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ABSTRACT

The Fifth Annual Report of the Stanford Center for Research and Development in Teaching covers the following: a) the center's program; b) a descriptive overview of the center; c) center resume; d) program and project register; e) Program 03, The Environment for Teaching; f) Program 04, Teaching the Disadvantaged; g) Program 05, Heuristic Teaching; h) support services; i) affiliated projects and visiting scholars; j) professional staff of the center; k) Executive Board and the National Advisory Panel members; and 1) recent publications of the center. The main body of the report deals with the three major research programs of the center, and separate projects within each research program are described and reviewed briefly. (HMD)

ED 091354

STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING

School of Education
Stanford University

THE EDUCATION AND EFFECTIVENESS OF TEACHERS

FIFTH ANNUAL REPORT

August 1, 1970

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
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Submitted to the Research and Development Centers Branch, Division of Educational Laboratories, National Center for Educational Research and Development, U. S. Office of Education, under Contract No. OE-6-10-078 (BR Center No. 5-0252). This report covers the period August 1, 1969 - July 31, 1970, with some reference to earlier activities of the Center.

N. L. Gage

N. L. Gage
Acting Director

SP008 026

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THE R&D CENTERS PROGRAM

This Center is one of a system of eight Educational Research and Development Centers funded under the Cooperative Research Act (as amended by Title IV of the Elementary and Secondary Education Act of 1965). The program was organized as one response to an increased national awareness of the importance of finding solutions to critical educational problems.

More specifically, the R&D Centers program was devised to fill a unique role in relation to other forms of educational research and development, by providing a prime avenue for (a) bringing together a critical mass of interdisciplinary talent and other research resources from the behavioral sciences and other disciplines, (b) focusing on a crucial educational problem area by means of a long-range coordinated attack on large-scale problems, and (c) moving promising innovations through development toward an impact on actual educational practice. Although R&D Centers generally do not carry the innovative process through to final implementation themselves, they are charged with the responsibility for projecting a further route toward that goal by enlisting the interest of a regional educational laboratory, commercial developer, State or local agency, coordinating body, or other appropriate institution.

This Annual Report describes some of the recent accomplishments of one of these centers in its progress towards meaningful education change. The complete list of eight R&D Centers is as follows:

Learning Research and Development Center, University of Pittsburgh (1964)

Center for the Advanced Study of Educational Administration, University of Oregon (1964)

Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin (1964)

Center for the Study of Social Organization of Schools, The Johns Hopkins University (1966)

Research and Development Center for Teacher Education, University of Texas at Austin (1965)

Stanford Center for Research and Development in Teaching, Stanford University (1965)

Center for Research and Development in Higher Education, University of California at Berkeley (1965)

Center for the Study of Evaluation, University of California at Los Angeles (1966)

Also funded through this same program is the National Program on Early Childhood Education, which consists of seven University-based centers whose research and development efforts are coordinated through the Central Midwestern Regional Education Laboratory (CEMREL), St. Ann, Missouri.

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The Educational Research and Development Centers are part of a larger set of institutions which contribute in specialized ways to the improvement of educational practice. These include:

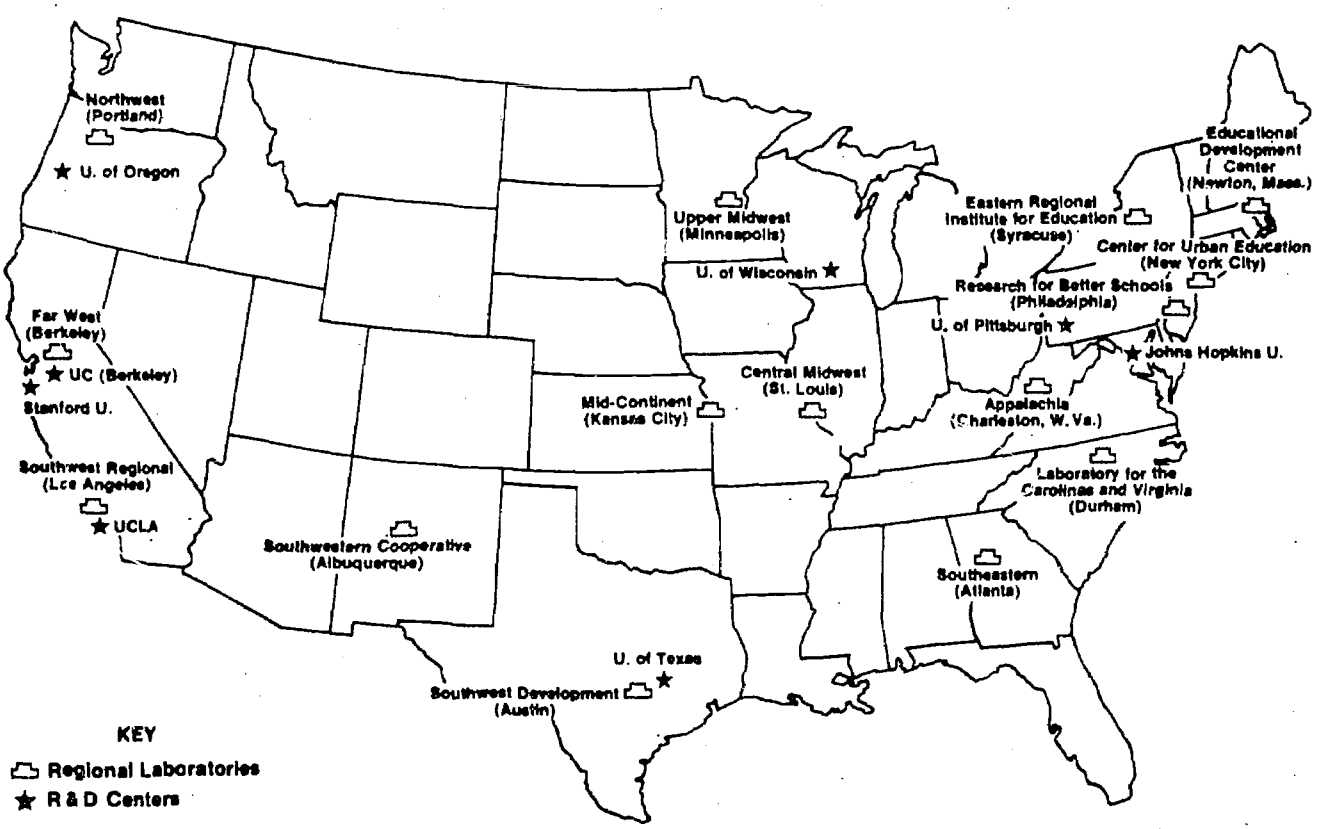
-- The two Educational Policy Research Centers, charged with providing a continuing examination of future educational needs and resources for the years 1980-2000.

-- The two Vocational Education Research Centers, established under the provisions of the Vocation Education Act of 1963.

-- The system of 15 Regional Educational Laboratories, each of which concentrates on specific problems concerned with the development, demonstration, and dissemination of educational alternatives, materials, and practices for the schools; some of these have close relationships with the Educational Research and Development Centers.

-- The Educational Resources Information Center (ERIC), a nationwide network for acquiring, selecting, abstracting, indexing, storing, retrieving, and disseminating information about educational research and resources, including 20 ERIC Clearinghouses each providing coverage of a particular educational area.

REGIONAL LABORATORIES AND R & D CENTERS CURRENTLY IN OPERATION



Adapted from Francis S. Chase, "R & D in the Remodeling of Education," Phi Delta Kappan, LI(6), February 1970, p. 301. Reproduced by permission.

A DESCRIPTIVE OVERVIEW OF THE CENTER

The central mission of the Stanford Center for Research and Development in Teaching is to contribute to the improvement of teaching in American schools. A detailed statement of that mission appears in the Résumé which follows this section.

The Center works toward achieving its mission through research, development, and dissemination activities carried on in three interrelated programs, each directed toward a pressing educational problem. The program on Heuristic Teaching is aimed at developing a theory of teaching and a model teacher education program, with supporting teacher training materials, which will reflect the functional uniqueness of the human teacher in relation to other components of the instructional system. The program on the Environment for Teaching seeks to develop research-tested strategies of organizational policy and change which will produce a more supportive environment for teaching and learning. Such an environment would clearly enhance the sort of teaching being developed by the Heuristic Teaching program. Finally, the program on Teaching the Disadvantaged seeks to arrive at a more complete and specific understanding of the social, cultural, linguistic, and attitudinal context of minority-group, disadvantaged communities and their schools, with the aim of improving both teacher training for and community participation in such schools. In its work, it draws on findings and materials from the other two programs.

Work toward these goals has been carried on in a variety of projects, which are described in the body of this report. During the past year the Center has faced the necessity, as suggested both by members of a USOE Site Visitors' Panel in late 1969 and by a meeting of its National Advisory Panel in early 1970, of sharpening its programmatic focus. During the first half of 1970 extensive discussions and planning have been directed toward a critical examination and where necessary a revision of the Center's programs. Toward this end, the new Program Plan and Budget Request due in the fall of 1970 will include a further development and

refinement of the Center's conceptual framework, projected over a three- to five-year period, with the understanding that the Center is and will be making its commitments only to staff who are most highly committed to work toward program goals and objectives. The plan will include the detailed specification of program objectives and their interrelations, the step-by-step scheduling of progress toward those objectives, the resources needed to accomplish the specified subgoals, the provisions for carrying outcomes further toward an impact on educational practice, and the guidelines for subsequent decisions on resource allocation, project termination, relations with other educational change-agents, and similar management problems.

In response to related recommendations, from its Advisory Panel, the Center is also taking steps to provide the Director with additional time in which to work toward the Center's objective and monitor its activities, to examine the allocation of funds as between full-time senior staff and part-time research assistants, to step up its developmental work, and to improve its procedures for reviewing commitments and progress.

The Director of SCRDT is responsible for supervising its work, for initiating proposals for action, and for implementing the policies and actions relating to program, personnel, and budget formulated by the Executive Board of the Center, which is made up of members of SCRDT with one outside representative. An Advisory Panel of distinguished educators and researchers from outside the Center meets twice a year to review the Center's activities and suggest further action.

The work of the Center is carried out by senior Research and Development Associates, with the assistance of junior Research Assistants and other part-time staff. As will be seen in the listings of Research Assistants in several of the project reports, the Center benefits from the services of a number of assistants who are volunteers or are supported by funds other than those of the Center. The work of the three programs is coordinated by Program Coordinators, who also serve on the Executive Board.

The major source of support for the Center is Contract OE-6-10-078 between the Stanford University School of Education and the United States Office of Education under the provisions of the Cooperative Research Program. Additional support is provided by the School of Education. Affiliated Projects are projects directed by SCRDT staff members which draw on other sources of funds but make use of Center concepts and knowledge and have a direct relationship to the Center's goals.

Most of the Center's R&D Associates are members of the faculty of the School of Education or of other academic departments at Stanford. Research Assistants are doctoral candidates in the School of Education or other departments, who spend up to twenty hours a week assisting in the Center's research and development activities.

The Secondary Teacher Education Program (STEP) of the School of Education serves as a laboratory for some of the Center's research projects. New approaches to teacher education and new hypotheses about teacher-student interaction have been examined through experimental studies, often videotaped, in which STEP teaching interns and supervisors collaborate with Center researchers.

Support services for SCRDT include the Methodology Unit, the Administrative Officer and administrative staff, and the Publications, Dissemination, and Media Unit. The Center's offices at 770 Welch Road, about one mile from the heart of the Stanford campus, provide space for the above activities and for a number of R&D Associates and Research Assistants. The Center's educational media operation is housed in the School of Education building.

The Center's research and development activities are carried out in various places--the Educational Media offices and the classrooms in the School of Education building, the schools participating in STEP, cooperating schools in the San Francisco Bay Area, and elsewhere. Data from experimental or statistical studies are processed by the Methodology Unit at the Center, using the Stanford Computation Center. The project on Educational Community Organization in the program on Teaching the Disadvantaged maintained a store-front office in East Palo Alto until

January 1970. From this base project workers attended a variety of community meetings, both formal and informal, and carried on their research and development efforts.

As noted a year ago, the Center was greatly encouraged by the decision of the Bureau of Research to grant Stanford approximately $4,000,000 toward the construction of a new educational research building under the provisions of the Educational Research Facilities Program. The new building, to be located on the main Stanford campus near the present School of Education, has been designed specifically to implement the Center's program and will be the focal point for all Center activities. It will be a model laboratory equipped with the technology of the 1970's, including a sophisticated information processing system which will greatly enhance the Center's research and development capabilities. The 60,000-square-foot facility, with net assignable space of 39,000 square feet, will provide opportunities for observing, recording, and reproducing the activities of students and teachers, using modern videotaping and electronic devices. Much of the recorded material will be tied to Stanford's central computer facilities.

The architects, Skidmore, Owings & Merrill, have translated the Center's educational specifications into an extremely attractive and workable building. Among its features will be a completely flexible research laboratory area of 3,500 square feet. This flexibility is established through the use of a five-foot module permitting arrangement of rooms with wall lengths in multiples of five feet, the smallest possible room being 5' x 5'. Each 25-square-foot division of this laboratory will have many electronic capabilities, i.e., provision for television camera and monitor, speakers, microphones, and, of course, electrical outlets for recorders and projectors. The building will also have a complete television/film studio and a large-group instruction room seating 156, with a student-response system and provision for simultaneous translation. The information retrieval system to be installed throughout the building will have enough capabilities to remain electronically up to date for many years. There will be a language laboratory area with 20 carrels, a small library, and space for the Methodology Unit and the Publication

and Dissemination operations. The building is planned to provide office space for all members of an expanded Center staff including Research and Development Associates, technical and professional personnel, Research Assistants, and clerical staff.

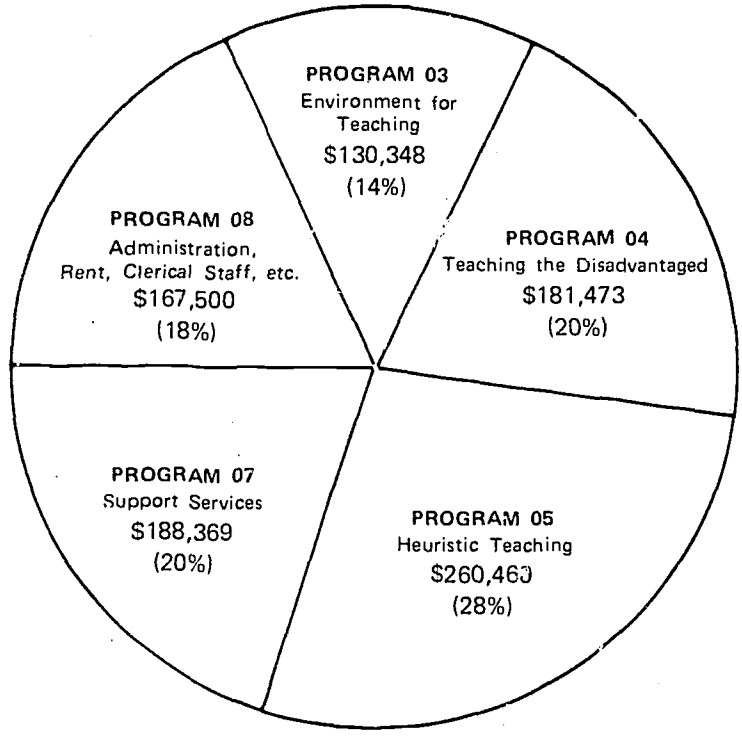
The Center's relationship with the Stanford community extends beyond the School of Education. The current list of R&D Associates includes faculty members with sole or joint appointments in the Departments of Economics, Linguistics, Psychology, and Sociology. Members of the School of Law are cooperating with the project on Educational Community Organization. In addition, the usual informal interchanges between Center R&D Associates and other Stanford faculty are stimulated by the Stanford environment.

Members of the Center meet and work closely with the Far West Laboratory for Educational Research and Development, most notably in a cooperative developmental effort involving the Center's Training Studies project. The teacher training program at San Jose State College has contributed extensively to the Center's research and development, as have cooperating schools in the San Francisco Bay Area and elsewhere. State departments of education are represented on the Center's Advisory Panel by a state Commissioner of Education and the Deputy Superintendent for Program and Legislation of the California State Department of Education (currently on leave of absence); regional educational laboratories are represented by the Director of the Far West Laboratory. The Director of the Stanford Center serves on the Executive Panel of the Far West Laboratory and the National Advisory Panel of the ERIC Clearinghouse on Teacher Education; the Acting Director serves on the Board of Directors of the National Society for the Study of Education and the Research Advisory Committee of the American Council on Education, and is a consultant to the International Association for the Evaluation of Educational Achievement.

The accompanying organization chart represents the substantive program and project activities, and the supporting services, as of the date of this report. Complete titles of current programs and projects appear in the accompanying Program and Project Register. The pie chart indicates the relative size of the components of the Center's overall program.

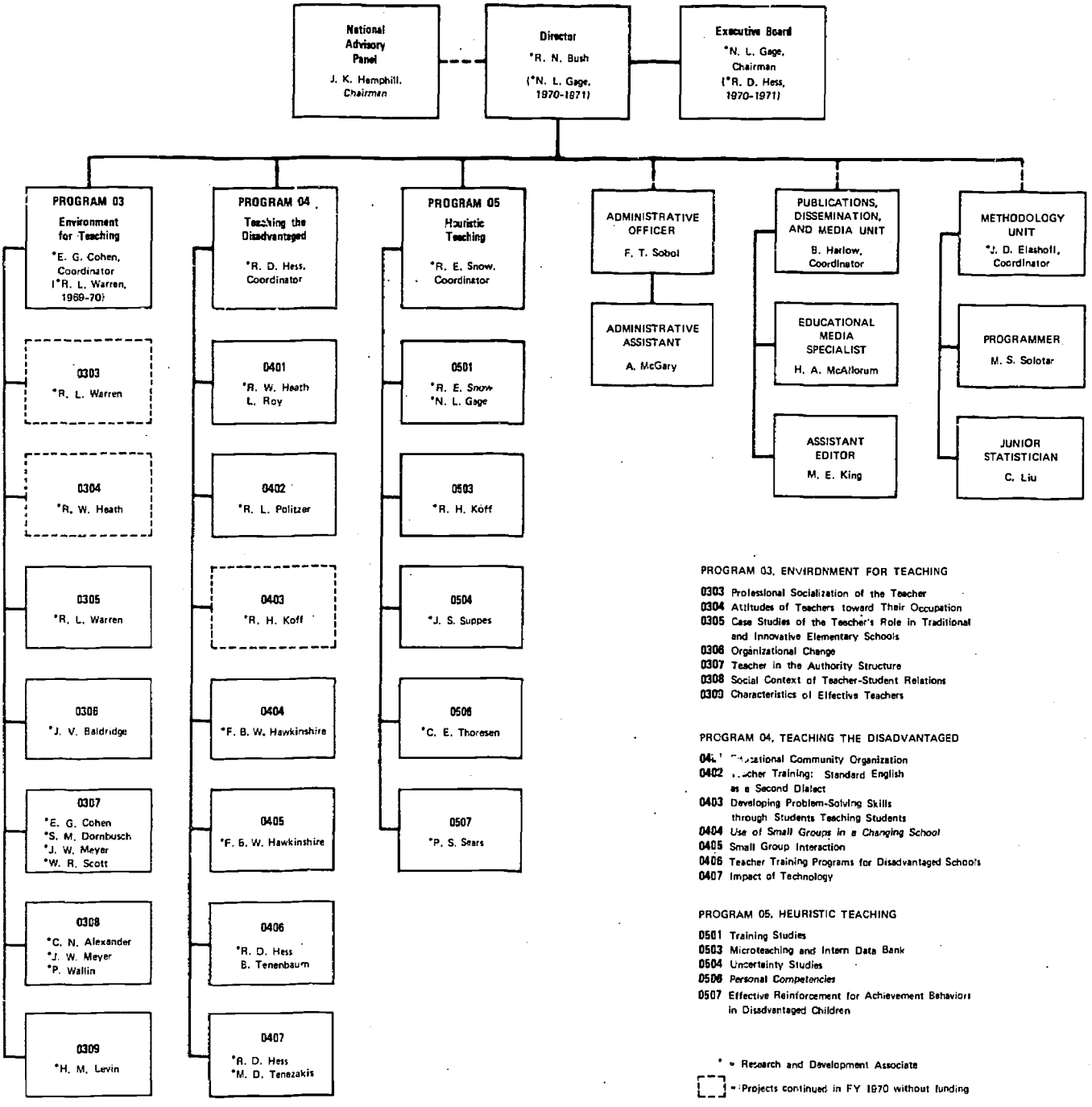
The concluding pages of this report list the Center's Research and Development Associates and the members of its Executive Board and National Advisory Panel.

Proportions of the Center's USOE Contract Funds Budgeted for Major Components of the Center's Program, FY 1970 (Total USOE Contract Funds, FY 1970: $928,150)



Stanford Center for Research and Development in Teaching

JULY 1970



PROGRAM 03, ENVIRONMENT FOR TEACHING

- **0303** Professional Socialization of the Teacher
- **0304** Attitudes of Teachers toward Their Occupation
- **0305** Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools
- **0306** Organizational Change
- **0307** Teacher in the Authority Structure
- **0308** Social Context of Teacher-Student Relations
- **0309** Characteristics of Effective Teachers

PROGRAM 04, TEACHING THE DISADVANTAGED

- **0401** Educational Community Organization
- **0402** Teacher Training: Standard English as a Second Dialect
- **0403** Developing Problem-Solving Skills through Students Teaching Students
- **0404** *Use of Small Groups in a Changing School*
- **0405** Small Group Interaction
- **0406** Teacher Training Programs for Disadvantaged Schools
- **0407** Impact of Technology

PROGRAM 05, HEURISTIC TEACHING

- **0501** Training Studies
- **0503** Microteaching and Intern Data Bank
- **0504** Uncertainty Studies
- **0506** *Personal Competencies*
- **0507** Effective Reinforcement for Achievement Behaviors in Disadvantaged Children

* = Research and Development Associate

[ ] = Projects continued in FY 1970 without funding

CENTER RÉSUMÉ

The Center's primary problem area remains that of reformulating and improving the role of the teacher. The Center's mission is to specify that reformulation on as empirical a basis as possible, to help shape it, to fashion and validate programs for training and retraining teachers appropriately, and to develop and test materials and procedures for use in these new training programs.

