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ABSTRACT

The results of a grant-supported project to develop a Center on Effective Elementary and Middle Schools in association with Johns Hopkins University in Baltimore, Maryland, are presented in this report. The first of the document's three sections describes the six basic planning activities conducted under the grant, including identification of the center's research and development mission, design of operating research and development mission, design of operating design of projects, and evaluation. The second section presents the revised design of projects, and evaluation. The second section presents the revised mission and strategy statement for the Center, describes the research base on effective elementary and middle schools, and reviews the research variables, to accomplish the center's future goals for research on elementary and middle school education in the should guide the Center's activities in collaboration and dissemination. The third section describes the work needed to accomplish the Center's future goals for research on elementary and middle school education in the areas of instruction, student motivation, use of time, improvement of the knowledge base, and reduction of barriers to innovation. (PGD)

Center on Effective Elementary and Middle Schools

FINAL PERFORMANCE REPORT

GRANT NO. NIE-G-85-7118

03/01/85 - 06/30/85

Submitted by:

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Performance Report: Part A

This section describes the planning activities conducted under the planning grant award and the particular problems and successes associated with each activity. This section includes a listing of participants in the planning grant.

Activities conducted and milestones accomplished

Figure 2, taken from the planning grant, shows the proposed schedule of activities and milestones. This section discusses each activity, the subactivities projected for each, and the problems and successes associated with each.

Each scheduled activity did occur and each milestone was reached, but scheduled dates were revised due to the delaying of the Center competition and the need to replan and reevaluate based on the Secretary's issuance of revised missions and elaboration of priorities.

Activity 1: Understanding the mission area

Activity 1.1: Establish 8-10 teams to provide expertise on major areas of the proposed Center's mission. The purpose of this activity was to gain a thorough understanding of the appropriate mission for a Center on Effective Elementary and Middle Schools by examining existing research, trends, criticisms, and implied successes and failures of elementary and middle school education.

Eight teams of researchers were formed. The teams and eight areas of research examined were as follows:

1. "Classroom instruction and management" (Karweit, Slavin and Stevens). Review recent process-product and experimental research on effective classroom instruction and management practices and review theories of incentives and motivation in learning.

2. "Human development processes during middle childhood and early adolescence" (Entwisle, Epstein, L. Gottfredson, McPartland). Review recent National Academy of Sciences reports, evaluate work of Centers and Clearinghouses in this area, summarize major implications for school and classroom instruction at elementary and middle school levels and for transitions between levels.

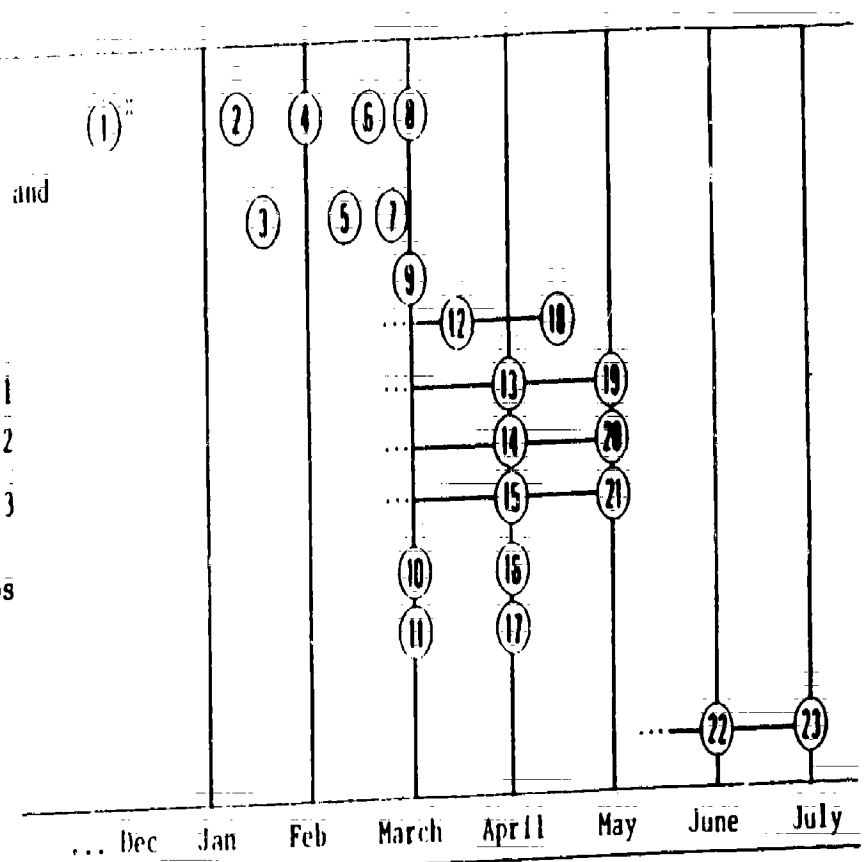
3. "School and classroom organization theories" (Alexander, Crain, Epstein). Review research on school and classroom organizational dimensions and their impacts on learning environments, processes, and student outcomes. Include studies of school size, tracking/grouping, departmentalization and grade structure, evaluation and grading practices, authority dimensions and opportunities for student choice, extracurricular activities and classroom settings for peer group formation and influence, and other aspects of the reward, task, and authority systems, as well as the demography and climate of the school and classroom.

