.91 (3.43) (.39)	-5.30 (5.54) (.34)	-13.6** (6.88) (.05)
Rural	-.858 (.687) (.21)	-.159 (.414) (.70)	-.698 (.461) (.13)	-1.31* (.743) (.08)	-1.47 (.924) (.11)
Tenure of superintendent	.131** (.038) (.00)	.070** (.023) (.00)	.062** (.026) (.02)	.073* (.041) (.08)	.143** (.51) (.01)
Years of superintendent's previous experience in district	.031 (.024) (.21)	.020 (.015) (.18)	.011 (.016) (.51)	.019 (.026) (.48)	.038 (.033) (.24)
R^2 (corrected)	.58	.44	.49	.41	54
Correlation coefficient	.79	.70	.74	.69	.76
Degrees of freedom	134	134	134	134	134
Range of dependent variable	0-20	0-9	0-11	0-15	0-24

NOTE: An asterisk (*) indicates significance at the .10 level; and a double asterisk (**) indicates significance at the .05 level

- The fourth group consists of three measures of the socioeconomic-ethnic characteristics of the community in which the school district is embedded: the percentage of families in the community with incomes over $25,000; the percentage of families in the community with incomes under the poverty level combined with the percentage of families from minority groups (black or Spanish-speaking); and whether the district is in a rural area.
- The final variable is the tenure of the district's current superintendent.

In the course of analyzing the results, we discuss the meaning of these variables more fully and interpret their theoretical significance.

Table C-3 displays the regression coefficients from each of the independent variables along with their standard errors and probability values. The same structural equation is used for the five measures of propensity to adopt innovations previously discussed. R^2, the proportion of the variation (adjusted for the degrees of freedom used in the estimation) explained by the independent variables, is indicated below each column.

The variable with the largest effect on the propensity to adopt innovations is the size of a school district as measured by enrollment.[7] Controlling for other factors, it accounts for approximately 30 percent of the variance in the dependent variables.

Why do larger school districts tend to adopt more innovations? One reason is that large school districts with numerous and diverse schools have more opportunities to innovate.[8]

A related theoretically plausible explanation is that larger school districts have more "organizational slack" than smaller districts. Organizational slack in the context of the school district can occur in several ways. Larger school districts have larger operating budgets and a greater flexibility to direct funds within that budget. Perhaps even more important, size may allow political flexibility. That is, the motivations for school districts to adopt innovations are complex and mixed. For any of a variety of specific reasons, the district may feel either a positive desire or a reactive need to introduce new programs. Moreover, although district decisionmakers may be risk-adverse in the sense that they may be more concerned with avoiding failures than promoting change, the consequences of failure of a project would have fewer and more diffuse political repercussions in a large district than a project with the same scope in a small district. In political terms, bigger districts can better afford to experiment than smaller districts.

Several implications for the prospects of particular innovations follow from this size effect. For a project of the same relative "scope," we would expect less pressure from above in a larger district than in a smaller one. We do not have plausible theoretical reasons to suggest what the direction of the effect of such pressure on the success of a project might be; we take this question to be an empirical issue. However, it is reasonable to hypothesize that, assuming equal success of an experimental project of the same relative scope, the larger district would be less likely to incorporate a project, that is, propagate it throughout the district on a regularized

[7] Since the distribution of enrollment is highly skewed a logarithmic transformation of the enrollment was employed leading to a much closer to normal distribution The regression coefficient for log enrollment should be interpreted as there being an average increase of 1.56 innovations for every change of one in the natural logarithm.

[8] Future analysis will consider measures of the propensity to innovate that are not sensitive to the accumulated number of innovations.

basis. For the smaller district, the lack of political slack means that adoption is equivalent to placing one's bets. For the larger district, the availability of political slack means the adoption amounts to experimenting; when the time comes to incorporate, the pressure is to spread the innovation throughout the district. Such propagation creates severe political risks.

We have deliberately glossed over the phrase "relative scope" of a project. A project involving the same absolute level of resources (teachers, materials, and expenditures) clearly has different economic consequences in a small district than in a larger district. In particular, the same project in the small district can be expected to have a larger opportunity cost than in a large district. Such opportunity costs cannot be calculated, but nonetheless they play an important role in district decisions. Moreover, identical projects may have more political visibility in a small district than in a large district.