The Center works in three interrelated problem areas:

1. Heuristic Teaching. The purposes of this program are to define and improve understanding of heuristic teaching functions and to develop means of promoting such teaching in schools. The term "heuristic" is used to suggest an emphasis on inquiring, inductive, hypothesis-generating modes of instruction rather than on fact-dispensing, deductive, expository modes. The program deals with teaching and learning in general, but the hope is to develop new, more adaptive, and functional forms of human teaching in relation to other components of instructional systems.

2. The Environment for Teaching. This program is concerned with making schools more flexible so that pupils, teachers, and learning materials can be brought together in ways that take account of their many differences. The program deals with the ways in which the characteristics and processes of particular environmental settings affect teaching and learning. Various projects are investigating such processes as teacher evaluation and allocation, change and innovation in schools, and collegial interaction. Other studies are examining the social class composition of teacher and student populations, the educational and occupational aspirations and expectations of students, and the effects on teachers of the "open" and "closed" (walled or unpartitioned) character of schools.

3. Teaching the Disadvantaged. Beginning in 1968, this program has sought information with which to improve the training of teachers in minority or poverty communities. This effort includes identifying teacher skills needed for crisis resolution and developing information about the function of teachers as change-agents in their schools. Other projects are documenting the self-defined educational needs of disadvantaged communities, identifying changes in the educational system that are responsive to these needs, and developing the strategies and tactics necessary

to implement the required changes. A reformulation of the program will result in projects aimed at identifying factors that affect the "engagement" of students and teachers with their school tasks and ways of training teachers to use such factors in desirable ways.

PROGRAM AND PROJECT REGISTER

Stanford Center for Research and Development in Teaching
(Center)

5-0252
BR No.

(Note: This is a listing of Center projects funded for FY 1970. The body of this Annual Report includes reports on certain earlier projects which were not funded during that period.)

Code No.	Title	Investigator(s)
03.	THE ENVIRONMENT FOR TEACHING	E. G. Cohen (Coordinator) (R. L. Warren, 1968-June 1970)
0305	Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools	R. L. Warren
0306	Organizational Change: The Study of Innovations in Educational Institutions	K. E. Knight J. V. Baldridge
0307	The Teacher in the Authority Structure	E. G. Cohen S. M. Dornbusch J. W. Meyer W. R. Scott
0308	The Social Context of Teacher-Student Relations	C. N. Alexander J. W. Meyer P. Wallin
0309	Characteristics of Effective Teachers and the Distribution of Teacher Services	H. M. Levin
04.	TEACHING THE DISADVANTAGED	R. D. Hess (Coordinator)
0401	Educational Community Organization	R. W. Heath
0402	Teacher Training: Standard English as a Second Dialect	R. L. Politzer
0404	Use of Small Groups in a Changing School	F. B. W. Hawkinshire
0405	Small Group Interaction	F. B. W. Hawkinshire
0406	Teacher Training Programs for Disadvantaged Schools	R. D. Hess
0407	Impact of Technology	R. D. Hess

05.	HEURISTIC TEACHING	R. E. Snow (Coordinator)
0501	Training Studies	R. E. Snow N. L. Gage
0503	Microteaching and Intern Data Bank	R. H. Koff
0504	Uncertainty Studies	J. S. Suppes
0506	Personal Competencies	C. E. Thoresen
0507	Effective Reinforcement for Achievement Behaviors in Disadvantaged Children	P. S. Sears
07.	SUPPORT SERVICES	
0701	Publication and Dissemination Unit	B. Harlow
0702	Advisory Panel	R. N. Bush N. L. Gage
0703	Educational Media Unit	B. Harlow
0704	Methodology Unit	J. D. Elashoff
08.	ADMINISTRATION	F. T. Sobol

PROGRAM 03: THE ENVIRONMENT FOR TEACHING

Coordinator: Richard L. Warren*

Program Résumé

The problem area with which this program is primarily concerned is the organizational context of teaching, and, in particular, those organizational decisions, arrangements, and processes which influence the nature and quality of the teaching experience. The low status of teachers within the school as an organization, the permeability of the school to outside influences, the "isolation" of the teacher within the classroom, and the uncertain nature of the authority structure of the school--all these are examples of organizational characteristics which appear to create problems for teachers and hence work against the development of an environment which supports effective teaching.

The major contribution of this program is seen, then, as the development of research-tested strategies of policy and action which can be used by school personnel to improve the teaching environment. The plan of the program in working toward this general goal is to begin with studies which explore the nature and impact of various organizational characteristics on teachers and teaching, to proceed toward a comparative analysis of experimental organizational changes in schools, and eventually to formulate policy recommendations designed to effect a more supportive environment for teaching.

Introduction to Project Reports

During the past year, substantial progress has been made both in developing theoretical frameworks for examining particular characteristics of the school as an organization, and in implementing studies of the nature and impact of such characteristics. In the coming year, such studies will be extended in order to provide a substantial base for the development of strategies of policy and action.

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*Dr. Warren completed his term of service at the Center on June 30, 1970. He will be succeeded as Coordinator by Elizabeth G. Cohen.

The program is continuing to move toward a more integrated focus on salient organizational characteristics. Projects which in themselves provide useful data on different aspects of the environment for teaching, but which prove to be peripheral to this focus, are being phased out. The project reports which follow include reports not only from ongoing projects (0306, 0307, 0309), but also from those whose funding was terminated earlier (0302, 0303, 0304), and those which are being phased out at the end of this fiscal year (0305, 0308).

Project 0302: The Organizational Context of Teaching

Project Leader: Richard L. Warren

This project dealt with the decision-making efficiency of elementary school teaching teams as compared to that of ad hoc groups of classroom teachers as well as individual teachers. It was also designed to yield data on interaction within groups engaged in the decision process. Thus the effects of such factors as the presence or absence of an appointed leader, experience working as a group, and size of group was assessed in relation to the pattern of social interaction in the decision-making behavior of the groups.

Analysis of the data indicates that performance with respect to specific tasks engaged in with colleagues is not affected by the administrative structure of the team. Whether a team-teaching arrangement is based on a collegial association or on a predetermined hierarchy makes no difference in the quality and kind of decision behavior.

Several inferences can be drawn from this study with respect to further research. First, insofar as the ad hoc groups used in the study can be considered to resemble those in small-group research, it appears that generalizations from small-group research may be applicable to teaching work groups in general since there were few significant differences between teams and ad hoc groups of self-contained classroom teachers. Thus more research is needed on the type of training being given teams and the effectiveness of this training. Secondly, the assumptions in the team teaching literature regarding the superiority of team decisions appear unwarranted for the problem situation used in this study. Hence continued research is needed to assess the advantages and limitations of team teaching.

A Technical Report by Barbara D. Lopossa, "A Comparative Study of Team and Individual Decision Making," is undergoing outside review preparatory to final editing and publication.

Project 0303: Professional Socialization of the Teacher

Project Leader: Richard L. Warren

Research Assistant: Rodney L. Brod

This project dealt with the socialization experience of beginning teachers in a single school district with 638 teachers and 89 administrators. Particular attention was given to a measure of changes in autonomy attitudes, i.e., attitudes toward the degree of independence of freedom of action a teacher should have. The basic instrument used as a pretest and posttest measure was the "Autonomy Attitudes Inventory," a questionnaire consisting of 18 items relating to the following areas of autonomy: Curriculum, Colleagues, Organization, Community, and Students. In addition, interviews were conducted with all new teachers (N=106) in the sample during May and June after the posttest administration, in order to identify the "significant other(s)" for each new teacher and to get measures of behavioral autonomy and job satisfaction.

Analysis of the data suggests that autonomy is task specific and that it is more likely to be achieved by virtue of the teacher's personal resources or qualities (e.g., experience, reputation, prestige of subject master) than of the teacher's demand. Other general findings include the following: (a) organizational evaluation is a significant factor in professional socialization; (b) demands for autonomy often clash with existing attitudes of superiors; (c) satisfaction in teaching is related to satisfaction with the way tasks are allocated and evaluated; (d) personal liking between teachers and their evaluator is a significant socialization variable; and (e) new teachers want more control and guidance in such areas as discipline and clerical tasks and more autonomy in such areas as curriculum content and teaching methods.

These results indicate the need for less research emphasis on general value orientations and more on the nature of specific work tasks and on teaching as a profession. The results also suggest the need to

examine more closely the way in which beginning teachers in an organization are evaluated, e.g., the allocation of rights to appraise newcomers, the relationships of authority-legitimacy between evaluators and beginning teachers, and the effects of evaluators on professional attitudes, on instability within the organization, and on attrition rates in the ranks of beginning teachers.

Technical Report No. 12 by D. E. Edgar and R. L. Brod, "Professional Socialization and Teacher Autonomy," summarizes the results of the study.

Project 0304: Attitudes of Teachers Toward Their Occupation

Project Leader: R. W. Heath

Research Assistant: Louis Weiss

During this reporting period, this project was completed. The objective of the project was to develop and test a six-scale Occupational Attitudes Inventory that could be used to characterize professions or jobs on the basis of the perceptions and attitudes held by those engaged in those professions or jobs. The six attitude scales were intended to have three basic characteristics: (a) each was to be based on a prevalent sociocultural value about a person's work, (b) each scale was to have sufficient internal consistency to permit reliable discrimination between small groups, and (c) the correlations among the scales should indicate that each was, in fact, measuring a different dimension.

The first step in the development of the item stems involved the selection from various sources of sets of attitudinal referents. On the basis of these referents, a pool of items was constructed and circulated among the staff of the Center. On the basis of judgments and suggestions from the staff, 60 items were equally distributed among six scales designed to measure each of the following attitudinal dimensions:

1. Job Security
2. Financial Reward
3. Status of Occupation
4. Creativity
5. Personal Freedom
6. Social Contribution

The 60 items were put in random order and presented with four response-alternatives: Strongly Agree; Agree; Disagree; Strongly Disagree.

The instrument was administered to 262 elementary school teachers in 30 schools in the Fremont Unified School District, Fremont, California. A brief summary of the statistics obtained for each scale in the Inventory is presented below. A mean of 40 represents the strongest positive attitude toward a particular aspect of the occupation while a mean of 10 represents the strongest negative attitude:

	Scale	Mean	Standard deviation	Coefficient alpha
1.	Job Security	37.22	4.37	.87
2.	Financial Reward	22.25	7.69	.90
3.	Status	30.55	7.90	.93
4.	Creativity	35.56	5.53	.88
5.	Personal Freedom	21.03	5.61	.80
6.	Social Contribution	37.95	3.49	.84

The teachers to whom the Inventory was given had previously participated in an SCRDT investigation of career aspects of teaching (Project 0303, Professional Socialization of the Teacher) from which much biographical data were available. From these data, variables such as age, sex, marital status, and years of teaching experience were used for analysis of variance of scores on the Occupational Attitudes Inventory. These analyses of variance provide evidence of the construct validity of the scales and suggest the following ways in which the instrument developed in this project could be used:

1. The instrument could be used, along with other measures, to predict which teachers and teacher candidates will remain in the occupation and which will leave the field after a brief tenure.

2. The instrument, being applicable to any occupation, could be used to identify occupational character profiles typical of various occupational groups. These archetypes would be useful in planning vocational education as well as in improving the general sociopsychological understanding of work.

3. The effects of various educational programs such as team teaching or flexible scheduling may be mediated by program influence on the

character of teaching. This instrument provides one technique for quantifying such influences.

4. Teacher training programs presumably affect trainees' attitudes as well as their knowledge and skill. Very little appears to be known about the direction of such effects or about the ideal character of the occupation of teaching. Is it different for different grade levels, for different curricular structures, in different kinds of communities? The instrument reported here may be useful in the search for such knowledge.

A Technical Report presenting the instrument and summarizing the results of the study is currently undergoing outside review prior to final editing and publication.

Project 0305: Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools

Project Leader: Richard L. Warren

A Technical Report is being prepared on a case study of a traditional elementary school. It is expected that the report will be completed during the fourth quarter of Fiscal 1970.

Previous reports on this project have generally centered on theoretical and methodological questions which have emerged from the field work and the analysis of the data. This emphasis will be continued here.

In the course of the study, parent-teacher relations have emerged as an aspect of school life particularly significant both for understanding the dynamics of school life and for beginning an exploration of certain theoretical questions which require further investigation. One such theoretical question concerns a conceptualization of "school" or "schooling" which adequately accounts for the interaction between the organizational structures and processes within a school and the external family and social norms and values projected into the school. Existing conceptualizations tend to reflect a kind of dichotomy which fails to clarify the nature and significance of this interaction. Organizational analysis views the school as a self-contained organizational unit or a self-contained system of social control with a stable and predictable work setting. Parents are seen as outsiders systematically prevented from exerting any authority over the system's operations.

From an anthropological point of view, a school is conceptualized as an instrument of cultural transmission and maintenance, and its socialization function is emphasized. Teachers are viewed as socialization agents or parent substitutes. How one conceptualizes a school affects, of course, not only the kind of research one undertakes, but also the kind of judgments one makes about any single fact of school life.

In this study it is being found useful to characterize parent-teacher relations as an interaction network, the characteristics of which are in varying degrees common to other interaction networks in the school, such as those between teachers and students, or teachers and the principal. This approach will be further developed as the case study and the Technical Report are completed. The report, when completed, will provide a basis for comparing teacher interaction networks in traditional schools with those in more "open," innovative schools.

Project 0306: Organizational Change: The Study of Innovations in Educational Institutions

Project Leader: J. Victor Baldridge

Research Assistant: Wayne Price

This project has consisted of two studies. Study A, "Innovations in Secondary Schools," was directed by Kenneth E. Knight, who has since left the Center. Study B, "Innovation and Change in Universities," has been directed by J. Victor Baldridge. The title of the latter study, which is continuing, will be changed to "Organizational Change: A Political Analysis of Educational Policy Formulation." Reports on both studies are presented below.

Study A: Innovations in Secondary Schools

Former Project Leader: Kenneth E. Knight

Study A in the Organizational Change project is based on a comprehensive set of data covering 50 changes in high schools in the San Francisco Bay Area. The study was designed to explore several current theoretical propositions as to the important variables and causal relations in the change process.

Research methodology. This study used a detailed set of research procedures which attempted to provide tight definitions and appropriate controls of variables in this complex field experiment. The study necessarily lacked many if not most of the controls available in a laboratory experiment, and its results can be considered only as indicative of hypotheses which warrant further consideration. It was possible, however, to compare the results of the study with those obtained using similar approaches in different environments.

Change

Change was defined as a major modification in school curriculum or organization structure. A list of 20 major modifications in high school education was made after a review of the literature which describes major change in education, a survey of 70 San Francisco Bay Area high school principals, and interviews with 12 professors in the Stanford School of Education. While this list is certainly not complete, it does provide a list of procedures by which some of the major modifications as perceived by educators could be determined.

The 20 changes are modifications of the educational institution and its relevant environment. For the overall project, the following two classifications seemed applicable: (1) content change, i.e., introduction of new content, such as BSCS Biology or SMSG Mathematics, into already existing courses, or the development and implementation of a new course; (2) structural change, i.e., use of school personnel in different ways, such as team teaching, teaching assistants, flexible scheduling, and differentiated staff. While changes of other kinds occur (new staff, principal, or building), the study was limited to only the two discussed above.

Phases of Change Process

Most authors describing the change process use a model that consists of several phases that occur sequentially over time, e.g., Rogers[1] and Miller.[2] In this project, a simple four-phase model was considered most useful for studying educational change. The phases are:

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[1] E. M. Rogers, Diffusion of Innovation. New York: The Free Press of Glencoe, 1962.

[2] R. I. Miller, "Some Observations and Suggestions." In R. I. Miller (Ed.), Perspectives on Educational Change. New York: Appleton-Century-Crofts, 1967, 359-386.

1. The interest phase: From the time that the idea of the change is informally discussed until the idea is first formally presented (in full) to incumbents concerned.

2. The decision phase: The time immediately after the formal presentation of the change until a decision for adoption or rejection is completed.

3. The first use phase: The time after the decision for adoption, up to one year or through the current school year, whichever is applicable, in which the change is put into practical application.

4. The continued use phase: The time of continued use after the trial application, i.e., after the first use phase.

After establishing which phase of change participants considered themselves to be in, data were gathered on the current phase of each change. One-fourth of the changes selected for study were in each of the four phases. Retrospective data were not used because of the great likelihood of bias.

Sample

Data were collected on a sample of changes with the important variables controlled as well as possible in this difficult field experiment in order to test the study's propositions statistically. Twelve medium and large high schools in the San Francisco Bay Area, selected for a spread of economic resources (as measured by assessed value/average daily attendance), were studied.

The data were collected in eight cells: Type of change (content or structure) x Phase (interest, decision, first use, or continued use).

The changes were selected to obtain approximately equal numbers of representatives in each cell and to control the important variables. The variables were (a) school size; (b) economic resources available to the school; (c) subject matter of the change (science or humanities); (d) whether the change was an adoption of an external development or one created by people in the high school; and (e) number of people involved in the use (or proposed use) of the change.

Approximately four changes were selected from each school to produce a total sample of 50 changes. The changes from each school were distributed over the four phases, two categories of changes, and control variables c, d, and e above.

Data Collection

Data were gathered through interviews and questionnaires in two categories. Initially a random sample of respondents was selected for each change studied. This first sample consisted of 50 percent of the individuals involved in the group of users, or probable users, of the change (589 teachers and administrators). A highly structured interview was held with each person selected to ask them to name the people involved in the change and the nature of their involvement.

In addition to the randomly selected sample, everyone mentioned as being involved was interviewed. At the end of the 20-minute interview each person was given a questionnaire consisting of up to three sets of questions: (1) items relevant to the specific change; (2) items relevant to the particular high school; (3) items relevant to the individual himself. Each person was given those sets of items relevant to his situation. For example, if a person in the high school was involved in two of the changes, Sets 1, 2, and 3 were given for the first change and only Set 1 for the second change.

Results. The project's work has already resulted in five completed Ph.D. dissertations in the Stanford School of Education; a sixth will be completed late in 1970. A brief summary of the six dissertations follows:

1. Thomas G. Gans, "An Examination of Initiative, Perceived Structural Openness, and Militant Behavior among Teachers in Selected Secondary Schools" (1970). Dr. Gans studied the way in which teachers' militance is influenced by the way in which the teachers in a given school perceive the school's structural openness and the teachers' initiative. The major findings are shown in the following table.

Teacher's perception of school's structural openness	Teacher's perception of teachers' initiative	
	Low	High
High	Low militance	Low to moderate militance
Low	Low militance	High militance

2. Gerald W. Hamrin, "An Analysis of Factors Influencing Educational Change" (1970). Dr. Hamrin described the major actors in the change process and the roles they play: the specific interactions between the actors, the sources of information for each actor, their views of the change, and the pressure techniques they use to bring about or stop the change.

3. Olan L. Knight, "Teachers' Participation in Educational Change Related to Their Judgments of Accomplishments" (1969). Dr. Knight measured the individual teacher's perceptions of (a) participation in a change, (b) appropriateness of the change, and (c) accomplishment of the change. These three variables were measured both for the individual teacher's perception of himself and for other teachers' perceptions of him. The results conflict with the general belief that participation in a change automatically increases an individual's positive feelings about that change. Dr. Knight found no positive relationship between an individual's participation in a change and his feeling that change was appropriate or his feeling of sense of accomplishment. He did find that teachers regarded as most appropriate those changes about which they had a positive sense of accomplishment.

4. William E. Penny, "Characteristics of Educators Involved in the Change Process" (1969). In an extensive replication of the pioneering work of Everett M. Rogers, but studying changes in schools rather than changes in agriculture, Dr. Penny found that innovative and noninnovative teachers and administrators had significantly different personality characteristics. The more innovative educators tended to be male, older, better educated, and more cosmopolitan. However, the study concluded that personality characteristics could account for only a small part of the differences in innovativeness among teachers.

5. William Schmick, "The Influence of Organizational Positions on Change Implementation in High Schools with Elected and Appointed Department Heads" (1970). Dr. Schmick found that department heads were seen as middle-level managers in schools with elected rather than appointed department heads. In schools with elected department heads, there was more and better communication regarding change between teachers, administrators, and department heads. But although the elected heads facilitated communication regarding change, administrators preferred appointed department heads.

6. William P. Gorth, "The Foci of Authority within the Secondary School during Education Change" (to be completed in 1970). Mr. Gorth's dissertation will examine sociological theory on authority and the way in which it influences the change process.

In addition to these dissertations, the project staff will write a monograph on the overall research design and the various dissertations. The different theoretical views of the change process represented by these six subprojects and the tests of these views using the data on identical changes will be contrasted. This comparison should extend knowledge about educational change and the psychological, sociological, political, and economic factors in such change.

Study B: Organizational Change: A Political Analysis of Educational Policy Formulation

Project Leader: J. Victor Baldridge

Research Assistant: Wayne Price

Theoretical background of project. The goal of this project is to analyze the processes of policy formulation in educational systems, especially as these processes help or hinder curriculum innovations, new teaching strategies, and the involvement of teachers and students in the decision process.

The 1969 Annual Report projected a year of work on a theoretical framework for analyzing policy decisions, and substantial progress has been made. A "Political Theory of Organizational Policy Formulation,"

as it is called, has been largely completed in preliminary form. Basically the theory should explain how critical educational policies are set, and how teachers and other participants influence those policies.

The project staff has found that traditional bureaucratic decision models are not adequate for analyzing educational systems which have (a) diffuse goals, (b) high penetration of external influence, (c) low technological development, (d) low "task interdependence," and (e) high professionalism. When the system has these characteristics, a "political" theory, as against a bureaucratic decision model, is much more useful, for it focuses on (a) the formation of interest groups, (b) the tactics groups use to influence policy, (c) the reaction of authority groups, and (d) the achievement of negotiated policy decisions.

Impact on the teaching process. Policy formulation is one of the critical aspects of the problem of improving teaching, for the nature of decision dynamics affects:

(a) teacher morale and job satisfaction;
(b) the implementation of innovations in teaching method;
(c) the implementation of curriculum change;
(d) the degree of student and teacher participation in decisions about educational improvement and reform.

All of these considerations directly affect the quality of teaching at all levels. Because of this strong influence, the study of policy formulation processes must be a significant part of any analysis of teaching. To neglect the policy dynamics influencing the context of teaching would be to insure the failure of attempts to develop innovations in teaching.

Research goals and accomplishments. The immediate task has been to construct the political theory of policy formulation. That task has progressed on schedule. Two Research and Development Memoranda (Nos. 57 and 58) have already appeared. The first of these presents a preliminary statement on organizational change and provides a classified bibliography on the topic. The second analyzes the organizational change process as exemplified by changes in educational policy and programs at New York University. Four additional memoranda are in preparation. The working

titles are (a) "The Analysis of Organizational Change: Human Relations versus a Political Systems Approach"; (b) "Social Science Paradigms and Organizational Theory"; (c) "Models of University Governance: Bureaucratic, Collegial, and Political"; and (d) "A Political Analysis of Academic Governance."

In addition, two doctoral dissertations have used the political theory to study educational decision making: (a) James C. Stam, "The April Third Movement: A Study of Interest Group Activity," and (b) John Richardson, "Portland State: An Organization and its Environment" (nearing completion). Technical Reports based on these dissertations will be prepared.

Projected plans. Continued refinement of the theory is the immediate task. Later next year, however, the project staff expects to undertake a field study of policy formulation involving a comparative analysis of several educational systems. Part of this analysis will be devoted to the influence of teachers on curriculum innovation, while another part will deal with the role of participants in a wide variety of educational policy decisions. In previous reports the projected plans focused entirely on universities, but plans have been revised to include secondary school systems.

Project 0307: The Teacher in the Authority Structure

Project Leaders: Elizabeth G. Cohen, Sanford M. Dornbusch, John W. Meyer, and W. Richard Scott

The studies in Project 0307 are concerned with two fundamental problems in the organization of the social role of the teacher: (a) What are the nature and distribution of the work-related interaction and influence which teachers experience and the effects of these patterns on the way teachers actually work? Teachers are commonly isolated, in the performance of their day-to-day activities, from their immediate colleagues and superiors and from the profession at large. What are the consequences of current efforts to change teachers' work situations for teachers' job satisfaction, sense of control over their own work, and actual job performance? (b) What is the nature of the system of evaluation of the work

of teachers, and how does the evaluation system affect teachers' job performance and attitudes? To what extent, that is, does the school as a formal organization actually evaluate various aspects of teachers' work performances? What criteria are used? What dimensions of the teacher's job are actually treated as most important in the evaluation process?

These two major themes, although they by no means exhaust the aspects of the teacher's role which can usefully be studied, reflect ways in which the teacher's role is most inadequately organized at present. Neither the system of interaction nor the system of evaluation now prevalent in American schools seems to provide teachers or the school with support, encouragement, instruction, or control over the most important aspects of the actual work of teaching.

Ongoing research on these two major aspects of the environment for teaching is reported separately in the following pages. The first report covers research on the first theme, patterns of interaction and influence, which has been defined as Study A in the Program Plan and Quarterly Reports of the Center. The second report, covering work on the evaluation of teachers, deals with Studies B, C, D, and E in the Program Plan and Quarterly Reports.

Study A: The Effects on Teachers of Patterns of Interaction and Influence in the School Organization[1]

Study Leaders: Elizabeth G. Cohen and John W. Meyer

Research Assistants: Erika Leuders, Sheila Molnar

Elementary schools are currently undergoing revolutionary changes in organization. How do these changes affect the status of teachers, their job satisfaction, their attitudes toward children, their sense of influence and autonomy within the school? The first study in this series, now completed, called for a comparison of teachers in open-space elementary schools with teachers in traditional schools, where teaching takes place in self-contained, or walled-off, classrooms. "Open-space schools"

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[1]This study has been identified in previous Center reports as "Status Orientation of Teachers and Their Professional Behavior" and, more recently, as "Teacher-Colleague Relations and Professional Behavior."

refers to a new type of school architecture with a minimum of interior partitioning. From the organizational point of view, such schools represent a radical departure from traditional school organization in at least two ways: (a) teachers operate as a team to make important decisions about deployment of groups of children, scheduling, curriculum, and learning problems; (b) teachers are visible to one another as they work.

The sample. The sample consisted of 110 teachers from nine open elementary schools and 120 teachers from eight traditional elementary schools. All were K-6 schools with a predominantly middle-class suburban clientele. Questionnaires were administered to all the teachers in the selected schools. Dr. Frank Brunetti, of the School Planning Laboratory, Stanford School of Education, collaborated in carrying out the study.

Major findings. As compared with teachers in traditional schools, teachers in open schools were more satisfied with their jobs, felt more autonomous, and reported more influence in making all kinds of decisions. Principals were seen as less influential in the open schools. The rise in sense of teacher efficacy in the open schools does not appear to be a product of the selection process, since the two sets of teachers were similar as to sex and education, with the open-school teachers being slightly younger (probably because open schools are newer schools). The high morale in the open schools does not appear to arise only out of the general increase in teachers' power and autonomy in such schools. It appears to have other sources as well, which have not yet been identified.

Other interesting findings concern the responses of ambitious teachers working in these two organizational systems. In the traditional schools, ambitious teachers tended to be more dissatisfied with teaching than did relatively unambitious teachers, regardless of the measure of ambition that was used. In the open schools, woman teachers interested in vertical promotion were also less satisfied than women without such interests. There was, however, a sharp rise in the occurrence of women with professional (i.e., collegial as opposed to bureaucratic) ambition in the open-school setting, and these women tended to be more satisfied with their jobs than women who did not score high on the project's measure of pro-

fessional ambition. This finding was interpreted as a structural effect of open schools; open schools appear to give teachers professional ambition, which, in turn, becomes an important source of job satisfaction.

Teachers' orientations toward children on five different dimensions were measured on an attitude instrument. The hypotheses of the study were that teachers who had maternal or "child-development" orientations toward children would be less happy in the open schools because of lowered opportunities for intensive teacher-child interaction. These relationships were not found; they apparently were wiped out by two much stronger relationships--teachers in open schools were more satisfied (in all subgroups) than teachers in traditional schools; moreover, in either setting, if a teacher had a maternal or "child-development" orientation toward children, he or she was more likely to be satisfied with the job. These orientations, as a rule, were not markedly different in the two settings.

Current study in progress. The results of this study led the project staff to look more carefully at the growth of a sense of autonomy and influence through the interaction of teachers in the team setting. It was clear that the sense of power and influence was somehow related to the opportunities for interaction in the group during the making of team decisions. Differences in reported level of interaction among teachers in the open schools were associated with influence measures. The study was limited by the nature of the questionnaire device; a need was felt to observe small-group interaction in teaching teams more directly to check the assumption that the organizational change exerted its critical effect through the small-group interaction in the work setting.

Sheila Molnar, a project Research Assistant, has completed systematic observation of teams in open schools, recording the interaction patterns. She has also designed and administered a questionnaire to measure in greater detail the dimensions of the teacher's sense of autonomy and influence; these measures will be correlated with the observed behavior of the teacher in team meetings. The hypothesis is that teachers who report greater autonomy and efficacy in the school are more active in the team meetings than teachers who do not have such a sense of efficacy. Miss Molnar will also examine whether interaction patterns and questionnaire responses reflect differences in the way the principal selected team members and organized the team.

Applications. This research is being done when about 50 percent of new elementary schools are being built according to the open-space design. The consequences of this design for the organization of work are not well understood. It is clear from the project's work that many teams experience considerable difficulty in interpersonal relations. Furthermore, some of these schools are moving from the model of equal-status cooperative groups to differentiated staffing. Schools need ways to look at the consequences of what they are doing. In the work done thus far, Frank Brunetti, a volunteer Research Assistant, has found that principals of open-space schools are most responsive to and interested in the project's studies of teacher morale. He is developing implications for the changed role of the principal in such an organization. Miss Molnar will be setting forth her recommendations on the improvement of the morale of troubled teams. The instruments developed in these two studies have a general utility in describing the dimensions of teacher influence in different organizational settings, including the problems associated with differentiated staffing. The measures of orientation and ambition allow descriptions of a given type of teacher operating in different types of settings.

Schedule of reports. A report of Dr. Brunetti's section of the first study is now available as a doctoral dissertation, "The Teacher in the Authority Structure of the Elementary School: A Study of Open-Space and Self-Contained Classroom Schools," Unpublished Doctoral Dissertation, Stanford University, 1970. Miss Molnar's study is in the data analysis phase; a doctoral dissertation summarizing the results should be completed by the fall of 1970. A Technical Report summarizing the overall project results thus far is now in the final stages of drafting.

Studies B-E: The Evaluation of Teachers' Work[2]

Study Leaders: Sanford M. Dornbusch and W. Richard Scott

Research Assistants: Warren Bryld*, Karen Cook*, Connie Evashwick*, David Gutierrez*, Judy Hanks*, Thomas Logothetti, Leonard Magnani, Inger Sagatun*, and June Thompson*

The past year's work can be summarized as follows:

1. The project staff developed a questionnaire for the study of the evaluation of teachers which is as satisfactory as the previous time-consuming interview schedule.

2. This questionnaire has successfully been given to 131 teachers in a school system in the Monterey Bay area. The teachers found that answering the questionnaire was rewarding, although difficult.

3. The first preliminary report on the analysis was presented as feedback to the superintendent of the school district and the teachers' committee on evaluation. Their response was immediate and enthusiastic. During the coming academic year the school system will use the project's findings on the current situation and preferences for the future in order to change its entire evaluation process. The project staff has been invited to aid in that development project and to evaluate the results.

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[2]The studies summarized under this title have been referred to in previous Center reports as: Study B, "Evaluation, Type of Task, and Authority Structures in Schools"; Study C, "The Evaluation of University and College Teachers"; Study D, "The Evaluation of Active and Inert Tasks Among Elementary School Teachers" (already incorporated into Study B); and Study E, "Reconceptualizing the Meaning of 'Professional' as Applied to Teachers." Study E earlier carried the title of "The Evaluation Process Related to Bureaucratic and Professional Orientations of Elementary and Secondary School Teachers and Principals." The single new title for Studies B-E reflects both the convergence of interests and the reconceptualizations which have taken place during the past year. All ideas involved in these various studies have been applied in the gathering and analysis of the specific empirical data described here.

*Not supported by Center funds.

4. Currently being developed is a combined questionnaire and interview schedule for school administrators, from department chairman to principal to superintendent of schools. The comparison of the perceptions of persons who are evaluating and teachers who are evaluated will provide important data on the communication of organizational goals and criteria for evaluating the effectiveness of performance. The staff has received permission from three school districts to interview all their administrators.

5. Impressed by the results of the project's study of teachers in the first school district, two of the three new school districts have agreed that the staff should study their teachers next year. One of these districts has 850 teachers and the largest minority enrollment between Los Angeles and San Francisco. Many of its teachers are members of minority groups; this activity should provide a sound empirical basis for coordination with the program on Teaching the Disadvantaged.

6. During the past year, there has been delay in the completion of two book-length manuscripts, one on the general theory of authority and evaluation and the other on the evaluation of university teachers. Both of these tasks should be completed during the summer of 1970.

The analysis of data from the teachers in the first system studied has barely begun, but even the total group's frequencies of responses have material of interest. All the data are on the computer and the cross tabulations should be completed this summer. Despite the necessarily tentative and broad-gauge nature of the first examination of the data, the following can be reported as illustrative of the analysis:

1. The work of the teacher was subdivided into four major tasks: teaching subject matter, teaching character development, maintaining control, and record keeping. The theory underlying the project predicted that task conceptions, perceptions of the abstract nature of the tasks, would be associated with the teachers' level of autonomy. Results indicate that record keeping and maintaining control, compared to teaching subject matter and teaching character development, have a higher degree of predictability, efficacy, and clarity. As predicted by the theory, record keeping and maintaining control displayed a lower level of current autonomy and teachers preferred less autonomy for these two tasks.

2. About half of all teachers have no idea of what criteria are used to evaluate them or of what information about their work is sampled by their evaluators. Predictably, teachers are very dissatisfied about these aspects of the evaluation process, more dissatisfied than members of any other occupation investigated by the study leaders.

3. As a basis for improved performance in their teaching role, teachers rate evaluation as less helpful than their previous formal training, and formal training as less helpful than their experience as teachers.

4. Teachers perceive that they are not evaluated frequently enough. There are major differences between elementary and secondary school teachers in their perception of the role of the principal and the school superintendent in evaluation.

5. The conception of the teacher as a professional requires considerable reformulation. Clients, such as students, are more important sources of stimulation for teachers than are their teacher colleagues or their administrative superiors. Teachers do not want other teachers to evaluate them, but they do want teachers as a group to play a more important role in determining the criteria and information used for evaluation.

6. In general, teachers do not view their own goals for the various tasks as vague or ill-defined, but are much more likely to view their principals' goals for these tasks as vague. Teachers in secondary schools perceive the goals of the department chairmen as intermediate--less well defined than their own goals, but better defined than those of the principal.

In summary, the first analyses of the project data are mutually reinforcing and provocative. The study of larger, more heterogeneous school districts next year and the comparison of data from teachers with data from school administrators should prove equally constructive. Simultaneously, next year will see the beginning of a development program in teacher evaluation based on this last year's research.

Project 0308: The Social Context of Teacher-Student Relations

Project Leaders: C. Norman Alexander, John W. Meyer, and Paul Wallin

The studies in this project are concerned with a single classic problem in the sociology of education, which is of concern to those interested in the environment for teaching: How do schools affect the way their students are allocated to positions in the social structure? Many specific empirical problems are considered part of this general question; high schools affect the college plans and aspirations, as well as the occupational choices, of their students, and colleges similarly affect the aspirations and plans of their students. The specific studies in this project focus on different aspects of the problem and employ different data in their investigations, but all are concerned with the general issue. Similarly, the studies differ in their concern with the specific social processes by which schools may affect students. Study A has focused primarily on the ways in which school personnel and family members exert personal influence on a student who is making crucial life decisions. Study B is concerned with the way the school environment structures the student's perceptions of the social world (occupational and educational) in which he is about to move, and in this way guides his choices. Study C focuses on the ways in which schools affect the student's evaluations of his abilities and future possibilities by placing him in environments which are more or less prestigious and competitive.

Although these studies vary in the specific outcomes they consider, and in their consideration of the specific processes by which the social context affects these outcomes, all of them are concerned with the single overall problem of the organizational effects of schools on the future roles of their students. Also, all the studies in this project have methodological as well as substantive foci in that they face the classic problem of disentangling the effects of organizational structures from effects of variations among the types of individuals which those structures select. Sometimes the methodological effort involves holding constant relevant individual characteristics of the students while comparing students in different schools. Other studies in the project proceed by obtaining data drawn on students at several different points in time.

Study A: A Study of Family and School Effects on Student Educational Goals

Study Leader: Paul Wallin

Research Assistants: Bruce Everett, Stuart K. Geisinger*

This study of family and school effects on the college plans of tenth-grade boys has been completed. A final report was submitted to the U. S. Office of Education: Paul Wallin, Stuart K. Geisinger, and Freda B. Wallin, "Family and School Influence on the Educational Goals of Working-Class and Middle-Class Tenth-Grade Boys," Final Report on Project 5-0542, Contract No. OEC-6-10-004. The study, begun under the contract just cited, was supported in its final phase by SCRDT.

Study objectives, sample, and method. The major purpose of this research was to determine whether the social class composition of high schools, or related conditions, could change the level of educational goals developed by boys in response to family influence. The study also was designed to investigate a series of more specific school and family variables as determinants of goals: (a) What are the determinants of concordance between boys' educational aspirations and their goals?[1] (b) What are the determinants of parents' educational goals for their sons? (c) How does the quality of parent-child relations influence concordance between parents' educational goals and their sons' aspirations?

A second major objective of the research was methodological: to assess the accuracy of the data on parents' attitudes that is provided by boys' reports. (In this study, as in most others, these reports constitute the main, and often the only, source of data.) For this important purpose, boys' reports on selected items were compared with those obtained in interviews with their parents.

Most of the data of the study were obtained directly from two questionnaires administered to some 1,600 tenth-grade boys in eight high schools. The eight schools varied considerably in the proportions of their students who were from working-class and middle-class families. Data were also obtained from 277 sets of their parents, as well as from counselors and school records.

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*Not supported by Center funds.

[1]An aspiration is something an individual would like to see come about if he were free to choose. A goal is an end toward which a person is working and to which he is committed.

Findings. The findings may be briefly summarized as follows:

1. There was little consistent association between the social-class composition of their schools and boys' educational goals. This research, therefore, challenges the assumption that the social-class composition of high schools--and related conditions--can change the educational goals of students.

2. Given high aspirations, boys are more likely to set high goals when they perceive their aspirations to be realistic (i.e., feasible). High aspirations, when intensely held, can override a low perceived feasibility of realizing them.

3. With family social class controlled, the more positive the quality of the parent-son relationship, the greater the likelihood of concordance between parents' goals and their sons' aspirations.

4. In studying determinants of parents' educational goals for their sons, a sharp differentiation was drawn between parents' aspirations and goals. The distinction pointed to the conclusions that (a) parents of all social classes are likely to have high educational aspirations for their sons, and (b) the positive correlation between parents' goals and their social-class position can be attributed to class differences affecting their perception of the feasibility of fulfilling their high aspirations for their sons.

5. The outcome of the methodological study (the comparison of boys' and parents' reports) was mixed. Considerable agreement was found in reports on factual items regarding home and family, but considerable divergence was observed in reports on (a) parents' education and occupation, and (b) attitudes of parents and attitudes of their sons.

6. Before moving to where they now live, few parents, whether middle-class or working-class, apparently considered the quality of the school system in the area.

7. There was a very large discrepancy between parents' estimates of their sons' academic ability and the estimates of the school counselors (the latter being considerably lower than the former).

The present study of educational goals was formulated in the context of a theoretical framework which viewed goals as a function of aspirations and the perceived educational and economic feasibility of their attainment. From the perspective of this model, the finding that schools have minimal influence on the educational goals of high school students--and on those their parents set for them--suggests that teachers and counselors interested in raising the educational goals of their less privileged students might profitably concern themselves with (a) effectively informing the students of the instrumental value of a college education, thus raising their aspirations, and (b) persuading both students and parents of the academic and economic feasibility of such an education.

Study B: Occupational Prestige Perceptions and Adolescents' Aspirations

Study Leader: C. Norman Alexander, Jr.

Research Assistants: Roy Childs*, Bruce Everett, Patrick McDonnell*

This study investigates the hypothesis that the occupational and educational aspirations of high school students are influenced by their perceptions of occupational prestige. It focuses on the extent to which these perceptions of prestige change and are shaped by information received about occupations that fall at different status levels. If the hypotheses are supported, they will provide guidance to teachers and counselors about how to modify adolescent aspirations by manipulating sources of information about jobs.

In the spring of 1970, approximately 3,500 questionnaires were administered to ninth- and twelfth-grade students in four high schools. This procedure permits the project staff to relate freshman students' perceptions of occupational status to the socioeconomic status of their family and junior high school and also to measure their aspiration levels and estimates of ability and education required for job attainment. Comparison with the questionnaire data from seniors in the same schools will permit analysis of the effects of high school status in changing prestige perceptions and aspirations.

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*Not supported by Center funds.

The information an individual receives from peers in schools of different status levels may create cognitive changes in his structuring of the prestige of occupational alternatives. A number of studies have shown that the socioeconomic composition of an adolescent's high school affects his aspirations (although the Wallin, Geisinger, and Wallin study summarized elsewhere in this report failed to replicate this finding). While this "structural effect" has been discussed in the terms of "normative" peer pressures and school "value climates," it is equally reasonable to regard the effects as due to "informational" influences that produce different evaluative perspectives on the occupational and educational hierarchies.

Although there is no direct evidence that aspirational levels and prestige perceptions vary together, each has been shown to be associated with the socioeconomic composition of the school. Covariation could be observed easily during a process of change if sudden shifts in the socioeconomic composition of a school could be produced. Such sudden changes occur occasionally with the consolidation of previously separate schools into a larger single-school district; but the process regularly occurs when the students of a junior high school move to a senior high school which draws on several junior high school populations.

The high schools studied in this project are in systems in which the movement from eighth to ninth grade places a number of individuals among peers of markedly different socioeconomic backgrounds. Consequent changes in aspirations and perceptual perspectives on occupational and educational goals can be observed. Existing data on school effects indicate that the impact of school composition produces substantial change. This change affords an opportunity to observe the extent to which aspirations and perceptions vary together during the process of change.

The research will test the first systematic and explicit theoretical statement concerning the relationship between individuals' evaluative perspectives on the occupational structure and their occupational aspirations. Moreover, the findings will permit assessing the extent to which perceived requirements for and barriers to the attainment of occupational positions result from prestige perspectives rather than factual knowledge

fact that American society does not have diffusely defined elites may account for the fact that, according to the available research, American schools have relatively small effects on student values. Second, American research typically emphasizes the necessity for the existence of isolated or "total" educational settings if broad effects on students are to result. It is argued here, however, that this necessity arises only if such broad changes are not routinely included in the school's social charter, or right to allocate students.

A study of high school effects has been completed. Research and Development Memorandum No. 62, "High School Effects on College Intentions," by John W. Meyer has been published (February 1970). It is also being published externally.[2] This report reviews the research finding that the social status of a high school affects the college intentions of its students, over and above the effects of family status and individual ability. This finding was analyzed with data from the Educational Testing Service's 1955 sample of 35,330 students in 518 American high schools. The effect was found to result from the social status composition of the school rather than from formal features of the school organization. The positive effects of school status on college intentions mask an important negative effect: In schools with students of higher average ability, students of any given ability and status are less likely to have college intentions, presumably because internal standards of competition rise. When this hidden negative effect is held constant, the positive effect of school status on college intentions increases. These findings, now being pursued with more recent data, have obvious applications to the heated contemporary discussion of the effects of the separation (through tracking or other means) of groups of varying social status and ability within school systems.

A study of college effects on student occupational choice has been completed and submitted to the U. S. Office of Education: John W. Meyer, "The Effects of College Size and Quality on Student Occupational Choice," Final Report on Project No. 7-1-070, Grant No. OEG 9-8071-070-0061, June 1970. In its final phase this study was supported by the Center, and a Research and Development Memorandum based on this study will be published.

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[2] American Journal of Sociology, 1970, 76(1), in press.

The report describes the findings of a contextual panel study (N=946 students in 99 American colleges, 1963-1966) of the effects of various measures of college quality, size, and organizational complexity on the social status and academic character (e.g., teaching and research as against medicine or other professions) of the occupations students choose. Neither college quality (i.e., the college's resources in terms of prestige, faculty qualifications, educational facilities, and student background and ability characteristics) nor college size, no matter how measured, affected the social status or academic character of the occupational aspirations of the students. As against larger schools, smaller schools which do not have graduate or professional training (these variables are inseparable empirically) produce more students who go into academic professions and fewer students who go into such professions as medicine, law, and engineering. This finding, of course, involves holding constant the occupations the students came to college intending to pursue, and also such individual attributes of the students as sex and academic ability. The finding may reflect the greater opportunities in small colleges for interaction and identification with teachers (who are academics) and correspondingly less opportunity to identify with and enter the established or "free" professions. This finding bears on the long-debated practical and theoretical questions about the educational benefits and disadvantages of smaller educational units.