Another dimension of district size also affects innovation. Districts that have the same overall enrollment may differ in the number and size of the schools within the district. To capture part of this important organizational difference among school districts, we used as an explanatory variable the enrollment density for the district, that is, the average number of students per school in the district.[9] Density decreases innovation, other things being equal. Although density's effect on innovation is about one-third as great as that of enrollment, it is highly significant (see Table C-3).

Several plausible explanations of the importance of density can be offered. Perhaps the most compelling theoretical reasons are based on organizational slack. The more dense the district (and thus the fewer the number of schools for the same enrollment), the less slack exists both in economic and political terms.

In addition to size-related characteristics, the effects of "wealth" (controlling for size and other wealth-related characteristics) can be expected to affect the propensity to adopt innovations. Measuring the wealth of a school district is an extraordinarily complex task. Not only is it difficult to conceptualize what the appropriate measures of wealth should be, but gathering the appropriate information from school officials, who cannot be expected to keep their financial records in a theoretically useful way, is, at best, uncertain. To cope with this situation, we used surrogate measures involving expenditure per pupil and the district's general financial situation.

Expenditure per pupil varies considerably across individual school districts throughout the country. However, part of this variation is due to differences among the states in such areas as state policies and regional wage rates. Since our sample of school districts was picked by a first-stage state selection, we need to control the effect of the state on the expenditures of school districts within the state. Therefore, the regression includes both deviation of each school from the state average expenditure per pupil and th absolute value of the state average. Neither of these variables was significantly related to innovativeness.

That the state average expenditure per pupil fails to be significant is not surprising. Much of this difference in averages among states is due to such costs as

[9] The enrollment density increases with larger enrollment. (Overall, (log) enrollment is correlated .485 with enrollment per school.) Since we are interested in the effect of density independent of enrollment, the variable used in the regression is the residual of (log) pupils per school regressed on (log) enrollment.

teacher salaries and operating and maintenance costs of districts rather than to the type of additional expenditures that might result in economic slack.[10]

The lack of significance of the relative expenditure per pupil is more surprising —at least at first thought. The reason why it is not statistically significant may be that different levels of per pupil expenditure reflect two conflicting tendencies. Insofar as school districts spend more money per pupil than other districts (in the same state) in order to deal with problems such as compensating for children from poor or minority families, then these higher relative expenditures do not represent slack. But higher relative expenditure per pupil can also reflect a greater local wealth base of the district and political pressures from the wealthier members of the community; in this case, one does expect slack and an impetus toward innovation. In short, the differences in relative expenditure per pupil arise from conflicting sources and thus cause expenditure per pupil not to be significantly related to innovativeness unless these other sources are taken into account.[11]

Whereas expenditure per pupil has little effect, two other direct but "noisy" measures of the financial situation do affect the propensity to adopt innovations. We asked each superintendent to indicate what the present financial situation in the district was and whether the district had been forced to cut back on programs.[12] Because both of these variables rely on the subjective judgment of superintendents, their validity needs to be questioned. Nonetheless, it seems reasonable to interpret the superintendent's answer to the financial situation for carrying out *needed* educational programs as a surrogate for the extent of economic slack (excess over needed funds) available in the district. In any event, the better the financial situation, the higher the propensity of districts to innovate. Half of the superintendents in our sample said they had to cut back on programs due to financial shortages. Their

[10] For example, the range of the average of the salaries of the instructional staff for the highest paying state (New York) to the lowest paying state (Arkansas) in our sample is $11,730 to $6715. (Research Division, National Education Association, *Rankings of the States, 1972*, Research Report 1972-R1, 1972.)

[11] The data support the above explanation for the lack of significance of the relative expenditure per pupil in the following way: The zero-order correlation between relative expenditure and the innovativeness scale is approximately .2, but expenditure per pupil also has a zero-order correlation of .13 with the percentage of families in the district who are black or Spanish-speaking and .19 and .12 with the percentage of families with incomes over $25,000 and the overall financial situation of the district as reported by the superintendent, respectively. The analysis includes and controls for all of these variables (as well as the others indicated in Table C-3), in which event expenditure has a positive but not significant effect on innovativeness with a partial correlation under .1.