Further analyses of high school effects on the college plans of students have been made possible by the acquisition and organization for computer analysis of the data on students and teachers collected in the course of the USOE study on Equality of Educational Opportunity. These data will make possible more detailed analyses of more recent high school effects, in particular the effects of a variety of attributes of the teachers in the school sample.

Project 0309: Characteristics of Effective Teachers and the Distribution of Teacher Services

Project Leader: Henry M. Levin

Research Assistant: Godfrey Ohanu

The purpose of this project is to identify those teacher characteristics that affect both learning and attitudes among different popula-

tions of students and to determine the most cost-effective routes to obtaining more effective teachers. A mathematical model of the educational production process that incorporates student attitudes and cognitive measures as outputs of the school has been developed. The model takes the form of a set of simultaneous linear equations where school inputs are classified according to student characteristics, teacher characteristics, school facilities, and other inputs.

The system of equations has been estimated for a sample of sixth-grade students in a large eastern city. The data, for the school year 1965-66, are derived from the U. S. Office of Education's Survey of Educational Opportunity (used for the "Coleman Report"). Estimates of the system suggest that student backgrounds are probably less important direct determinants of academic achievement than has been reported in earlier studies, and that student attitudes play a larger part in determining the level of academic achievement. The model and some tentative interpretations of the results are reported in Research and Development Memorandum No. 63, "A New Model of School Effectiveness," by H. M. Levin.

Further work in this area is proceeding along several lines. First, better estimates of the equations are being sought through refinement of both the data and the model. Second, statistical estimates of the system are being compared with results derived from another approach, mathematical programming. In this case a linear programming solution that is analagous to the reduced forms of the statistical system is derived. The programming approach yields different results on the input-output relation because its findings are based upon only the most "efficient" schools. The third extension of the work is in the area of cost-effectiveness analysis. Wherever possible, the prices of the inputs are being obtained and related to their effectiveness in order to derive policy recommendations for maximizing the impact of additional expenditures.

PROGRAM 04: TEACHING THE DISADVANTAGED

Coordinator: R. D. Hess

This program is oriented toward the educational needs of children in minority and poverty communities. It has focused especially on the community and other social influences that affect the educational process in disadvantaged areas and the lack of communication and understanding that often exists between communities and the school in such areas.

The goals of this program have been to conduct research which will provide teachers with a more complete and specific understanding of the social, cultural, linguistic, and attitudinal context provided by the community and the school in which teaching and learning are to take place. The focus has thus been more on cultural aspects of the learning environment than on curriculum and instructional strategies and techniques, though the latter are included in at least one project.

During the past year, the program staff has been particularly interested in defining the educational needs of disadvantaged communities and the attitudes of persons in the community toward the school and the teacher. A central effort here has been the development of bilingual studies and instructional techniques. Of particular interest also has been an attempt to develop in teachers a recognition of the need to mobilize educational resources of the community in order to deal with the problems of poverty and discrimination. Two important aspects of this effort are (a) to find ways in which communities can be helped to participate in formulation of policy and in the educational program of the school, and (b) to identify and help remove barriers to communication between the school and community.

The problems of schools in low-income areas are often manifested in various intraschool tensions as well as in alienation between the school and the community. These tensions reflect, of course, the more general stresses and educational disparities in society which give rise to problems of low-income groups. A major effort of the past year has gone toward developing methods which schools can use to identify and

deal effectively with their own problems. Another effort of the program has been to study and describe the unique instructional relationships that develop between students and nonhuman teachers as represented in computer-assisted instruction (CAI) and to study the possibility that CAI may have particular advantages for motivating the student from a minority background.

The efforts of the program staff during the past year have been concentrated upon reporting the results of research activities and preparing these for dissemination. Several of these publications and materials are now available; others are nearing completion. They represent the conclusion of the initial phase of the program for teaching in disadvantaged areas, and provide a basis for further planning. A revised plan for the program will be submitted in the Program Plan due October 1, 1970.

Project 0401: Educational Community Organization

Project Leader: R. W. Heath

Community Organization Specialist: Larnders Roy

Research Assistant: James Robinson

A. The writing of the Manual on Educational Community Organization, originally scheduled to continue through Fiscal Year 1974 (see Third Annual Report, October 30, 1968), will be completed by October 1, 1970. All chapters are in draft form, have been distributed for internal review, and are now being edited and rewritten as necessary.

The manual is based on the extensive logs, videotapes, and other records developed by the staff as its members served as participant observers in a minority-group community near Stanford. These activities have involved not only the regular project staff but also faculty members or students from the Stanford School of Law (Prof. Jack H. Friedenthal, Teaching Fellow Richard Kuhns, and students Leroy Bobbitt, Martin Eichner, Ronald Romines, and Peter Schilla); Graduate School of Business (through Vista volunteers David Gordon, Frank Wentworth, and Debbie Wentworth); Secondary Teacher Education Program (a seminar for some 12 teaching interns); and the News and Publications Service (Robert W. Beyers). The manual is expected to help prepare teachers and interested citizens to achieve educational changes responsive to the needs of their communities.

It has become increasingly apparent that the source of educational failure in minority and poverty communities is to be found in the more affluent, dominant, white society. Moreover, the social, political, and economic power to remedy these failures is most frequently available in the dominant culture. Accordingly, the manual places greater emphasis on the roles of teachers serving in such communities and not just those in disadvantaged communities.

The intended audience for the manual is the typical teacher or teacher-to-be. The manual will not encourage white, middle-class teachers to assume major organizing responsibilities in minority communities. Rather, it will attempt to provide teachers with ideas for community work in their own subculture--work that would, it is hoped, support changes needed in schools serving minority children. Though many of the techniques and ideas discussed in the manual may be of interest to teachers serving in poverty and minority communities, such teachers are not the primary target of the manual.

The manual's contents will include:

1. Analysis of local education systems
2. Strategies for change
3. Functions and skills of community organization
4. Tactics in community organization
5. Management of community organizations
6. Legal aspects of community organization

B. Data on citizen access to public school information are almost entirely collected. Private citizens in a number of school districts were asked to request copies of their school districts' Title I Compensatory Education proposals. Since the information originally collected on four school districts (documenting the procedural and psychological barriers erected by school systems that prevent citizens from influencing education) was incomplete for a variety of reasons, other districts were included in the sample. An analysis of the data will be reported in a subsequent Technical Report.

C. Direct statements from students concerning their views as participants in school systems have been prepared and disseminated.[1] The interviews present feelings and attitudes of students because these are often overlooked as various groups of adults attempt to resolve issues of educational policy. These interviews attempt to transmit the experience of the students directly to the reader without analysis or interpretation by adult professionals.

D. A study of the behavior of teachers that facilitates their ability to relate to both black and white students was completed.[2] High school students, 50 black and 50 white, viewed and rated videotapes of 50 white teacher-interns. Each intern was rated on ability-to-relate and seven characteristics of teaching style. Two main conclusions were reported:

1. The ability of teachers to relate to students is likely to vary substantially as a function of the ethnic background of the student group.
2. Characteristics of teaching style contribute to ability-to-relate differentially in student groups of differing ethnic background.

E. An evaluation of an EPDA-sponsored summer institute for teachers serving in a community-controlled black community's elementary school system was completed.[3] Both attitudinal and informational measures were obtained.

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[1] R. W. Heath and L. Roy, "Interviews with Seven Black High School Students," Stanford Center for Research and Development in Teaching, R&D Memorandum No. 59, December 1969.

[2] R. W. Heath, "The Ability of White Teachers to Relate to Black Students and to White Students," Stanford Center for Research and Development in Teaching, Technical Report No. 10, February 1970.

[3] R. W. Heath, L. Roy, and Delores Mack, "Evaluation of an E.P.D.A. Institute, 'Teachers for Multicultural Education,'" Stanford Center for Research and Development in Teaching, R&D Memorandum No. 68, July 1970.

1. Teacher Attitude Inventory. The TAI provides an index of racism in teaching. The EPDA group exhibited a statistically significant increase in average total score (i.e., showed less racist attitudes) on the Teacher Attitude Inventory between pretest and posttest. Further, at the end of the institute, the EPDA group, on the average, scored significantly less racist than the comparison group.

Though statistically significant, these differences are modest in psychological magnitude. With an instrument that has a possible range of 0 - 182, the difference between pretest and posttest average for the EPDA group was only 4.64 points. The institute had its most dramatic attitudinal effects with regard to such topics as the academic preparation of minority teachers, the aspirations of Negro families for their children's education, the suitability of vocational education for minority students, and preferential treatment in the employment of minorities.

2. Word Association. This instrument used a semantic differential technique to measure conceptual structures of teachers with respect to ethnic topics. As with the Teacher Attitude Inventory, the semantic differential measures indicated moderate changes in the conceptual structure of the teachers. Statistically significant change occurred only in the concepts of "race," "white," and "western civilization."

3. Final Examination. These tests were based on the six instructional units used in the institute, namely, Black Experience in Literature, Racism and Prejudice, History of the Civil Rights Movement, History of Tropical Africa to the 19th Century, Afro-American History, and Contemporary Education of Afro-Americans. On each of these, the EPDA group scored substantially higher, to a statistically significant degree, than the comparison group. Though no pretest data are available, the effectiveness of the Institute in imparting information seems clear.

4. Summary. The evaluative measures reported here were applied to only the first stage of the institute's work. Consequently, the danger of overinterpreting the results is very real. Even so, these data suggest that the institute was more successful in correcting misinformation and imparting new knowledge than in changing attitudes. It might very well

be that teachers volunteering for such an institute are already more sensitive to educational racism than their nonvolunteer counterparts. If that is so, then one should not expect dramatic changes in attitude scores. It may also be that the observable manifestations of attitude change require time and experience before becoming apparent.

Others involved in training teachers to serve in black communities should know that this institute was devised and administered by black educators and that the teachers were in service in a school district governed by an all black school board and a black superintendent. The institute was not just about education in minority communities; it was in and of urgent local educational concerns.

As the trainees return to their classroom and the second stage of the program continues, the new information and understanding gained during the summer will surely be tested by daily experience. The first stage has apparently met its purpose successfully.

Project 0402: Teacher Training: Standard English as a Second Dialect

Project Leader: Robert L. Politzer

Research Assistants: Diana E. Bartley, Sheila McMahon

Many American children who have been described as culturally and economically disadvantaged speak a nonstandard dialect of English. Since standard English is the vehicle of instruction in the school systems, it can be assumed that many of the learning difficulties of such children are directly related to their deficit in standard English. This project is aimed at examining the language of speakers of nonstandard dialects of English and developing strategies and materials for the effective teaching of English as a second dialect.

To date, the project has had two parts, each having its own aspects of both research and development. In the first part, information was gathered concerning types of nonstandard English and classified into two main categories: (a) nonstandard English characteristic of black speech, and (b) nonstandard English which reflects interference from

The second part of the project is concerned with (a) identifying the specific linguistic constraints which contribute to the child's deficit in standard English and (b) examining their interaction with the pupil's age, sex, and native language or dialect background. The 226 subjects for this set of experiments were drawn from the first, third, fifth, seventh, and ninth grades. Of these, 84 spoke Spanish, and 142 spoke English. The subjects were tested in auditory discrimination and in perception of phonological, morphological, and syntactical elements of standard English.

The test of auditory discrimination consisted of pairs of nonsense items, of which 24 were neutral for native speakers of English and Spanish, eight were English-based, and eight were Spanish-based. The following results were obtained (significance levels for all tests are $p < .01$ unless otherwise indicated):

1. On the part of the test which was neutral for native speakers of English and Spanish, there were no significant differences in performance due to sex or language background. Performance did improve significantly with maturation.

2. On the English-based section of the test, native speakers of English performed better than native speakers of Spanish. The reverse was true on the Spanish-based section of the test. On both the English- and the Spanish-based sections of the test, performance improved significantly with maturation. There were no significant sex differences.

3. On the total test, the neutral section, and the English-based section, a significant grade-by-language interaction was observed (Spanish-speaking third and fifth graders outperformed their English-speaking counterparts, while the reverse was true for first and seventh graders).

In the tests of phonology, morphology, and syntax, specific variables such as a particular sound or noun inflection were examined in what could be described as a measure of dialect sensitivity or awareness. Subjects were instructed to listen for certain kinds of errors, i.e., phonological

errors or grammatical errors, and were asked to rate taped utterances as acceptable or unacceptable. On all three tests, performance improved significantly with maturation; English-speaking subjects performed significantly better than Spanish-speaking subjects on morphology and syntax, but Spanish-speaking subjects outperformed English-speaking subjects on the phonology test. Sex differences appeared only on the syntax test, where girls performed better than boys. A significant ($p < .05$) grade-by-sex interaction appeared on the phonology test (in Grade 5, boys outperformed girls).

Refinement and further administration of the instruments used in the second part of the project will be aimed at the development of serviceable diagnostic instruments. Such instruments could in turn aid in the development of teaching techniques and materials useful in dealing with specific problems in reading and other language skills.

Project 0403: Developing Problem-Solving Skills Through Students Teaching Students: Use of Small Groups

Project Leader: Robert H. Koff

Research Assistants: James H. Lytle, Judith V. Ramirez*

Students in a classroom influence each other's attitudes, self-concepts, aspirations, and motivation to learn. This influence usually is unplanned, but it inevitably exists wherever persons share goals and interests. Previous experience has shown that, under certain conditions in the classroom, students may influence each other for the better, and that this influence might become an important resource for improving student skills in solving problems. The present project was intended to identify conditions which facilitate student-to-student interaction and to consider how to establish such conditions within the routine of the school. In addition, the project was committed to developing methods for studying and evaluating the effects of a "learning-by-teaching" arrangement on the ability of students to solve school-related problems.

*The two Research Assistants, Mrs. Ramirez and Mr. Lytle, were directly involved in the planning, implementation, and evaluation of the project summarized in this report. Mrs. Ramirez and Mr. Lytle contributed to this research to such an extent that it is difficult to differentiate their contribution from my own (R. H. Koff, Project Leader).

The problem. In recent years, tutors have been used in widely differing educational programs to pursue varying educational goals. Many individuals concerned with improving academic achievement of students in slum schools have urged supplementing classroom programs with after-school projects in which volunteer tutors provide youngsters with opportunities to practice and extend skills and concepts being learned.[1]

Many individuals and groups involved in such projects have claimed far-ranging benefits to the tutee. As a result, a number of public schools have instituted tutorial programs utilizing older students, rather than adults, as tutors. The assumption underlying such programs generally appears to be that older students from the same cultural background as the younger ones will be better able to communicate with, and hence teach, the younger students than will their middle-class adult teachers. Promoters of tutorial arrangements utilizing students as tutors also expect improvements in the tutors' self-concepts, attitudes toward school, and academic achievement as a result of their experience in the one-to-one helping relationship.

The project's review of the literature associated with tutorial programs identified three major types of purposes: (a) remediation of academic deficiencies of tutees (thereby improving attitudes toward school); (b) remediation of academic deficiencies or improvements in attitude toward school of tutors as well as tutees; and (c) increased knowledge or improved interpersonal skills of tutors, tutees, or both.[2]

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[1] See, for example, G. Janowitz, Helping Hands: Volunteer Work in Education. Chicago: The University of Chicago Press, 1965.

[2] The following studies are especially worthy of note: R. D. Cloward's 1967 study of 11th graders tutoring fourth and fifth graders in reading ("Studies in Tutoring," Journal of Experimental Education, 1967, 36, 14-25); Stanley Frager's and Carolyn Stern's work with fifth and sixth graders as tutors of kindergarten children in pre-reading skills (Paper presented at the meeting of the International Reading Association, Boston, April, 1968); J. W. Eisman's and R. Lippitt's "olders-youngers" project (Progress Report, February 1966, University of Michigan, Institute for Social Research); and R. Lippitt's and J. E. Lohman's study of cross-age relationships (Children, 1965, 12, 113-117).

The research reported here is an example of the third type of tutorial arrangement. In the present project, tutoring was used to promote the ability of tutors (sixth graders) to solve school-related problems and to foster their interpersonal skills in developing a supportive group within which tutors could discuss problems. The tutees were first graders in the same school.

Procedures. The elementary school selected for the project was a racially mixed, primarily lower class school into which 60 percent of the students were bussed. The sample of tutors consisted of the entire sixth-grade population (N=43). Of the 19 girls and 24 boys, seven girls and 11 boys were Negro students who traveled to and from the school by bus. Their classmates were Caucasian and lived within walking distance of the school.

Subjects were randomly assigned to either experimental or control groups. To promote supportive group interaction, the experimental group was further divided into two smaller groups of 11 and 10 members. The first participated in the tutorial project for five months, the second for only two months. During participation, each group met twice a week for one to one-and-one-half hour sessions.

Prior to beginning work with students, a number of meetings were held with the teachers and principal to inform them of the project's goals and proposed procedures and to elicit their cooperation. Arrangements were made with the district office for the project to reimburse the teachers for their time.

The project staff used a "directed inquiry" approach. The leaders (staff members) urged the tutors to seek group solutions to problems and discouraged dependence on the leader as the only source of direction and information. Instead, they guided the tutors in planning appropriate next steps in their tutorial activities, giving them, on occasion, a number of instructional strategies to discuss and consider. The research staff and first- and sixth-grade teachers worked closely together to coordinate lessons, diagnose problems, and evaluate tutorial activities.

In general, the first meeting of the week with the sixth graders was spent in planning an activity or lesson to be used with the first graders. The second meeting usually involved carrying out and evaluating the activity or lesson.

For purposes of evaluation, individual and group criterion tasks were developed. The tasks were administered, individually, to tutors and nontutors over the six-week period following conclusion of the tutorial work. The individual criterion tasks used a model of a sixth-grade classroom and required subjects to arrange or rearrange furniture in the room. Four problem-solving scores (problem sensing, problem defining, generating alternative solutions, and foreseeing consequences) were derived for each subject on each task.

The group criterion task required small groups of three and four sixth graders to design a playground for young children, using pictures of playground paraphernalia mounted on easels. Scores for participation, satisfaction with the playground designed, and role diversification were obtained from interaction records or interview schedules. In addition, each playground was rated on four dimensions of product quality (safety, utility, aesthetic appeal, group interaction).

Results. Major findings of the research may be summarized as follows:

1. On the individual criterion tasks, the scores of the total group of experimental subjects were higher than those of control subjects for all four problem-solving skills. However, the differences were not statistically significant, except that average problem-solving scores were significantly higher for the first experimental group in the foreseeing consequences category.

2. Differences between experimental and control groups on the group problem-solving variables of participation satisfaction and role diversification were not significant, and indeed tended to be higher for the control group.

3. Experimental groups received significantly higher quality-of-product ratings for group interaction than did control groups. Differences between the groups on ratings of safety, utility, and aesthetic appeal were not significant.

Given these results, it seems that the present tutorial project was over-ambitious in its goals. Limited by time, student readiness for group work, and the problems of integrating an experimental program into an ongoing school situation, the project staff could not successfully implement its plans for developing supportive, inquiry-oriented groups dedicated to study of problems associated with tutoring first graders. In spite of failure in this regard, however, positive changes in the attitudes and behavior of many of the students who participated in the project were noted by both the staff and the classroom teachers. For example, one of the teachers who had lower-ability sixth graders reported enthusiastically that a number of her students who had been hostile toward the administration, teachers, and other classmates had become much more cooperative members of the class, and the principal observed with amazement some of his former problem students working successfully with first graders.

In summary, the present inquiry has brought to light a number of issues in the use of small groups as a forum for student learning. In the present project, the dual goals of (a) developing supportive, problem-solving-oriented groups, and (b) learning about and tutoring first graders were only partially achieved. Staff observations and project data suggest that factors which influenced progress toward these goals included the length of time subjects spent in the treatment, the subjects' prior experiences in developing inquiry-oriented groups, the content of group experiences provided in the treatment, and procedures for selecting tutees. Future studies should examine more specifically the significance of these and related factors for the use of problem-solving-oriented groups with elementary school students.

Products developed. The following products and manuals are in the final phase of completion:

1. Group and individual problem-solving tasks:
   a. Model classroom task and examiner's manual.
   b. Playground construction task and examiner's manual.
2. A "curriculum" guide for training tutors in the group situation.
3. Final Technical Report.

Products completed include:

1. Judith Valla Ramirez, "Effects of Tutorial Experiences on the Problem-Solving Behavior of Sixth Graders," Unpublished Doctoral Dissertation, Stanford University, January 1970.

2. An audiotape and slide presentation that describes the tutorial program and presents accounts of formative and summative evaluations of the program.

Project 0404: Use of Small Groups in a Changing School

Project Leader: Frank B. W. Hawkinshire

Research Assistants: John T. Repa, Donald A. Snider, George N. Sousa, Malcolm Taylor

The original impetus for this project arose from alleged racial difficulties within a high school near Stanford. The research team was told that aggravated racial tensions had emerged within the school because of the increased number of disadvantaged Negro students who had been transferred into this middle-class-oriented suburban school. A series of disruptions had led to the closing of the school. Many claims and counter claims had been expressed as various groups attempted to assess blame for the situation.

The research staff took as its central focus the tasks of understanding the problems and assessing the effectiveness of strategies designed to help teachers, students, parents, and administrators to ameliorate the situation. Toward this end, the project staff developed a problem-solving model which would permit the participants to move from intransigent positions of accusation and defense to more open and receptive styles of problem-solving effort.

The model involved the formation of small groups representing students, teachers, parents, and administrators. These groups, meeting separately, were aided in defining school-related problems as they saw them and in arriving at suggested solutions.

During the six working sessions held with each of the four groups in the local high school during the 1968-69 school year, the participants were able to identify over 70 different problems which reflected their interests and priorities. The issues covered varied from racial to national concerns.

In general, the desire for change extended to matters other than racial tensions. In time the task groups went on to bring about effective changes in scheduling, school rules, counseling procedures, social events, and even communication between the school and the community. Although there was a high level of attrition of participants over time, those who remained in the task groups were able to achieve their desired objectives and demonstrated rather clearly that effective and creative solutions to school problems can emerge from all four sectors of the school community. The greatest difficulties for the parents, teachers, and students (although not the administrators) seemed to be to find the time to develop the problem-solving skills and the willingness to alter their perceptions of the problems, and so to arrive at workable solutions.