[12] The questions and the marginal results were as follows:

How do you view the present financial situation in your district? Would you say your budget is more than adequate, adequate, barely adequate, or inadequate to carry out needed educational programs?

More than adequate	29.8%
Adequate	26.7%
Barely adequate	39.8%
Inadequate	3.7%

Number of responses = 194; no answers = 3.

Has your district been forced to cut back on programs in the last few years as a result of financial shortages?

Yes	49.0%
No	51.0%

Number of responses = 194, no answers = 2.

districts, which were on the financial margin a.' were less likely to have economic slack, were less likely to adopt innovations.

The above findings can be further clarified by examining the analysis of class-type innovations versus administrative innovations. Table C-3 shows that for the subset of class-type innovations, the general financial situation is significant (indeed more so than for the innovativeness scale including all innovations), whereas cut-back fails to be significant. The opposite result holds for administrative-type innovations. A plausible interpretation of these results is that districts having economic slack are more likely to adopt class-student-type innovations and districts operating at the financial margins are less likely to adopt administrative-type innovations.

One important implication of the above findings for particular innovative projects is clear: We would expect a district having financial slack to be more likely to continue a class-student-type project on its own funds after initial federal funding is completed than it would an administrative-type project.

The next group of variables is concerned with the source of financial support for school districts. There is considerable variability among school districts in the extent to which their revenues come from local government, the state, or from the federal government. A major aspect of this variability is related to the differences among states in terms of their wealth, their demographic characteristics, and their state policies toward financing education. For example, the percentage of revenue for schools from state government varies in our sample from a high of 68.7 (North Carolina) to a low of 21.7 (Massachusetts). To correct for state variation, the analysis uses both the absolute value of the state average percentage and the relative deviation of the school district from its state average.

The results of the analysis shown in Table C-3 indicate that differences among school districts in the percentage of federal funds they receive vis-à-vis revenue from state and local governments does not significantly affect the propensity to adopt innovations. This finding is understandable when one considers the "entitlement" or grants-in-aid basis for federal funding.

Differences among school districts in the percentage of revenue derived from the state government does significantly affect innovativeness. The higher the percentage of revenue from the state relative to other school districts within the state, the lower the propensity to innovate. Two hypotheses may explain this result. First, incrementally more state money may be going to districts that need the funds in order to deal with their financial problems. Thus, the relative deviation of a district from the state average in the percentage of funds received from the state is negatively correlated with both the relative expenditure per pupil (−.31) and the general financial situation of the district (−.24); it is also negatively related (−.31) to a measure that in part reflects the wealth base of the community, the percentage of families with income over $25,000. Moreover, the relative percentage of revenue received from the state shows a high negative correlation (−.89) with the relative percentage of revenue received from the local government. Second, state monies may be more tied down than either local or federal funds. Both of these hypotheses work in the same direction toward reducing the amount of slack for the school district.

The next group of variables, representing demographic characteristics of the community, are importantly related to innovativeness. The percentage of families with income of at least $25,000 increases innovativeness, whereas the percentage of

families with income below the poverty level, combined with minority, decreases innovativeness. Rural decreases innovativeness as anticipated, although the result fails to be significant.

The final group of variables refers to a factor that analysts of school systems believe strongly influences the policies of the school district—the superintendent. The tenure of a superintendent (whether measured in terms of numbers of years as superintendent or as a dummy variable for three or fewer years or more than three years) increases innovativeness. This result holds up even when controlling for the mobility and the past experience of the superintendent. A hypothesis explaining this result is a political-organizational one. Innovations in school districts generally come incrementally and involve the ability of the superintendent to use the political slack in the system. More experienced superintendents know how to manipulate their system better.[13]

[13] This result may be affected by a measurement error in the dependent variable. It is possible that newer superintendents would not have knowledge of all the innovations in the district during the past ten years and therefore would underreport "older" innovations This bias is minimal in the data because most school superintendents had worked their way up in the same school system.