After the initiation of the work in the local high school, a major county school district in Florida, in the fall of 1969, asked two members of the research team for help on some of the human relations problems developing in the district. A three-day workshop focused on helping the participants develop problem-solving skills which could be taken back to their schools to help eliminate some of their emerging problems. To accomplish this task the following activities were carried out:

Fifteen leaders (principals, teachers, counselors, etc.) employed in one of the subdistricts of the county district were brought together for 2-1/2 hours of initial training in the use of the problem-solving model. These leaders then worked with 140 teachers and principals drawn from the 47 schools throughout their subdistrict. The groups developed a list of problems and then worked on specific problems drawn from a list of 15 selected for further study. The 140 participants worked on the problem selected as a way of gaining further skill with the model.

The leaders received additional training at the end of each day to upgrade their skills as they reached the next step in the model. Over half of the leaders were able to move their groups towards effective problem-solving strategies. The outcome of the three-day workshop indicated that various subgroups were interested in continued meetings as well as in attempting to try out the approach within their individual schools. Interesting prototype plans were developed in several of the groups.

A second three-day workshop in another subdistrict of the Florida county system was held in January 1970.

A summary of the concerns identified in the local high school and the Florida districts appears in Table 1. The striking similarities will be noted.

TABLE 1

Percentages of Different Kinds of Problems Identified in Two School Settings

	Local High School[a]	Florida District[b]
Interpersonal--racial	11%	15%
Interpersonal--nonracial	31%	31%
Instructional and faculty	10%	26%
Administrative	24%	5%
Community	18%	13%
National	3%	2%
Not classified	3%	8%
Total	100%	100%

[a]Combines teachers, parents, administrators, and students.

[b]Teachers and administrators only.

One of the subprojects which grew out of the efforts of the administrative group in the local high school was a training program to help the school counselors learn to work with socially disturbed students in a group. The majority of the students in the groups established came from disadvantaged homes and had serious adjustment problems in the school. Nineteen counselor training sessions were conducted from the spring of 1969 through the winter of 1970. In addition, six sessions were conducted in the spring of 1970 with 40 students involved in four groups. An analysis of audiotapes from each of the meetings is now being carried out, with the findings to be made available by October 1970.

The development and dissemination efforts planned for this project involve the completion of a Research and Development Memorandum describing the total project. This document will include information from the

original experiment at the local high school, the results of the two Florida projects (using the same model to look at desegregation), and also a report on the problem-solving model in a parochial school involved in an assessment of its focus and an evaluation of a new curriculum. In addition to this monograph-length report, two dissertations will provide experimental tests of various aspects of the model. Donald A. Snider will deal with the interpersonal interactions of the group members involved in problem-solving activities, while John T. Repa will examine the social perceptions of the individual participants in a human relations problem-solving task. The project staff is also beginning to prepare a manual of materials for use by educators and others interested in problem-solving work in crisis situations. This manual will be further developed by the principal investigator at the newly developed Center for the Study of Human Relations at New York University beginning in the summer of 1971. In addition to the problem-solving manual, plans for a package of materials for counselors interested in group work with seriously disturbed students are now being made. These materials will include audiovisual aids as well as written materials.

Project 0405: Small Group Interaction

Project Leader: Frank B. W. Hawkinshire

Research Assistants: James Ang*, Bernadette Nelson*, John T. Repa, Donald A. Snider, Malcolm Taylor

The widespread use of small groups in classroom teaching has not always been based on a systematic analysis of social interaction theory as it may apply within the classroom. This project has attempted to develop a preservice professional course for teaching interns focusing on social interaction strategies. The format of the course ("Foundations of Education: Social") involved using a variety of group activities. Careful assessment was made of the interns' ability both to conceptualize and to cope with different group settings. Exposure of

*Not supported by Center funds.

the interns to ways of looking at a wider range of behavior on the part of students in their own classrooms was another aspect of the course. The staff also examined the feasibility of getting interns more adjusted to the interpersonal demands of small-group teaching so that they could begin to apply new strategies in classrooms which are subject to a relatively high level of disruption. One result of the course is that the intern teachers will have more first-hand knowledge of effective ways of exercising social control through the use of small groups while helping their students work toward specific educational objectives.

The project's research findings and developmental effort, soon to be presented in an R&D Memorandum, bear upon three different issues:

1. The receptivity of students of education to a different process of teacher training.
2. The kinds of difficulties and pressures experienced by the teachers in training as they become involved in this kind of course.
3. The sequencing of activities necessary to permit this kind of experience-based teaching to be effective.

The materials developed for the course will provide insights into ways of helping to use small-group concepts effectively in the various new curricula being developed. This package could be used for in-service as well as preservice training.

Project 0406: Teacher Training Programs for Disadvantaged Schools

Project Leader: Robert D. Hess

Curriculum Specialist: Bonnie Tenenbaum

Research Assistants: Leonard Berk*, Sandra Clyman*, Carol Codori*, James Robinson

The intention of this project was to study in detail the methods by which teacher trainees are prepared to work with educationally disadvantaged children in preservice training programs. The literature about the needs and characteristics of low-income children now is substantial,

*Not supported by Center funds.

if not always conclusive or accurate. Only recently have pedagogic prescriptions specifically directed towards satisfying these needs and appropriate teacher training techniques been developed. The aim of the project, then, was to identify and describe the techniques used by teacher trainers to provide their preservice trainees with the skills and competencies required to teach educationally disadvantaged children effectively.

A literature search helped the project staff to summarize pertinent research results, to identify programs for site visits, and to direct its attention toward particularly salient components of the programs. An interview schedule was devised to gather information from the program participants about specific topics: (a) objectives of the programs and the capabilities the trainees were expected to acquire; (b) the processes of trainee recruitment and selection; (c) the field work experiences of the trainees in the classroom and in the local community; and (d) particular curriculum materials and instructional techniques which the program staff emphasized.

The major findings of this exploratory study concern the state of knowledge about the education of disadvantaged children and the distinctions that the investigators feel must be drawn between training for teachers in white, middle-class schools and that for teachers in schools in low-income or ethnic communities. For example, the list of teaching skills which the program instructors regarded as necessary for working with low-income children coincided almost completely with the set of skills that one would expect a good teacher to possess regardless of where he taught or who his students were. While the program staffs usually provided an opportunity for the trainees to participate in school, classroom, and community settings in low-income areas, the guidelines and procedures for these activities were not always precisely delineated.

These findings help account for the termination of this project upon the completion of a preliminary report, soon to be issued as an R&D Memorandum. In addition, they suggest several avenues for future research. For example, researchers have not yet made sufficient progress in determining the extent to which the "problems" which characterize schools in

low-income areas derive from (a) the social context of the classroom, (b) the differences in culture, values, and patterns of behavior between the school and the community, or (c) the differences between the learning styles of low-income and ethnic children and of white, middle-class children. Until such information is available, it will be difficult for teacher trainers to identify the needs of the children, and, consequently, the set of teaching skills which would distinguish these special programs from other teacher training programs.

Beyond research which describes problems in low-income schools or surveys teacher attitudes, it is imperative that research also be conducted which will develop new pedagogic techniques or alter the role of the teacher. Several researchers at the Center are conducting projects to that end. For instance, research in the Heuristic Teaching program is aimed at the interaction of pupil characteristics and teaching styles. Another project in that program seeks to identify teaching methodologies which contribute to improvement of pupil achievement through shaping the motivational and belief systems of disadvantaged children. The research in the Environment for Teaching program has also been pertinent. This is particularly true in the projects studying the role of the teacher in innovative educational settings. That work bears directly on the field work experiences upon which the staffs of the programs studied relied heavily in working toward their objectives. Finally, other projects in the program on Teaching the Disadvantaged will contribute knowledge about the learning styles of educationally disadvantaged children, especially in the area of language development.

Project 0407: The Impact of Educational Technology upon Noncurricular Dimensions of Children's Behavior: A Study of the Computer as a Socializing Agent

Project Leader: Robert D. Hess

Research and Development Associate: Maria D. Tenezakis

Research Assistants: Rodney L. Brod, Henry T. Ingle*, Barbara G. Oppman*, Ian D. Smith, Judith B. Spellman*

*Not supported by Center funds.

(Note: This project was identified in previous SCRDT reports as Project 0602 and listed under a category titled "nonprogrammatic research." That category of work at the Center has been discontinued. The project was made a part of the program on Teaching the Disadvantaged because of the frequent applications of educational technology, and particularly computer-assisted instruction, in the teaching of such students.)

Summary description. The project aims at investigating the impact of educational technology upon children's socialization. It focuses on the effects of computer-assisted instruction (CAI) on children's attitudes and orientations toward computers as sources of information and instruction. The purposes of the initial study were: (a) to clarify conceptual issues arising from application of socialization theory to interactions between humans and machines; (b) to develop strategies for studying human orientations to computers; and (c) to collect baseline data on parameters of children's responses to CAI.

Data from unstructured interviews and observation of students learning from CAI in several schools in the San Francisco Bay Area were used to develop a questionnaire and a semistructured interview schedule. These instruments were pilot tested with a small group of junior high school students with and without CAI experience. The questionnaire was then used to collect data from 189 students in a junior high school in the San Francisco Bay Area, of whom 50 had been assigned by their teachers to CAI in the form of an arithmetic drill-and-practice program administered as remedial instruction in mathematics. A small sample (10 percent) of the total group of students were also interviewed. The students had predominantly Mexican-American, lower socioeconomic status, home backgrounds. The allocation of subjects to the treatment (CAI) and control (Non-CAI) groups was not controlled by the investigator.

Data were first analyzed to determine the extent to which characteristics of the sample (i.e., sex, grade level, ethnicity, socioeconomic status, intelligence test scores, and the CAI/Non-CAI dichotomy) were significantly associated with the responses to questionnaire items. The greatest proportion of significant differences in the distributions of responses was associated with the CAI/Non-CAI dichotomy. Hence, descriptive statistics were computed for CAI and Non-CAI groups separately.

Summary of findings. Both CAI and Non-CAI students had a very positive image of CAI and the computer--they liked it, thought it gives right answers, and saw it as having a vast array of information available to it. They also saw it as fair, trusted its evaluations and its handling of task assignments, and sometimes attributed to it an almost human role.

Both groups perceived CAI and the computer in more positive terms than other sources of information and instruction. The major elements of the favorable image of the computer were associated with the idea of greater expertise in processing and transmitting information. Feelings of greater trust in the learning situation managed via computer as compared to that monitored by the teacher were especially evident among CAI students. On the other hand, while both groups tended to ascribe charismatic qualities to the computer rather than the teacher, CAI students were more aware than their Non-CAI peers of the computer's unresponsiveness to students' eventual desires to change the course or the content of its lessons.

The CAI group's greater confidence in the computer as compared to the teacher may arise because the teacher is perceived as evaluating student performance in mathematics tasks on the basis of behavior not related to these tasks. The machine is seen as exercising primarily task-related functions and not bringing in the affective and evaluative components inevitably present in teacher-student interactions.

Products. Products developed or in the process of development include the following:

1. Hess, R. D., Tenezakis, M. D., et al. "The Computer as a Socializing Agent: Some Socio-Affective Outcomes of CAI." SCRDT Technical Report No. 13. Scheduled for publication August 1970.

2. A revised version of the questionnaire for students is now in the process of development. New items are being devised to form scales for major parameters of students' images of the computer and CAI as compared to other human and nonhuman sources of information and instruction; these parameters include expertise, trustworthiness, attractiveness (ability to elicit positive attitudes), charisma, and responsiveness to student attempts to bring about change in the content and format of lessons.

3. A teacher interview schedule is being developed to obtain data on teachers' attitudes toward computers as used in education, and in particular toward CAI.

Implications for education and further research. The findings have implications for the further development of CAI and its uses in schools and for the analysis and evaluation of teacher behavior. Several additional studies are now under way to investigate (a) the motivational characteristics of CAI, especially the fit between program level and the child's ability; (b) the effect of explanations (information) about the computer on images of CAI; (c) the impact of CAI experience on attitudes toward the computer; and (d) the effect of CAI experience on the student's self-concept. Other studies exploring parameters of CAI are in the planning stage.

PROGRAM 05: HEURISTIC TEACHING

Coordinator: R. E. Snow

Problem

Adaptation to complex change in modern life is critical. It is thus important that a substantial portion of teaching effort be devoted to developing individuals who are adaptive, flexible, and inventive. Yet, teaching style often appears to be the most static aspect of schooling, proceeding today much as it has for generations. The basic mode of instruction still seems to be mainly didactic, with teachers dispensing information to passive pupils and testing, at regular intervals, the amount of information absorbed and retained. Further, there has been little attempt to adapt teaching styles to complement the development of instructional technology, which should take over larger portions of conventional, expository instruction in the coming decades. The result is that current teaching styles and the learning styles promoted thereby may be largely inappropriate for modern life.

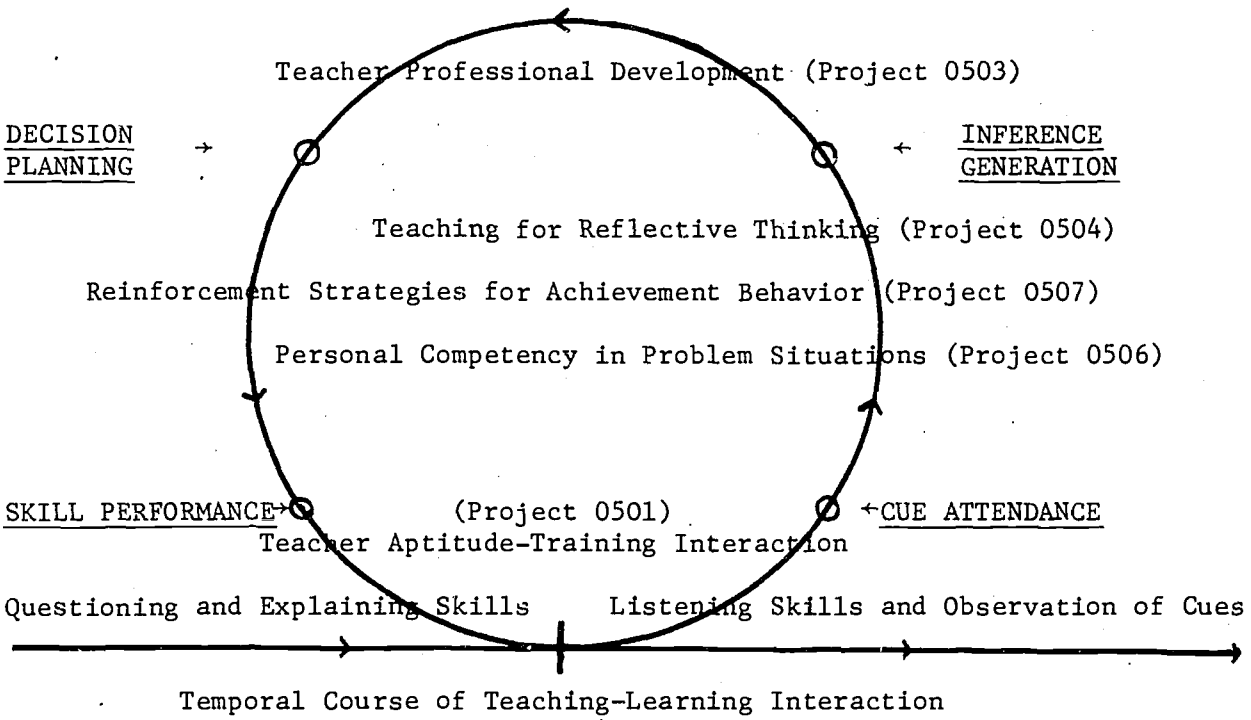
In the face of this problem, the program on Heuristic Teaching was established in April 1968. It emerged directly from earlier Center work on microteaching and the technical skills of teaching approach to teacher training, as well as other research on cognitive and affective interactions in the teaching-learning process. The term "heuristic" is meant to suggest an emphasis on inquiring, inductive, hypothesis-generating modes of instruction rather than on fact-dispensing, deductive, expository modes. While the program's research deals with teaching and learning in general, the hope is to develop new, more adaptive, and functional forms of human teaching through this emphasis. A long-range need of the program involves defining and improving the functional uniqueness of human teaching in relation to other components of the instructional system.

Objectives and Expected Output

The objectives of the program, as stated in previous Annual Reports, are (a) to define heuristic teaching functions in education; (b) to understand the psychological processes of heuristic teaching and learning; and (c) to develop means of promoting heuristic teaching and learning in schools.

The program aims eventually at outlines for a theory of teaching and for a model teacher education program, with supporting teacher-training materials. These aims for the five-year period 1969-1974 have not changed appreciably since they were spelled out on October 1, 1969, in the Program Plan for FY 1970. The various project activities described there have been moving forward approximately according to schedule. Considerable time has been spent in recent months, however, in sharpening and elaborating the program plan. The results of these activities will be reflected in the Program Plan and Budget Request to be submitted October 15, 1970.

The program's activities are guided and coordinated by a rough paradigm of teaching-learning processes also described in several previous reports. A portion of the paradigm is reproduced in the following diagram to serve as a guide for this program report. It is designed to show schematically how the concerns of the various projects of the Heuristic Teaching program are related within the cognitive operations of the individual teacher. The diagram emphasizes teaching activities; left implicit are comparable processes in the learner, which are becoming increasingly important foci in current and projected program plans.



Cyclical Model Showing Cognitive Events in Teaching Performance and Areas of Current Program Research and Development

Strategy

The strategy of the program represents fairly equal emphases on research and developmental work. Developmental work in the form of training programs, clinics, and institutes has been an emphasis of the program since its inception. Now with an increasing research base, the program has also moved into development in the form of manuals and materials for training purposes.

Specific strategies and accomplishments are best described separately for current projects. During the past year, five projects have operated within the program, as shown. In addition, two program-level activities of the past year should be mentioned here. One concerned the survey of a large quantity of commercially available teacher training materials and the purchase of selected, potentially useful items. These materials are being reviewed by Frank Sobol and other program personnel and utilized in research, development, and training activities where appropriate. The second activity was a symposium on the definition of heuristic teaching in which six Stanford faculty members (Drs. Joseph E. Strzepek, Jon L. Higgins, Robert G. Bridgham, Jan L. Tucker, Elliott W. Eisner, and Lawrence G. Thomas) not associated with the Center were invited to participate. Five participants represented curriculum areas (English, Mathematics, Science, Social Studies, and Art) and prepared papers on heuristic teaching as viewed from particular content specialties. Discussants represented philosophic orientations (Professor Thomas) and the viewpoint of the Center. Professor D. Bob Gowin of Cornell University is also serving as a reviewer. The collected papers will be issued as a Technical Report in the summer of 1970.

The next sections of this report review separately the progress of each project during the past year.

Project 0501: Training Studies

Project Leaders: R. E. Snow, N. L. Gage

The Training Studies project has aimed at identifying teaching and learning skills, designing training procedures for the development of such skills, and understanding the complex interactions between these variables and individual characteristics of teachers and learners. This

project continues previous Center microteaching research directed toward analyses of technical skills of teaching and the training methods that best promote the acquisition of these skills.

Among the project's dissemination activities this year was the issuing of Technical Report No. 8 by David C. Berliner, entitled "Microteaching and the Technical Skills Approach to Teacher Training." This report summarizes past Center research in the area. A companion report by Berliner, entitled "Manual for the Use of Technical Skills in a Microteaching Clinic," has been under development this year, with completion expected during the coming months. Also to be noted is a forthcoming Research and Development Memorandum by Blaine E. Ward entitled "A Survey of Microteaching in NCATE-Accredited Secondary Education Programs." This report, based on Dr. Ward's doctoral dissertation at the University of South Dakota, reviews the use of microteaching in teacher training institutions. He found microteaching being used in 32 percent of the nation's 442 institutions for secondary teacher education in 1968-1969. Another study by James A. Johnson, "A National Survey of Student Teaching Programs" (Northern Illinois University, DeKalb, Illinois, July 1968),[1] found that 44 percent of all teacher education programs use some form of microteaching. The Center has also recently received evidence of the use of microteaching in Scotland (University of Stirling), in the Netherlands (the University of Leiden), in Denmark (Gladsaxe Kommune, Kulturelle Forvaltning), in Canada (University of Alberta), at the University of Botswana, Lesotho, and Swaziland, and in various Australian teacher-training institutions.

During the past year, the project has sought to conclude previously described research on questioning skills and on listening and other cue attendance skills, while continuing exploration of aptitude-treatment interactions in both teachers and students. New activities include work on explaining skills and a teacher-learner dialogue situation to be used for investigating the integration of teaching skills in relation to learning criteria.

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[1]Cited in James M. Cooper and Dwight W. Allen, "Microteaching: History and Present Status" (authors' draft of report prepared for the ERIC system).

Questioning skills. (Research Assistant: Stanley J. Nicholson.* Consultant: Karen E. Claus.) The Center's earlier research on questioning is being summarized, along with information from other sources, in two Technical Reports by Karen E. Claus. This work has aimed at the development of classifications of teacher-learner behavior, particularly as related to questioning skills. A further investigation has developed methods for the study of sequences of question-answer interchanges between teacher and student in microteaching situations. When completed, this study should provide an analysis of teacher question-sequencing patterns and an approach to the examination of sequences of behavior in other teaching situations.

Listening and related cue-attendance skills. (Research Assistants: J. Philip Baker, Maria F. Hernandez, Robert Lundgren, Philip C. McKnight, Richard J. Shavelson*.) Two studies (by Lundgren and McKnight) were designed to investigate the use of an audiotape listening program for teacher training. The programmed instruction tapes and booklet had been developed earlier by Xerox Corporation for use with businessmen. The studies centered on whether the existing program would be useful in improving teachers' listening skills in receiving and organizing student comment and whether this improvement would generalize to affect teacher behavior in classroom discussions. It was found that training produced striking improvement in listening skills as measured by the highly specific pre- and posttests that accompany the programmed materials. In both studies, however, the effects of the training on teacher behavior in classrooms were slight. There was some indication that teachers trained in listening skills referred more often to earlier student statements when questioning and leading discussion than did control teachers, but this finding remains only a hypothesis for further research.

Another study (by Maria F. Hernandez) was designed to assess the extent to which teachers use student comments in their subsequent remarks and to relate this variable to the kinds of cognitive activity generally represented in class discussion. It was hoped that teacher listening and questioning activity could be related and also that improved measures for

*Not supported by Center funds.

detecting the effects of skill training in these areas could be obtained. Unfortunately, the observation system failed to achieve the levels of rater agreement sought, and a revision of the instrument seems required. A report on the analysis of this instrument is currently being prepared by J. Philip Baker.

Earlier Center work on cue attendance had investigated the use of photographic feedback to promote accurate teacher perception of student attending behavior. In the most recent of these studies, Norma Dimmitt has demonstrated significant improvement in this teacher skill by using perceptual training procedures involving the analysis of 35 mm. time-lapse photography of student attending behavior. Further, it was shown that observed student attending was significantly higher in classes where teachers perceived attending behavior more accurately. This work will be described in a Technical Report now in preparation.

Aptitude-treatment interactions in teachers and learners. (Research Assistants: Akimichi Omura, Trevor Whitford, Antonio DePorcel.) A continuing project activity involves the search for interactions between training treatment variables and trainee aptitude characteristics. "Interaction" refers to the occurrence of differences in effects of training methods as a function of differences in level of a specific student characteristic. The work takes two forms. One form seeks such interactions as a function of characteristics of teacher trainees in microteaching treatments. A study by M. L. Koran now being prepared as a Technical Report found interactions between some trainee aptitudes and videotape vs. written transcript models of analytic questioning skill. Another study, a reanalysis of earlier work by Claus, showed interaction between trainee aptitude and the presence or absence of a supervisor during viewing of a videotape model of higher-order questioning skill. These findings suggest that interactions of this sort may be widespread in teacher training and that different training methods may be appropriate for different teacher trainees. A Research and Development Memorandum on this work is in preparation.

A second form of the investigation of aptitude-treatment interaction considers teachers as representing alternative treatments and seeks interaction with learner aptitude variables. Three analyses of existing data have been under way during the past year. While highly exploratory and

incomplete, the work may lead to the recommendation that aptitude-achievement regression slopes (analyses of relations between student aptitudes and achievement) for classes be used in addition to class averages to indicate important differences in teacher style and effectiveness.

Explaining skills. (Study Leader: N. L. Gage. Research Assistants: Chandrakala Dhar and Robert Miltz*.) This activity has been aimed at developing and validating a manual and other products useful in improving the teacher's ability to explain orally and extemporaneously. Further review of the literature corroborated earlier evidence that explaining will probably continue to be a significant part of the teacher's role, despite changes resulting from the adoption of programmed instruction and other technologies.

Theoretical and empirical explorations during the first quarter were followed by the definition of two separate studies. These were (a) the development of a performance test of effectiveness in explaining and (b) the development and validation of a manual for improving effectiveness in explaining.

The first study (by Dhar under Gage's supervision) was intended to provide a tool for research on effectiveness of teacher education programs. It was assumed that explanations can be evaluated formatively, i.e., on grounds other than their effect on student achievement, or learning.

The proposed test of effectiveness in explaining uses dimensions found to affect readability, e.g., (a) proportion of lines giving examples (Funkhouser, 1968);[1] (b) frequency of "explaining links" (Rosenshine, 1968)[2]--prepositions and conjunctions which indicate that the cause, result, or means of an event or idea is being presented; (c) number of words or lines relevant to each test item--this factor being

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*Not supported by Center funds.

[1]G. R. Funkhouser, "Communicating Science to Non-scientists." (Paper presented at the 1967 Conference of the American Association for Public Opinion Research.) Stanford, Calif.: Institute of Communication Research, Stanford University, 1968.

[2]B. Rosenshine, "Behavioral Predictors of Effectiveness in Explaining Social Studies Material," Unpublished Doctoral Dissertation, Stanford University, 1968.

negatively correlated with effectiveness (Funkhouser, 1968); and (d) "vagueness" (Hiller, et al., 1969),[3] or verbal material characterized by much qualification, haziness, and ambiguity, as measured objectively by the proportion of words counted by a computer as belonging in these categories.

The test being developed will consist of 12 questions dealing with a variety of topics in science and the social studies as taught in the fifth and sixth grades in California. These questions are to be answered with explanations and will require knowledge and understanding that the typical teaching intern is assumed to possess. This knowledge is being insured by selecting the questions from the content of textbooks, curricula, and lessons taught by interns as part of their teaching practicum.

The test has been administered to 20 elementary teaching interns. After being recorded and transcribed, test responses are being analyzed on the basis of various linguistic features and logical criteria, such as internal consistency, accuracy, number of words, and number of explaining words. The total test of 12 questions was generally completed within 45 minutes. Tryout of the procedure of furnishing concise text-material to control for differences among teachers in relevant knowledge led to a decision not to use such materials; explanations obtained without such guides seemed to be logically tight and brief enough.

The second study (by Miltz under the supervision of Gage) is aimed at the development of a manual for improving teachers' explanations. For the initial tryout, the manual contains five lessons designed to help the teacher understand major aspects of good explanations and giving him practice in improving these aspects. The design of the manual draws upon ideas developed by Bryce Hudgins and his students at Washington University (St. Louis), by the Far West Laboratory for Educational Research and Development, and by work on explaining carried out at SCRDT by Barak Rosenshine, Maria Belgard, W. R. Unruh, Robert Pinney, and Robert Shutes.

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[3] J. H. Hiller, G. A. Fisher, & W. Kaess, "A Computer Investigation of Verbal Characteristics of Effective Classroom Lecturing." American Educational Research Journal, 1969, 6, 661-675.

The five lessons in the manual are self-administered by the trainees in five one-hour sessions, on each of five successive days. Each lesson with its written exercises is distributed on the day before each practice session. The practice session requires that subjects have read the lesson and completed its written exercises in advance. During the practice session itself, each subject works with a self-selected fellow trainee. One asks the other to provide an explanation in answer to a specific question. The explanation is tape-recorded and is then criticized by both trainees as they listen to it. The procedure is then repeated, with the roles of the trainees reversed.

The manual itself was completed in June 1970 and an experimental evaluation is being conducted during the summer of 1970. The project is being conducted with the cooperation of the College of Notre Dame (Belmont, California), which is furnishing the facilities, videotape equipment for presenting instructions in standardized form, operators, experimenters, and subjects for the project.

In scoring and analyzing the responses of the trainees, the investigator will seek to prevent scorers and coders from being influenced by knowledge of whether the response was given as part of a pretest or a posttest. That is, the pretest and posttest responses will be transferred to one tape in random order. The explanations will then be played to the class which the teacher trainee (subject) taught during the summer session. This class will rate each explanation as to its clarity and comprehensibility. If the students assign significantly higher mean ratings to posttest explanations, the training with the manual will be considered to have been effective.

The subjects in this first evaluation of the manual are 64 beginning teacher trainees, randomly assigned to training and no-training groups in a pretest-posttest design. The pretest requires subjects to offer explanations in response to three stimulus questions asked by the experimenter. Responses are tape-recorded. After the self-administered training with the manual, the subjects will take an equivalent posttest, following the same procedure but answering different questions. A second, delayed posttest will use the test of effectiveness in explaining being developed by Dhar.

Teacher-learner dialogue situations. (Research Assistants: Richard Shavelson* and Joan Marks.) An important need of the project and the program is to develop criteria for teacher behavior that are derived from the behavior and characteristics of students. For this purpose, a tutorial laboratory situation in which the details of cognitive and affective interaction between teacher and learner can be studied intensively, over a sequence of meetings or lessons, has been designed. A pilot investigation was conducted this year, using four teachers tutoring each of four students. The dialogue situation used introductory physics material, with teachers meeting each student individually one hour per day for five days before going on to another student. In addition to pre- and posttests of achievement and constrained-association tests, data were collected in the form of "foresight-hindsight" diaries kept by the teachers from day to day, recording their ideas for planning and review. These diaries were analyzed, along with transcripts of each dialogue itself, to detect changes over tutoring sessions and students. While data analyses are not complete, it appears that the dialogue situation offers a potent technique for evaluating training effects on learning. It is also important to note that the situation permits the examination of "learning-to-teach" effects similar to "learning-to-learn" effects. That is, teachers seem to show improvement as they deal with successive students.

Project 0503: Microteaching and Intern Data Bank

Project Leader: Robert H. Koff

Research Assistants: Richard Beyer, Annalee Elman, Richard Krasno, James Lytle, Richard Shavelson*†, George Sousa, Laurel Tom, Robert Trinchero

Additional Staff: Deborah Davis, Jean Krasno, Ethel Lichtman

This project aims at developing teacher training programs, evaluating those programs, and using the evaluation as feedback for revision. The teacher is viewed as both an independent and a dependent variable. This means that different groups of teachers may receive training which

*Not supported by Center funds during 1969-70.

†On July 1 Mr. Shavelson will join the project as a Research and Development Associate.

is systematically varied; the success of the differential training depends upon the teacher's behavior and the effects of teacher behavior on student behavior. The project is developing instruments to gather information on teachers, conducting formative and summative evaluation on Stanford's preservice and in-service training programs, and disseminating information to interested researchers and practitioners through regional educational laboratories, local workshops, and technical reports.

The project has two related parts: Intern Data Bank and Microteaching. Information from the Microteaching Laboratory is used in the Intern Data Bank; biographical and aptitude information contained in the Data Bank is used in microteaching research. For convenience, program activities will be reported in separate sections.

Intern Data Bank. The purpose of the Intern Data Bank is to provide extensive biographical and aptitude information on preservice and in-service teacher trainees. Work on the Data Bank this year has been carried out in four activities. The objective of the first activity was to simplify storage of Data Bank information on Stanford's computer. A major reorganization of the storage system has been completed. This reorganization has reduced the computer storage requirements to 1/7 the original requirement. Information is now more easily retrieved and is completely cross-referenced. This means that the user can access interns' grades, the names of their supervisors, their current addresses, their undergraduate schools, and their subsequent employment, from one source of data. The Data Bank contains sufficient information to investigate the way in which the admission variables (e.g., grade point average, GRE scores, teaching major, previous degree or degrees, interviewer ratings) predict success in the Secondary Teacher Education Program (STEP).

Robert Trinchero and Deborah Davis are preparing a Research and Development Memorandum which gives the rationale and history of the Data Bank and summary descriptive statistics for all variables in the Data Bank except the videotape recordings (see below).

The second activity was aimed at the development of a supervisor questionnaire designed to supplement information on interns with data on their supervisors. The questionnaire was developed in response to the need for evaluating the quality of supervision provided by both the

STEP supervisor and the resident supervisor (a master teacher at the school in which the intern teaches). Interns are asked to rate their supervisors on questions in five categories (skills and competencies, feedback content, feedback process, personal characteristics of supervisor, and institutional constraints). Data collected from the most recent class of interns (1969-1970) are currently being analyzed to obtain information on individual items, reliability, and empirical subscales comprising the questionnaire. Robert Trinchero and George Sousa are preparing a Research and Development Memorandum which provides the rationale, history, and description of the instrument and summarizes statistical analysis completed to date.

The Career Patterns study, the third activity, was organized to answer the questions, "Do graduates of the Secondary Teacher Education Program enter teaching? If not, why? What are the relationships between career patterns and teacher-selection variables? What implications do STEP graduates' career patterns have for revising the curriculum of the teacher training program?" No comparably comprehensive longitudinal study of teachers' career patterns has been reported. The design of the study was formulated between October and December 1969. The survey was conducted by telephone, with the interviews lasting no longer than ten minutes each. An attempt was made to reach all interns from the 1959 through 1969 classes; 94.6 percent of the approximately 1,000 graduates were interviewed. The interviews had two main objectives: (a) to obtain detailed information about the STEP graduates' present and previous occupations in the field of education, and (b) to have the graduates evaluate the preservice training program in the light of their personal experience.

From January to April 1970, data were collected; from April to June, the data were prepared for the computer. Some initial results from the data presently available are the following: Of the approximately 1,000 STEP graduates, 43 percent are still in secondary teaching, another 24 percent have present occupations in other areas of teaching or in directly related occupations, and 33 percent are in non-educational occupations. Men comprise 36 percent of those graduates whose present occupation is secondary teaching (N=139); this number is

51 percent of all male STEP graduates. Women, on the other hand, comprise 64 percent of those graduates whose present occupation is secondary teaching (N=249), but this number is only 25 percent of all STEP graduates. The data suggest that a crucial survival period for teachers is 3-5 years after graduation. An interesting sidelight is that STEP interns had significantly higher average verbal ($p < .001$) and quantitative ($p < .05$) scores on the Graduate Record Examination (GRE) than doctoral students in Stanford's School of Education during the same period.

The data have already demonstrated that the Teacher Education Program (leading to the degree of Master of Arts in Education) has fulfilled its mission of getting highly competent personnel into the teaching profession. The final analyses will portray the longitudinal occupational pattern for all graduates in each of the classes from 1959 to 1969. Combined with the information on the STEP graduates already contained in the Data Bank, this study will provide information on other important questions yet unanswered.

Deborah Davis, Richard Krasno, and Jean Krasno are preparing a Research and Development Memorandum on the study.

The fourth Data Bank activity is the Videotape Training and Research Library. During the past seven years, videotape recordings have been made of interns and teachers for many purposes. The content and quality of the recordings vary greatly. Up to this year, tapes were indexed primarily by number or by name of the person taped, with supplementary indexes for models of the technical skills of teaching. This inadequate indexing hindered effective future use of the tapes once a project was completed. The past year saw the beginning of a new system for cataloging tapes, which lists the tapes by name of person taped, code number, and teaching variable exhibited. The first part of the catalog lists tape numbers. Following each tape number is a paragraph describing the general purpose, content, proceedings, and most significant characteristics of the tape. The remainder of the catalog lists separate teaching variables such as "use of reinforcement" (e.g., teacher encourages student). This listing carries references to all tapes show-

ing that variable. A set of keysort cards is being developed to accompany the catalog. These cards will permit the library user to identify a tape showing any one or a combination of teaching variables he wishes to view. Previous research associated with each tape will be identified as well.

This new indexing system will be of value in both training and research. For training, tapes can be readily selected by supervisors or professors to demonstrate particular approaches to teaching or use of curriculum. Model tapes demonstrating the technical skills of teaching can continue to be used for training interns in the Microteaching Clinic. In addition, the tapes provide a basis for formulating and exploring hypotheses for research. A series of tapes could be used to trace the development of particular interns with respect to a certain set of teaching variables. Variables obtained from other parts of the Data Bank, such as GRE scores, could be used in attempts to find predictors of the developmental trend.

Budget limitations for FY 1970 seriously limited the progress of the indexing; it is hoped that funds for FY 1971 can be found, from non-Center sources if necessary, to allow completion of the task. Jean Krasno is preparing a Research and Development Memorandum describing the indexing activities.

Microteaching. Conceptualized before the Center began, microteaching has undergone extensive development and refinement through the Center. It presents a miniature classroom with two to ten students to the preservice or in-service teacher. Then the teacher practices teaching and immediately afterwards views his teaching on videotape. Since its conception, microteaching has been used as a laboratory method for research on teaching, a supervisory tool, a major component of workshops for teachers and administrators, and as the inspiration for "Minicourses" to train teachers in the schools. (This latter work has been carried on at the Far West Laboratory for Educational Research and Development.) This diversity of general uses for microteaching is reflected by the microteaching activities at the Center.

The Microteaching Clinic is a component of the Secondary Teacher Education Program (STEP) at Stanford University. Its purpose in STEP is to

train preservice teachers. The clinic, funded in part by the Center to provide a laboratory for Center research, provided the setting for four major research studies this past year. Two studies dealt with "uniquely human" qualities of the teacher, the third looked at alternative instructional methods for teaching algebra, and the fourth trained preservice teachers (interns) to work in learning teams. In his study of teacher responsiveness, McKnight[1] argued for research on teaching emphasizing uniquely human qualities of the teacher. A report on this study is found in the Training Studies section of this report (Project 0501).

In the second study, Lytle[2] investigated the leadership styles of interns. He observed that interns entering STEP could be differentiated by the amount of emphasis they place on the personal and content aspects of teaching. Some interns place emphasis on the personal aspect almost to the exclusion of the content aspect. Other interns do just the opposite. He labeled these interns "high interpersonal" and "low interpersonal," respectively. Lytle expected "high interpersonal" interns to have classes which were more dysfunctional (e.g., displaying non-relevant discussion, whispering, etc.) than classes with "low interpersonal" interns. In general, this expectation was not confirmed. Interns rated on the extent to which they showed interpersonal behaviors (e.g., attempts to gain approval by being extremely friendly) could not be distinguished as high or low interpersonal teachers. Extremely high interpersonal interns were described as informal and casually dressed; they asked more questions of their students. Even though low interpersonal interns stressed content, they were found to be very supportive and approving of their students. On the basis of these findings, Lytle distinguished extremely high interpersonal interns from warm interns. Placement and training of interns, Lytle suggested, must take into consideration the needs, expectations, and views of the teacher's role held by students, as well as intern style.

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[1]Philip C. McKnight, "Behavioral Responsiveness of Teachers in Verbal Interaction with Students," Unpublished Doctoral Dissertation, Stanford University, 1969. A Technical Report on this study is in preparation.

[2]James H. Lytle, "A Study of Interpersonal Leadership Styles of Preservice Teacher Trainees," Unpublished Doctoral Dissertation, Stanford University, 1970.

In his study of mathematics instruction, Knight[3] observed that mathematics teachers commonly use language and mathematical symbols to teach this subject matter. Graphs and other pictorial representations are used infrequently. Yet, there is evidence that certain students are better motivated and instructed by graphic explanations. The problem posed in this study was, "How can we train teachers to be flexible in their use of graphic, verbal language, and symbolic methods of instruction?" To answer this question, mathematics interns were identified by their preference for graphic, verbal, or symbolic methods and placed into three respective groups. All three groups received flexibility training, i.e., training designed to train interns to use all three instructional methods. Following training, the three groups were observed microteaching. The study found that the verbal component for all groups of teachers was by far the most dominant. The groups which had expressed a preference for graphic or symbolic methods could not be distinguished by their performances.

In the fourth study, 40 interns participated in an experimental program designed to train them in techniques of solving problems in groups. Five interns worked in a learning team along with a curriculum and instruction specialist. Each team conducted a study of the community in which they were to teach, developed and presented a curriculum unit within microteaching situations, wrote a case study that described individual pupils in the microteaching situation, and wrote a case study examining their own learning team's growth. Koff[4] expected trainees in this experiment (a) to show an increase in positive attitude, (b) to receive more favorable student ratings of teacher effectiveness, and (c) to see their course as more relevant to teaching than would interns outside the experiment. These expectations were confirmed. Five months after the training, interns in the experiment expressed stronger feelings that their training was relevant than did the interns in the regular training program.

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[3]Lewis Knight, "An Investigation of Flexibility Training in Use of Instructional Modes" (doctoral dissertation in preparation).

[4]Robert H. Koff, "Crisis in Content in Teacher Education." Paper delivered at the American Educational Research Association Meeting, Minneapolis, Minnesota, 1970. A Research and Development Memorandum based on this paper will be prepared.

The microteaching project staff, as representatives of the Center, cooperated with members of the School of Education faculty in planning and carrying out two one-week workshops, titled "Theory into Practice," held at Stanford in July 1970. Each workshop had 40 participants. The workshop was designed to provide an intensive one-week exposure to new and innovative approaches to teacher training, aimed at administrators, supervisors, and experienced teachers. Two important features of the workshop were (a) microteaching and the technical skills of teaching, and (b) strategies for using videotape as an instructional and supervisory tool. The Center staff supplied the expertise in these areas.

Project 0504: Uncertainty Studies

Project Leader: Joan Sieber Suppes

Research Assistants: Sharon Elliott, Jana Floyd, Hedva Lewittes (SCRDT); Bette Acuff, Alan De Young, Theodore Feely (EPDA Project)

Additional Staff: Joan Grossman*, Vicky Katz*, Helen Smith*, Sister Mary Peter Travis*

The aim of this project is twofold: (a) to explore the psychological construct of ability to generate warranted uncertainty, and (b) to design teaching techniques and materials that promote warranted uncertainty, and also to design instruments that assess the development of these skills. An attempt is being made to define these skills in terms of the following cognitive components: Generation of alternative solutions, recognition of one's own likely errors, assessment of the sufficiency of information for drawing conclusions, ability to distinguish between fact and inference, and between subjective and objective judgments, and ability to analyze questions to determine why solutions are not readily obtainable. Possible correlates of interest in the present study include teacher characteristics, age, socioeconomic class, IQ, ethnicity, family size, birth order, sex, grade level, and scores on related tests of warranted uncertainty. Regression analyses are being used to determine the extent to which these variables predict scores on tests of ability to generate warranted uncertainty.

*Not supported by Center funds.

The assessment instruments and procedures for teaching pupils to generate and reduce warranted uncertainty were developed in part through an Affiliated Project funded by the U. S. Office of Education, Bureau of Educational Personnel Development from July 1, 1969 to December 31, 1970. The Affiliated Project consisted of an in-service training program entitled "Institute on Teaching for Reflective Thinking." Institute participants were trained to develop skills of teaching for reflective thinking and were assisted in the development of curriculum and the solving of teaching problems. The behavior of teachers who participated in the Institute, of 35 "control group" teachers, and of their respective students was studied. Videotapes of teacher behavior were obtained and analyzed through use of a system for coding pupil and teacher behavior. The system, developed last year to examine the extent to which teachers and pupils generate uncertainty in classroom discussions, has now been demonstrated to be reliable and germane to the aims of the project. Tests of the six thinking skills listed above were administered to more than 800 fourth-, fifth-, and sixth-grade students. These data are being analyzed both to explore the construct of the ability to generate warranted uncertainty, its correlates and predictors, and also to evaluate the results of three instructional experiments performed this year.

The instructional experiments, in which project Research Assistants served as teachers, tested the effectiveness of various techniques. This procedure was used to overcome problems encountered in classroom experiments in which the teacher was relied upon to provide the specified experimental treatment. The three experiments proceeded as follows:

(1) Role-playing skills of 64 fifth-grade students in problem recognition and hypothesis generation were examined in relation to student characteristics and the characteristics of the role-playing task. The role-playing tasks were experimentally varied as to the amount of uncertainty they were designed to evoke. A schedule for use by teachers or researchers in rating role-playing behavior, developed for use in the experiment, proved to be highly reliable. Data are now in the final stages of analysis.

(2) A series of units on art was developed along with relevant instructional methods. These units were designed to show the effects of two techniques of eliciting uncertainty (namely, cue attendance and hypothesis generation) under two stimulus conditions. This experiment was derived from the experiment reported in Research and Development Memorandum No. 49, "Relevant Subjective Response Uncertainty as a Function of Stimulus-Task Interaction," by Gavriel Salomon and Joan E. Sieber. A pupil-response rating schedule was designed to assess reflective thinking skills in art in relation to the four methods used in the experiment. The experiment was conducted over a six-week period with 128 fifth-grade students. Data are now being analyzed.

(3) An experiment was conducted to explore the effectiveness of various procedures for teaching students to distinguish between objective and subjective judgments. A series of lessons and instruments was devised and given to 40 fifth-grade pupils in this two-week experiment. Final analyses of the data are now being completed.

Various other curriculum materials have been developed for teachers in the project, but a systematic study of their effects could not be carried out. Finally, a model of mathematics learning based on Feather's analysis[1] of information-acquisition behavior has been devised and is being tested.

Project 0506: Personal Competencies

Project Leader: Carl E. Thoresen

Research Assistants: M. Michael Dansker, Virginia DuPraw

EPDA Postdoctoral Fellow: Dr. Theodore Alper*

Other Assistants: James Barrick*, Jana Floyd*, James Hannum*, Richard Jacks*, Jerry Tally*

In this project, a personally competent individual is defined as one capable of responding successfully to everyday problem situations. This capability is translated into observable actions by the individual

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[1]Norman T. Feather, "An Expectancy Value Model of Information-Seeking Behavior," Psychological Review, 1967, 74, 342-360.

*Not supported by Center funds.

when confronted with problem situations. A successful response is defined as one that produces positive consequences for the individual with a minimum of negative consequences for others. Actions include responses which take place inside the person as well as overt, observable responses. A personally competent third-grade teacher, for example, acts to decrease disruptive student behaviors in her classroom in ways that increase positive consequences for herself and do not increase negative consequences (in the long run) for the students. Over the long term, the actions of the personally competent individual produce positive experiences for himself and for others. The immediate as well as the continuing results of the teacher's specific actions in classroom problem situations are important in considering the effectiveness of her actions. Strongly aversive actions by the teacher, for example, may curtail the problem behaviors immediately but at a cost to herself and the students. Acting in punishing ways may increase rather than decrease the problem. Ignoring the problem, hoping it will "go away," may increase the intensity of the problem behaviors.

The perspective sought by the personally competent individual is the ability to see his own behavior and that of others as influenced by a variety of factors in any given situation. What one thinks, feels, perceives, says, i.e., how one acts, is affected by the actions of others and, in turn, influences the actions of others. Personal competencies include skills in behavioral analysis, description of one's own and students' behavior, intervention, and assessment. The third-grade teacher cited above, confronted with the problem of disruptive behavior, would first carefully analyze the problem situation. What are antecedents of the behavior? That is, what is going on that may be eliciting or bringing about disruptive behavior? Such an analysis would deal with the actions of the teacher herself, the students' actions, the physical setting of the classroom, and the work materials being used. And what are the consequences? What happens immediately after the disruptive behavior? Again careful attention would be given to the teacher's own actions as well as those of the students. This kind of behavioral analysis, leading to a detailed description of the problem situation, is then used in deciding on what actions may reduce the problem behaviors in ways that increase positive outcomes for the teacher and for the students.

During the past year, the conception of personal competence has been developed in ways that emphasize the individual's response capability and the specific actions taken in problematic situations. Can the individual analyze the situation, describe it carefully, decide on what actions to take, and demonstrate that positive consequences result from his actions, for himself and for others? There is, of course, no one best way of handling any situation. There are various ways, some of which differ significantly from each other in the consequences they produce for all involved.

The major activities of the Personal Competencies project this past year involved work with (a) 32 Stanford secondary teaching interns, (b) six in-service elementary teachers of the disadvantaged, and (c) four in-service junior high school counselors and one intern teacher. In addition, work continued on clarifying the concept of personal competence, on developing classroom observation forms, and on developing procedures for assessing the personal competence of teachers.

Stanford interns. During the summer of 1969, 32 interns in the social studies and English areas were selected and randomly assigned to one of four learning experiences. The objective was to find out if any brief intervention during the summer, before regular teaching started, would reduce the frequency and intensity of problems these interns would encounter in the fall quarter. (Stanford interns spend a summer of course work in education, including microteaching, and in their academic specialties before beginning regular part-time teaching assignments in the fall.) The experiences took the form of (a) a "self-help" group (N=7), in which the interns read materials dealing with such skills as physical relaxation, observation of behavior, reducing fears, and acting more assertively; (b) personal interviews with a counselor (N=7), focused on the interns' concerns about teaching and ways of modifying their concerns; (c) a group behavior seminar (N=10), which emphasized using the interns' own current, observable interactions in the group as a way of learning how to observe, describe, and change behavior; and (d) participation (N=8) in a class dealing with "crisis" situations.

Results were generally disappointing. None of the experiences seemed to prevent or reduce appreciably the problems experienced by

these interns during their first quarter of teaching, as measured by objective self-reports, classroom observations by trained observers, and structured personal interviews. The following conclusions seemed warranted: (a) Brief didactic interventions (such as having students read and discuss materials) are not effective in reducing problems encountered in the classroom. (b) The intern's own immediate behaviors "here and now" in problem situations he is actually experiencing should be a major focus in developing personal competence. (c) The intern's personal characteristics, such as a marked need for social approval, anxiety about assuming responsibility for others, or an inability to act assertively, determine how he deals with classroom problems. These individual characteristics must be specifically dealt with in helping each intern to be personally competent. (d) Guided practice, with examples, in learning how to deal with problem situations should be stressed.

Elementary school teachers. Work this year has also been aimed at finding ways of retraining teachers to be more personally competent and to provide students with a more positive classroom environment. Six volunteer elementary school teachers were trained in more effective ways of working with their students, all of whom were black. These teachers expressed a need for learning how to relate better to students, to be more relaxed, and to present academic materials more effectively. Classroom observations revealed high rates of non-task-oriented student behaviors, such as being out of seat, talking out, and inattention. Observations also indicated that the teachers were generally ignoring students, and seldom being positive.

The plan was first to train the teachers to be more physically relaxed in the classroom when stressful situations occurred, on the grounds that only after these teachers had learned how to reduce tension could they learn to observe both their own and others' behavior more carefully and change their behavior. The next step was to train the teachers in classroom management skills, namely, skills in observing classroom interaction, analyzing classroom problem situations, changing student problem behavior, and increasing students' academic motivation.

The results of this work have been highly encouraging. The frequency and magnitude of undesirable student behavior--talking out, being out of seat, being inattentive, etc.--in these classrooms decreased significantly. While not all six teachers showed equal changes, there was evidence of improvement in all cases. The teachers experienced more self-control of their actions and an increased sense of competence in dealing with problems.

Developmental aspects of this work include the production of a classroom behavior observational system, a system for observing the teacher's nonverbal behavior, and a system for training teachers in classroom management. These will be presented in a Technical Report.

Counselors. Four junior high school counselors and one intern teacher interested in counseling volunteered to learn how to be more personally competent in helping teachers with their problems. The skills of behavioral consulting were taught, involving the steps of problem definition, data collection, planning, carrying out a change project, and evaluation. Each counselor carried out two consultations with teachers and tried to evaluate systematically the effectiveness of his consultation. Whereas, in past years, these counselors had felt somewhat incompetent in working with teachers, they were now both willing and able to handle many teacher requests. Projects included helping teachers increase the frequency of voluntary student participation in several classrooms, decreasing disruptive behavior in a music class, assisting a teacher in reducing a student's extreme fear of singing, and increasing the frequency of positive statements by a teacher.

The project has demonstrated the feasibility and value of developing planned training experiences to help school counselors increase their personal competencies in interacting with teachers.

Other activities. Because of equipment problems and a change in research plans, the measurement of physiological responses of teachers was postponed to the 1970-71 academic year.

Currently, work is being conducted on techniques for improving the self-regulation of behavior--both external and internal, or covert, be-

havior. The general goal is to create ways in which a person can control his internal and external responses to problem situations. The emerging model of personal competence uses knowledge and hypotheses from behavioral psychology to serve goals articulated by humanistically oriented psychologists and philosophers. Can we create learning experiences that will provide competencies which individuals, such as teachers and counselors, can use to act in more humanistic ways with others? The project will continue to seek answers to this question.

Project 0507: Effective Reinforcement for Achievement Behaviors in Disadvantaged Children

Project Leader: Pauline S. Sears

Research Assistants: Mobolaji Adenubi, Marianne Bloch, Judith Hubner

The purpose of this project is to delineate teaching skills which contribute to enhanced school achievement in young, black, disadvantaged children. A reasonable hypothesis, it appears, is that children differing in motivational characteristics need somewhat different treatment by their teachers in order to achieve most effectively. The two motivational variables selected for study are self-concept and belief in internal control of reinforcement. The project seeks teacher behavior conducive to these student attitudes as well as student behavior which interacts with the attitudes so as to produce achievement gains.

In the first phase of the project, conducted during the past year, six third-grade classrooms in a predominantly black area participated. The children were tested in the fall and the spring on self-concept, belief in internal control, and achievement. Social distance measures were obtained once. Teachers rated the children twice and wrote anecdotal reports weekly during the spring.

A comprehensive schedule for observing teacher-child interaction has been devised and used. This schedule is intended to quantify the interactions considered relevant to the study's purpose. Observer reliability, and ranges of frequency of given behaviors in the six classrooms, have been determined. Estimates of the split-half consistency of behavior will be calculated.

During the summer of 1970, the data will be subjected to a regression analysis aimed at discovering teacher behaviors which contribute to (a) effective achievement gains, (b) enhanced self-concept, and (c) development of beliefs in internal control of reinforcement. Dr. Henry Levin and Dr. Richard Snow are participating in planning the data analysis.

In the second phase, results from this first phase will be incorporated into training procedures now being planned. During the coming year, biweekly workshops will be conducted for two groups of teachers. One group will focus on the development of effective reinforcement conditions in the classroom, differentially adapted to children according to their identified motivational characteristics. Another group will participate in an equal number of workshops in the field of science, with no emphasis on shaping of motivation for achievement. The latter workshops will be conducted with the consultation of Dr. Paul Hurd. Children in the classrooms of both groups will be tested as in Phase 1, and the effects of the training workshops on both children and teachers will be compared.

Phase 3 will consist in the development, tryout, evaluation, and dissemination of training procedures found to be effective.

SUPPORT SERVICES

Project 0701: Publication and Dissemination Unit

Coordinator: Bruce Harlow

The Publication and Dissemination Unit is responsible for preparing the required reports to the National Center for Educational Research and Development, for editing, producing, and distributing the Center's publications, for assisting in product development, and for disseminating information about the Center's work in various ways.

A list of Center publications issued during 1969-1970 appears on pages 110-114. A complete list of Center publications and films is available on request.

During the year the Unit published and distributed two new items which made information about the Center available to a much wider audience than that previously reached. The first is a 16-page brochure describing the Center's mission, programs, projects, products, organization and administration, and staff. The second is the initial issue of a newsletter, Teaching, which provides news of Center activities and summaries of the content and results of a number of Center studies. Teaching will appear at irregular intervals as the Center's budget permits. Both publications were sent to (a) the Center's basic mailing list of some 900 names; (b) directors of teacher education at all of the member institutions of the American Association of Colleges of Teacher Education; (c) members of Division C (Learning and Instruction) of the American Educational Research Association; (d) all Title III Centers; (e) editors of educational journals and education editors of major newspapers; and (f) the superintendents of selected school districts. The subsequent flow of requests for Center publications, information about Center projects, and additions to our mailing list has provided gratifying evidence of the widespread interest in the work of the Center.

The Unit continues to mail announcements of its publications to those on its basic mailing list, with an invitation to request single

copies while the supply lasts. This procedure is the best means yet devised for ensuring that the copies of our publications remaining after the initial distribution to some 100 recipients will go where they will be of most use. However, the limitations imposed by federal restrictions on the number of copies produced, coupled with budgetary restraints, prevent the Center from reaching many potential readers, including libraries, to the desired extent. These limitations are in part compensated for by the processing of Center publications through the ERIC system and their subsequent listing in Research in Education. However, delays in ERIC processing frequently result in a significant time lapse between the date of Center publication and the date when Center materials become available through ERIC.

An article on the Center appeared in a "School of Education News" supplement to the May 1970 Stanford Observer, which is distributed to over 118,000 Stanford alumni, members of the Stanford community, and high schools and news services across the country.

Dissemination was further aided by the conclusion of arrangements for commercial publication of three books based on Center Technical Reports. These titles, which are in the public domain, were scheduled for early publication by the Center for Curriculum Development, Inc. They are Practice-Centered Teacher Training: French, by Robert L. Politzer; Practice-Centered Teacher Training: Spanish, by Diana E. Bartley and Robert L. Politzer; and The Successful Foreign Language Teacher, by Robert L. Politzer and Louis Weiss.

The Center continues to attract visitors from the United States and abroad. Visitors are interviewed to determine their particular interests and are seen by Center staff members and supplied with relevant Center publications.

During the year the Center received news of the revised U. S. Office of Education copyright guidelines effective June 8, 1970, which provide for the retention by USOE contractors of 50 percent of the royalties received on materials published under limited copyright by commercial publishers under procedures approved by the Office of Education. The Center is preparing recommendations for a Stanford University policy with respect to the use to be made of such royalties.

Project 0702: Advisory Panel

Coordinators: Robert N. Bush, N. L. Gage

The members of the Center's National Advisory Panel, whose names and affiliations are listed elsewhere in this report, met with Center staff on February 19-20, 1970. The Panel produced a list of recommendations which, as indicated in the Descriptive Overview, have received close attention as the Center has engaged in planning for sharpening and tightening its operations.

Project 0703: Educational Media Unit

Coordinator: Bruce Harlow

Educational Media Specialist: Hugh A. McAllorum

During the past year the Unit was able to improve its service capabilities considerably. A number of new one-inch Ampex videotape recorders were purchased to replace recorders of other types which had deteriorated to the point at which repair costs were becoming prohibitive. The Ampex equipment allow the Unit to standardize on the kind of equipment most widely used throughout the country.

The Unit has also acquired two studio-type viewfinder cameras. These will be used for in-house production of demonstration and mod videotapes and will be moved to the film and television studio in Center's new building.

A package of equipment has been assembled into a "Porta-Studio." This portable package, capable of accepting two cameras and two microphones, can be used for superimposition, split-screen photography, matting, "wipes," "fades," and audio mixing.

A new portable field recording unit (videotape cart) has been designed and constructed as the prototype for portable recording units to be used in the future. The new cart accommodates two cameras, three monitors, a videotape recorder, a camera switcher, an audio mixer, and a special effects generator which allows for split-screen photography. The cart can be wheeled into a tight area and set up in approximately four minutes. It provides improved shock protection for all mounted equipment and is more compact than the carts currently being used for field recording.

Work has gone forward on dubbing videotapes from the existing videotape library onto reels usable with the new Ampex equipment. The Unit has also assisted with the improved videotape cataloging system developed by the project on Microteaching and Intern Data Bank.

Accounting procedures for charging an appropriate part of the cost of videotaping to specific projects within the Center have been improved.

The Unit is now able to (a) monitor classroom activity through the use of a camera and a monitor, (b) record audio and video on tape for instant playback or storage, (c) use split-screen technique with two camera shots on one screen, e.g., teacher and students, (d) provide playback in slow motion, (e) use audio override placing commentary track onto videotape without erasing original audio, e.g., a supervisor commenting on an intern's tape, (f) dub videotapes, (g) produce model and demonstration tapes, and (h) provide portable battery-operated units for videotaping outside situations, e.g., physical education or other outdoor classes, and locations inaccessible to the wheeled videotape cart. In addition, the Unit offers the usual range of conventional audiovisual services to the Center. The Educational Media Specialist has continued to participate in the planning of media facilities for the new building.

Project 0704: Methodology Unit

Coordinator: Janet D. Elashoff

Research Assistants: John Burke, Akimichi Omura

The Methodology Unit is responsible for assisting other Center projects with research planning, data analysis, and computer-based data processing. Staff members consult with Center project staffs, maintain and develop a social sciences computer program library, and conduct methodological research.

The Unit has continued to provide consultation services for research design and analysis and to handle the details of computer-based data processing for the Center. Among the projects given extensive assistance were Small Group Interaction (Hawkinshire); Teacher Training: Standard English as a Second Dialect (Politzer); Training Studies (Snow); Uncertainty Studies (Suppes); Teacher Leadership Development Institute (Bush, Callison).

The computer program library continues to be updated and revised. A major series of programs was developed for the Monte Carlo investigation of the outlier model. The model studied was an ordinary linear regression model in which a certain percentage of the errors around the regression line were assumed to have a bias depending on the value of the independent variable; in other words, outliers from the regression line were assumed to have a quadratic relationship with the independent variable. Programs were developed for use by the administrative section in budgeting. Several large programs from other universities were modified for use at Stanford by projects in the Heuristic Teaching program. Two tapes from other organizations were decoded and reformulated for Center processing.

The Methodology Unit continues to develop new statistical procedures to meet the data analysis needs of the Center. Projects recently completed include a review of literature on techniques for the description of individual growth curves when serial correlation exists, and the exploration of a model for outliers in regression analysis. A quadratic outlier model was proposed for linear regression problems, and a Monte Carlo study was made of the small sample properties of the maximum likelihood estimators of the parameters in the model. These estimators performed well in samples as small as 21 and were robust in the face of inaccurate specification of the mixing parameter.

Research projects still continuing include a review of the literature on statistical techniques for the description of group growth curves when serial correlation exists, an investigation of dichotomous response problems with missing data, and the development of methods for searching for patterns in sequences of behaviors.

AFFILIATED PROJECTS AND VISITING SCHOLARS

Certain members of the Center staff sometimes have the opportunity to direct projects funded from sources other than the Center's contract with the National Center for Educational Research and Development. When such projects have objectives which directly support the Center's own goals, they are identified as Affiliated Projects of the Center. One such project, the Institute on Teaching for Reflective Thinking, is described as part of Project 0504, Uncertainty Studies. A report on other Affiliated Projects follows.

1. Stanford Teacher Leadership Development Institute

Project Director: Robert N. Bush

Associate Director: William L. Callison

The direction and focus of activities of the Stanford Institute for Teacher Leadership Development (TLD), which is supported by the Bureau of Educational Personnel Development (BEPD) of the U. S. Office of Education, changed significantly in the fall of 1969 as a consequence of revised fiscal and program priorities established by BEPD. At that time, members of the TLD Advisory Panel, in consultation with Don Davies, Associate Commissioner of BEPD, and other key BEPD Program Officers, reassessed the Institute's plan of operation and suggested alternative and appropriate TLD activities. Accordingly, the original plans were not implemented.

The first-year funding for TLD projects in the field was minimal and the number of funded projects was drastically reduced from approximately 35 to six. Hence, the Institute did not sponsor a week-long training workshop for Project Directors originally planned for March 1970, a series of regional meetings for Project Directors scheduled as follow-up to the workshop, or an Executive Committee meeting planned for January 1970.

Instead, a revised set of TLD activities were carried out. In September 1969, a TLD subcommittee was created to assist BEPD in establishing draft guidelines for an Urban/Rural School Development Program (U/RSDP). Later in September, the subcommittee convened to discuss viable channels of assistance to BEPD in its efforts to create the pro-

posed Urban-Rural program. In January 1970, members of the U/RSDP Task Force from the U. S. Office of Education met with representatives of the TLD-U/RSDP Subcommittee and with educational personnel from Stanford University, the University of California at Santa Cruz, Cabrillo Junior College, San Francisco Unified School District, and Pajaro Valley Unified School District to obtain meaningful and substantial information concerning urban-rural school problems and recommendations for suggested U/RSDP program guidelines.

Since January 1970, the Institute has commissioned outside educational professionals to write a series of position papers addressed to the central issues and concerns of the Urban/Rural School Development Program. These position papers have been received by BEPD program officers and used in final preparation of U/RSDP guidelines.

The Institute is closing TLD activities with an educational personnel conference for the Council of Chief State School Officers, scheduled for July 30-August 7, 1970, in Palo Alto, California. The conference will focus on (a) recent research and innovation in preservice and in-service teacher education; (b) allocation and organization of educational personnel; (c) accountability, evaluation, and performance contracting; (d) the teaching-learning process; and (e) group dynamics.

The primary objective of this conference is to make chief state school officers aware of recent and possible future developments relating to educational personnel so that they may be more competent in their decision-making roles in their respective states.

In response to suggestions from BEPD, the Stanford TLD Institute has applied for federal funds to create a Leadership Training Institute for the new Urban/Rural School Development Program of BEPD. The ultimate goal of the U/RSDP is to provide in-service, on-site teacher-training programs to assist teachers in improving students' reading and computational skills and their self-concepts. The first year's operation of the Stanford LTI would be directed toward helping some 35 schools develop decision-making structures and toward preparing operational designs for this training. In addition, the Stanford LTI would make policy recommendations to BEPD.

If the Stanford application is accepted, as expected, the Executive Board of SCRDT will be asked to determine whether this new project (to be directed by R. D. Hess) should become an Affiliated Project of the Center.

2. Survey of the Literature on the Relationship between Teacher Variables and Student Achievement

Project Director: N. L. Gage

This project is being supported by the International Association for the Evaluation of Educational Achievement (IEA), whose office is located in Stockholm, Sweden. During the present year, the project proceeded along the lines planned. Dr. Barak Rosenshine of Temple University, a former research assistant at SCRDT, completed in November the review of the literature on relationships between teacher behavior and student achievement that had been commissioned by SCRDT and IEA. This review will be published as a monograph, Teaching Behavior and Student Achievement.

In March, a conference was held at the Center in which Drs. Arno Bellack (Teachers College, Columbia University), Benjamin S. Bloom (University of Chicago), Arthur W. Foshay (Teachers College, Columbia University), N. L. Gage (SCRDT), Torsten Husen (University of Stockholm and IEA), Barak Rosenshine (Temple University), and Richard E. Snow (SCRDT) participated. The criticisms and suggestions emerging at that conference were used by Drs. Foshay and Gage in writing a second version of "A Proposal for an International Study of Teacher Behavior and Classroom Environment in Relation to Student Achievement" (the first version having been drafted at IEA in Hamburg, West Germany, in November 1968). The second draft was submitted to the IEA in Stockholm for international circulation. It incorporated in a new conceptual framework (a) the dimensions of teacher behavior found by Rosenshine's review to be promising as correlates of student achievement and (b) illustrative items for students' and teachers' questionnaires to be used in obtaining measures of these dimensions of teacher behavior.

After this version of the proposal had been reviewed, a second conference was held on June 22--26, in London, at the National Foundation

for Educational Research in England and Wales. At this conference, the participants were Drs. Foshay, Gage, and Rosenshine (from the U. S. A.), Douglas Pidgeon, Philip Taylor, and Gilbert Peaker (of the United Kingdom), T. Neville Postlethwaite of IEA, and Herman Wold of the University of Uppsala. This conference resulted in a third version of the proposal, prepared at IEA in Stockholm. At present writing, this version is being reviewed by the participants in the conference and others. When the results of this round of criticism are incorporated into the proposal, it will be submitted to the IEA Council's Meeting in October. If it is approved by the IEA Council, the IEA will undertake to secure financial support for the proposed international multi-nation investigation.

3. Training Instructional Teams for a Differentiated Approach to Learning

Project Directors: Robert H. Koff and Richard J. Shavelson

A grant for this project was approved by the Bureau of Educational Personnel Development (USOE) in May 1970, and the project was approved as an Affiliated Project of the Center in June 1970. Its purpose is to develop and evaluate a practical method for training and retraining teachers to work in teaching teams, in which each teacher's role is differentiated according to his aptitudes. The project will develop and evaluate protocol materials for training preservice and in-service teachers in group dynamics. Also, research will be conducted on the interaction between teacher aptitudes and their roles in instructional teams. Work on the project began on July 1, 1970.

4. The Development of Protocol Materials on Teacher Behavior, Student Behavior, and Teacher-Student Interaction in Classrooms

Project Director: N. L. Gage

Assistant Project Director: David C. Berliner

Research Assistants: Leonard Beckum*, Mary Ann McGivern*

On May 1, in response to an earlier invitation from the Bureau of Educational Personnel Development (BEPD) of the U. S. Office of Education,

*Not supported by Center funds.

N. L. Gage submitted a proposal, written by him and Walter Borg of the Far West Laboratory for Educational Research and Development, for the project whose title appears above. The invitation came as part of a new effort by BEPD to prepare materials usable in improving teachers' ability to understand and interpret educational phenomena. Such materials, termed "protocol" materials, were to be distinguished from "training" materials, which were intended to be used in improving the teacher's ability to perform a certain kind of behavior or skill.

The proposal benefitted from the assistance of Robert Koff. Preliminary ideas were submitted by Robert Heath, Richard Krasno, and Frank Sobol. In brief, the proposal was to develop packages of protocol material on four components of teacher behavior, each represented by two categories: (a) drive-arousing behaviors (task orientation and enthusiasm); (b) cue-providing behaviors (organization and variety); (c) response-eliciting behaviors (questioning and probing); and (d) rewarding behaviors (approval and feedback). Each of these eight categories will be represented by a package consisting of a film, an instructor's guide, and evaluation material indicating how the package should be used in the teacher education program. The packages will be field tested in both preliminary and final versions. The various phases of the project will be carried out by either the Center or the Far West Laboratory, each collaborating with the other. Drs. Gage and Borg will supervise the project, but operational direction of the work will be carried out by Dr. Berliner.

The proposal was accepted and a one-year contract between the Center and BEPD was negotiated, providing $60,000 for the project. Approximately half of this amount will be expended by the Far West Laboratory under a subcontract with the Center. On June 24, 1970, the Center's Executive Board accepted the undertaking as an Affiliated Project of the Center.

5. Teachers' and Pupils' Cognitive Preferences in Mathematics

Project Director: Robert W. Heath

Work on this project, originally funded under the earlier Center formulation as Project 0202, was carried on during the year without

Center funding other than a portion of the Project Director's time. Assistance was received from other sources including the Educational Testing Service and the University of Illinois.

This study is intended to investigate the relationships between mathematical aptitude, preference for a mode of presentation of mathematical ideas, actual mode of presentation, and achievement. In the study, the modes of presentation were graphic, symbolic, and verbal. That is, a given idea, such as the Pythagorean theorem, was presented in a geometric figure, a set of algebraic symbols, or words. The study consisted of three experiments, each on a different topic: (a) the concept of area, (b) the commutative principle in multiplication, and (c) percent. Fifth-grade students (N=586) from schools in Humboldt County and Fremont, California, were given a General Mathematics Test and a Cognitive Preferences Inventory developed by the project staff. The students were assigned to 24 (3 x 8) groups of about 24 students each. The 24 groups were formed by making all of the possible combinations of three levels of mathematical aptitude (high, middle, low) and eight (2^3) patterns of cognitive preference (high or low on each of the three modes of presentation). Each of these 24 groups was randomly divided among the nine (3 modes of presentation x 3 topics) cells mentioned above. The instructional presentation consisted of films prepared earlier in the project. An achievement test specific to the subject matter of a given experiment was administered following instruction.

The data have been collected and are being analyzed and interpreted. The correlations of preference with achievement have been determined. Preliminary analyses included regression analysis (prediction of achievement from combinations of aptitude, preference, and presentation) and analysis of variance for these variables. Further statistical work is directed toward tracing the effects of teaching mode and cognitive preference on achievement.

5. Visiting Scholars

Two Visiting Scholars interacted during the year with members of the Center staff on matters pertinent to its program and projects. David R. Olson, Department of Applied Psychology, Ontario Institute for Studies in Education, worked in three areas: He completed Cognitive Development: The Child's Acquisition of Diagonality (Academic Press, 1970, in press). He completed the draft of a monograph, "Teacher-Student Communication Games: Some Experiments on Instruction." Following an earlier theoretical paper, "Language and Thought," he initiated studies with Nikola Filby and H.H. Clark on the verification of active and passive sentences.

Dr. Karl-Gustaf Stukát, University of Göteborg, Sweden, reviewed the European literature on the problem of the nature and treatment of the mentally retarded. Subsequently, he worked on the problem of individualized instruction and its role in planning for schools in Sweden. He visited several such projects in this country and prepared a summary and evaluation of these projects. During the course of the year he was also able to work out the major parts of a text book on educational psychology suitable for Swedish undergraduates.

PROFESSIONAL STAFF (RESEARCH AND DEVELOPMENT ASSOCIATES)

C. Norman Alexander, Assistant Professor of Sociology. B. A., Sociology, University of Alabama, 1961; M. A., Sociology, University of North Carolina, 1963; Ph. D., Sociology, University of North Carolina, 1965. General interests: Social perception and the effects on attitudes and behaviors of role relationships and normative milieux.

J. Victor Baldridge, Assistant Professor of Education and Sociology. B. A., Sociology, Lambuth College, 1963; B. D., Social Ethics, Yale University, 1966; Master of Philosophy, Sociology, Yale University, 1967; Ph. D., Sociology, Yale University, 1968. General interests: Applying sociological theories of complex organization to academic governance in universities; development of a theory of organizational change and adaptation.

Robert N. Bush, Professor of Education, Director of SCRDT (on leave 1970-71). A. B., History and Political Science, Colorado State College, Greeley, 1935; M. A., History and Political Science, Colorado State College, Greeley, 1937; Ed. D., Higher Education, Stanford University, 1941. General interests: Teacher education, secondary education, teacher personnel.

Elizabeth G. Cohen, Associate Professor of Education and Sociology, Coordinator, Environment for Teaching Program (effective August 1, 1970). B. A., Psychology, Clark University, 1953; M. A., Sociology, Harvard University, 1955; Ph. D., Special fields (social stratification and socialization of the child), Harvard University, 1958. General interests: Race and education; client orientation in teachers as a function of organizational arrangements.

Sanford M. Dornbusch, Professor of Sociology. B. A., Sociology, University of Syracuse, 1948; M. A., Sociology, University of Chicago, 1950; Ph. D., Sociology, University of Chicago, 1952. General interests: Formal organizations and social psychology.

Janet D. Elashoff, Assistant Professor of Education. B. S., Statistics, Stanford University, 1962; Ph. D., Statistics, Harvard University, 1966. General interests: Experimental design and analysis; robustness of statistical techniques to failure of assumptions.

N. L. Gage, Professor of Education and Psychology, Chairman of the SCRDT Executive Board (Acting Director, 1970-71). A. B., Psychology, University of Minnesota, 1938; Ph. D., Psychology, Purdue University, 1947. General interests: Theories of teaching; person perception; correlates in teacher behavior of effects on student achievement.

Frank B. W. Hawkinshire, Assistant Professor of Education. A. B., Criminology, University of California at Berkeley, 1957; Master of Criminology, University of California at Berkeley, 1959; Ph. D., Social Psychology, University of Michigan, 1967. General interests: Strategy and tactics of planned change; developing and implementing new techniques for training pre- and in-service teachers; training professionals to work effectively with socially disturbed children.

Robert W. Heath, Research and Development Associate, Education. B. S., Psychology, Purdue University, 1954; M. S., Psychology, Purdue University, 1955; Ph. D., Psychology, Purdue University, 1957. General interests: The social psychology of education; development of research methodology; relation of social, political, and economic change to changes in educational goals and practices.

Robert D. Hess, Professor of Child Education, Professor of Psychology, Acting Chairman of the SCRDT Executive Board (1970-71), Coordinator, Program on Teaching the Disadvantaged. A. B., Psychology, University of California at Berkeley, 1947; Ph. D., Committee on Human Development, University of Chicago, 1950. General interests: Socialization, particularly the relationship between social structure and behavior; child and adolescent development; family interaction; early cognitive development; political socialization.

Robert H. Koff, Assistant Professor of Education, Director, Stanford Teacher Education Program. A. B., Psychology, University of Michigan, 1961; A. M., Educational Psychology, University of Chicago, 1962; Ph. D., Educational Psychology, University of Chicago, 1966. General interests: Theories of teaching; interpersonal dynamics in instruction; social interaction.

Henry M. Levin, Associate Professor of Education and Affiliated Faculty of the Department of Economics. B. S., Economics, New York University, 1960; M. A., Economics, Rutgers University, 1962; Ph. D., Economics, Rutgers University, 1967. General interests: Economics of education; school finance, decentralization of large-city school districts.

John W. Meyer, Assistant Professor of Sociology. B. A., Psychology, Goshen College, 1955; M. A., Sociology, University of Colorado, 1957; Ph. D., Sociology, Columbia University, 1965. General interests: Methodology; social stratification; political sociology; sociology of education; formal organizations.

Robert L. Politzer, Professor of Education and Romance Linguistics. B. A., Romance Languages, Washington University, 1941; M. A., Romance Languages, Washington University, 1942; Ph. D., Romance Philology, Columbia University, 1947; D. S. Sc., Political Science and Economics, New School for Social Research, 1950. General interests: Historical and descriptive linguistics; applied linguistics; education research in foreign language education; language learning.

W. Richard Scott, Professor of Sociology. A. B., Sociology, University of Kansas, 1954; M. A., Sociology, University of Kansas, 1955; Ph. D., Sociology, University of Chicago, 1961. General interests: Study of formal organizations; professional groups; authority and evaluation processes.

Pauline S. Sears, Professor of Education. A. B., Psychology, Stanford University, 1930; M. A., Guidance, Teachers College, Columbia University, 1931; Ph. D., Psychology, Yale University, 1939. General interests: Child development.

Richard J. Shavelson, Lecturer in Education and Research and Development Associate, Education (effective July 1, 1970). B. A., Psychology, University of Oregon, 1964; M. A., Psychology, San Jose State College, 1967; Ph. D. candidate, Educational Psychology, Stanford University (degree expected January 1971). General interests: Research on human learning and memory; research on instruction.

Richard E. Snow, Associate Professor of Education, Coordinator, Heuristic Teaching Program. B. A., Psychology, University of Virginia, 1958; M. S., Psychology, Purdue University, 1960; Ph. D., Psychology, Purdue University, 1963. General interests: Psychological research on individual differences, particularly human abilities as related to learning; research on media and methods of instruction, including the behavior of human teachers; visual media for instructional and research purposes.

Joan Sieber Suppes, Assistant Professor of Education. B. S., Education, University of Delaware, 1962; M. A., Psychology, University of Delaware, 1964; Ph. D., Psychology, University of Delaware, 1965. General interests: Cognitive development--variables accounting for individual differences in curiosity, decision making, and problem solving.

Maria D. Tenezakis, Research and Development Associate, Education. Diploma, Philology, University of Athens, Greece, 1950; Ph. D., Child Psychology, University of Athens, Greece, 1953; Diploma of Studies in Clinical Psychology, Institute of Psychology, University of Paris, France, 1957. General interests: Factors (in socializers and socializees) and processes underlying the formation of attitudes toward authority; antecedents and implications of changes in attitudes toward authority.

Carl E. Thoresen, Associate Professor of Education. A. B., History, University of California at Berkeley, 1955; M. A., Education, Stanford University, 1960; Ph. D., Counseling Psychology (Education), Stanford University, 1964. General interests: Experimental research in individual and group counseling-psychotherapy techniques; "systems" techniques in professional education training; behavioral-environmental analysis and modification strategies.

Paul Wallin, Professor of Sociology. B. A., Psychology, University of Manitoba, 1930; M. A., Psychology, University of Toronto, 1933; Ph. D., Sociology, University of Chicago, 1942. General interests: Sociology of education; social stratification; family; research methodology.

Richard L. Warren, Research and Development Associate, Education, Coordinator, Environment for Teaching Program (1968-70). B. A., Philosophy, Harvard University, 1947; M. A., History, Peabody College for Teachers, 1950; Ph. D., Stanford University, 1966. General interests: Anthropological perspectives on educational institutions.

EXECUTIVE BOARD

Robert N. Bush (on leave, 1970-71)
Elizabeth G. Cohen (effective August 1, 1970)
N. L. Gage
Bruce Harlow
Robert D. Hess, Acting Chairman (1970-71)
Robert H. Koff
Joan Marks (effective June 1, 1970)
Philip C. McKnight (1969-70)
Richard E. Snow
Frank T. Sobol (effective June 1, 1970)
Jack E. Thomas (1968-70)
Richard L. Warren (1968-70)

NATIONAL ADVISORY PANEL

James W. Brown, Dean, Graduate Studies and Research, San Jose State College

John B. Carroll, Senior Research Psychologist, Center for Psychological Studies, Educational Testing Service

Francis S. Chase, Professor of Education and Dean Emeritus, Graduate School of Education, University of Chicago

John K. Hemphill, Director, Far West Laboratory for Educational Research and Development

Ernest R. Hilgard, Professor Emeritus of Psychology and Education, Stanford University

Wilson C. Riles, Deputy Superintendent, Program and Legislation, California State Department of Education (on leave of absence until January 1971)

Robert M. Rosenzweig, Associate Provost, Stanford University

R. Nevitt Sanford, Director, Institute for the Study of Human Problems

Harold T. Santee, Superintendent, Palo Alto Unified School District

Wilbur Schramm, Janet M. Peck Professor of International Communication, Professor of Education, Director, Institute for Communication Research, Stanford University

B. Othanel Smith, Chairman, Department of History and Philosophy of Education, University of Illinois

Neil V. Sullivan, Commissioner of Education, Commonwealth of Massachusetts

LIST OF RECENT PUBLICATIONS

(Note: The following is a list of Center publications issued from July 1969 through July 1970. A complete list of Center publications, including Center-related books, journal articles, papers, and doctoral dissertations, is available on request.)

Research and Development Memoranda

51) Paulson, F. L. A system for the presentation of a concept-learning problem to fifth- and sixth-grade children. July 1969. (ED 034 278)

52) Engle, Patricia L., & Sieber, Joan E. The relation between human figure drawing and test anxiety in children. September 1969. (ED 034 705)

53) Sieber, Joan E., Kameya, L. I., & Paulson, F. L. The effect of memory support on the problem-solving ability of test-anxious children. September 1969. (ED 034 704)

54) Politzer, R. L., & Bartley, Diana E. Standard English and nonstandard dialects: Elements of syntax. October 1969. (ED 034 977)

57) Baldridge, J. V. Organizational change processes: A bibliography with commentary. January 1970. (ED 036 908)

58) Baldridge, J. V. Images of the future and organizational change: The case of New York University. January 1970. (ED 037 184)

59) Heath, R. W., & Roy, L. Interviews with seven black high school students. December 1969. (ED 037 400)

60) Sieber, Joan E., & Crockenberg, Susan B. The teacher and the anxious child. January 1970.

61) Politzer, R. L., & Bartley, Diana E. Teaching standard English as a second dialect: Suggested teaching procedures and sample microlessons. March 1970.

62) Meyer, J. W. High school effects on college intentions. February 1970. (ED 036 907)

63) Levin, H. M. A new model of school effectiveness. May 1970.

64) Sieber, Joan E., Epstein, Marilyn, & Petty, C. Teaching children to indicate uncertainty and to discriminate between problematic and nonproblematic statements. March 1970.

65) Meyer, J. W. The charter: Conditions of diffuse socialization in schools. May 1970.

66) Warren, R. L. Implications of ethnographic approaches for teacher training programs. May 1970.

67) Politzer, R. L., & McMahon, Sheila. Auditory discrimination performance of pupils from English- and Spanish-speaking homes. July 1970.

68) Heath, R. W., Roy, L., & Mack, Delores. Evaluation of an E.P.D.A. institute, "Teachers for Multicultural Education." July 1970.

Technical Reports

8) Berliner, D. C. Microteaching and the technical skills approach to teacher training. October 1969. (ED 034 707)

9) Millett, G. B. Comparison of training procedures for promoting teacher and learner translation behavior. November 1969. (ED 035 600)

10) Heath, R. W. The ability of white teachers to relate to black students and to white students. February 1970. (ED 037 399)

11) Koran, J. J., Jr. The relative effects of imitation versus problem solving on the acquisition of inquiry behavior by intern teachers. May 1970.

Books, Book Chapters, Journal Articles, and Papers

Baldridge, J. V. Power and conflict in the university. New York: John Wiley, in press.

Brod, R. L. Occupational socialization and teacher autonomy. Paper presented at the meeting of the California Educational Research Association, San Francisco, April 1970.

Bush, R. N. The status of the career teacher: Its effect upon the teacher dropout problem. In T. M. Stinnett (Ed.), The teacher dropout. Report of a Symposium Sponsored by the Commission on Strengthening the Teaching Profession of Phi Delta Kappa with the Cooperation of the NEA National Commission on Teacher Education and Professional Standards. Itasca, Ill.: F. E. Peacock Publishers, Inc., 1970. Pp. 111-135.

Claus, K. E., Nicholson, S. J., & Snow, R. E. Aptitude-treatment interaction in teacher acquisition of higher-order questioning skills. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Engle, P. L., & Suppes, J. S.* The relation between human figure drawing and test anxiety in children. Journal of Projective Techniques and Personality Assessment, 1970, 34(3), 223-231.

*Joan Sieber Suppes.

Feldman, D. H., & Sears, P. S. Effects of computer-assisted instruction on children's behavior. Educational Technology, 1970, X(3), 12-14.

Gage, N. L. Contemporary formulations of the learning-teaching process. In R. Saxe (Ed.), Educational comment, 1969: Contexts for teacher education. Toledo, Ohio: College of Education, University of Toledo, 1969. Pp. 87-93.

Gage, N. L. Teacher effectiveness and teacher education: The search for a scientific basis. Palo Alto, Calif.: Pacific Books, 1970, in press.

Gage, N. L. What sort of teachers are needed [for moral education]? Moral Education, 1969, 1(3), 33-36.

Hanushek, E., & Levin, H. M. Design of a school information system. For the Rand Corporation. December 1969.

Hess, R. D. The computer as a socializing agent. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Katz, L. G. Children and teachers in two types of head start classes. Young Children, 1969, 24(6), 342-349. (ED 036 039)

Koff, R. H. Crisis in content in teacher education. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Levin, H. M. Academic achievement and post-school opportunity. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Levin, H. M. (Ed.) Community control of schools. Washington, D. C.: The Brookings Institution, 1970.

Levin, H. M. A cost-effectiveness analysis of teacher selection. Journal of Human Resources, Winter 1970, 24-33.

Levin, H. M. Financing education for the urban disadvantaged. For the Committee on Economic Development, November 1969. To be published by CED.

Levin, H. M. A new model of school effectiveness. In A. M. Mood (Ed.), Do teachers make a difference? Washington, D. C.: U. S. Office of Education, 1970.

Levin, H. M. Social science findings and strategies for legal remedy. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Levin, H. M., & Osman, J. W. Alternative approaches for state support of independent higher education in California. Report to the Coordinating Council for Higher Education in the State of California. February 1970.

Lopossa, B. A comparative study of team and individual decision making. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Meyer, J. W. The charter: Conditions of diffuse socialization in schools. In W. Richard Scott (Ed.), Social Processes and Social Structures. New York: Holt, Rinehart and Winston, 1970.

Meyer, J. W. High school effects on college intentions. American Journal of Sociology, 1970, 76(1), in press.

Olson, D. R., Case, D. C., & Wine, W. Teacher-student communication games: Some experiments on instruction. Mimeographed.

Politzer, R. L., & Bartley, D. E. Practice-centered teacher training: Standard English as a second dialect. The Modern Language Journal, 1970, LIV(I), 31.

Rosenshine, B. New correlates of readability and listenability. In J. A. Figurel (Ed.), Reading and realism. Proceedings, International Reading Association, 1969, 13 (Part 1), 712-716.

Salomon, G., & Sieber, J. E. Relevant subjective response uncertainty as a function of stimulus-task interaction. American Educational Research Journal, 1970, 7(3), 337-349.

Sieber, J. E. Lessons in uncertainty. The Elementary School Journal, 1969, 69, 304-312. Reprinted in I. M. Strom (Ed.), Teachers and the Training Process. New York: Prentice-Hall, in press.

Sieber, J. E., & Crockenberg, S. B. The teacher and the anxious child. Today's Education, in press.

Sieber, J. E., Epstein, M., & Petty, C. The effects of modeling and concept-training procedures on children's acquisition of appropriate uncertainty responses. Psychology in the Schools, in press.

Sieber, J. E., Kameya, L. I., & Paulson, F. L. The effect of memory support on problem-solving ability of test-anxious children. Journal of Educational Psychology, 1970, 61(2), 159-168.

Snow, R. E. A second generation of microteaching skills research. Paper presented at the meeting of the American Psychological Association, Washington, D. C., September 1969.

Suppes, J. S. The effectiveness of modeling and concept-learning procedures in teaching fifth-grade children to indicate uncertainty and to discriminate between problematic and nonproblematic statements. Irish Journal of Education, in press.

Thoresen, C. E. The case for the empirical case study in counseling research. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Warren, R. L. Implications of ethnographic approaches for teacher training. Paper presented at the meeting of the American Educational Research Association, Minneapolis, March 1970.

Warren, R. L. Parents and teachers: Uneasy negotiations between socialization agents. Paper presented at the meeting of the American Anthropological Association, Seattle, November 1969.