4. "Special populations and remediation practices" (Braddock, L. Gottfredson, Madden, Portes). Examine how major recent reform proposals may affect interests of special populations, review facts on the distribution of educational problems of special populations, and examine evidence on alternative remediation approaches.

Figure 1

Timeline for Planning Activities

1. Understanding mission area
2. Designing research, development, and dissemination strategies
3. Developing internal arrangements and external linkages
4. Designing projects: for Program 1
   for Program 2
   for Program 3
5. Involving underrepresented groups
6. Evaluations at key benchmarks
7. Final documents from planning grant



*Milestones

1,2,4,6: Weekly briefings to staff by researcher teams on Center mission (staff)

3,5,7: Weekly briefings to staff by teams on research data and sites (staff)

8: Revision of mission statement (Co-directors; assistant director)

9: Determine organization & priority of Center programs and projects for years 1 & 2; determine project staff needs and responsibilities (Co-directors; staff)

10,11: Outside panels (including underrepresented groups) evaluate revised mission statement and program and project decisions (staff)

,18: Establish linkages and cooperative arrangements with school systems, professional & associational groups, practitioner and research groups (McDill, Hollifield, staff)

13,14,15: First designs of r & d projects completed and presented at seminars for criticisms and suggestions

16,17: Critical reviews by outside researchers and practitioners (including underrepresented groups) at AERA meeting (staff)

19,20,21 Final drafts of r & d projects completed, based on staff and outside consultants' evaluations

22: Institutional grant application completed for submission (Co-directors, assistant director)

23: Planning, performance, and financial reports completed (Co-directors, assistant director)

5. "Curriculum and computers" (Becker, Karweit, Thomas). Analyze the curriculum goals for basic and higher order skills in each major subject and the possible instructional role of computers, review the problems of fitting computer services into the organization of mass education and into the curriculum materials now in use, and establish how other major R and D actors are contributing to these issues. Give specific attention to the experiences that foster interest in science and mathematics, especially for women and minorities.

6. "Approaches to implementation of change and renewal in organizations" (D. Gottfredson, G. Gottfredson). Contrast different theories of organizational development and organizational adoption of innovations, review available materials for organizational assessments and problem solving, analyze how organization theories and materials might apply to school settings and teaching goals, and examine the special problem of implementation of magnet and alternative schools.

7. "The national reports on school reform" (Hollifield and McDill). Read and analyze the major recent national reports on school improvement and the principal critiques of these reports. Identify specific reform suggestions that apply to the elementary and middle/junior high school grades.

8. "Major practical problems of elementary, middle and junior high educators serving low-income students" (Bennett, Dawkins, D. Gottfredson, McDill, McPartland). Assemble a priority-ordered list of the clusters of major problems identified by educators of disadvantaged students in elementary and middle schools, examine assessments and opinions on the saliency of different solutions to issues such as absenteeism, dropouts, student delinquency, behavior problems in the school, parent involvement, and remediation.

Results of Activity 1

The team study activities produced a broad but detailed view of problem areas and the extent of previous research in elementary and middle school education, providing a solid base for the development and revision of a mission statement, indicating broad areas that deserved program designation, and indicating some specific areas in which research projects should be conducted.

Some of the specific results of the team activities included:

1) A review of the status of classroom instruction and management research that revealed a strong research base in elementary education, but much less research at middle school levels.

2) A review of adolescent development research and middle school research that revealed a strong research base in adolescent development but little integration of that research in middle school practices and policies.

3) A review of middle school research that found few existing well-defined studies, few agreements on issues -- in short, a lack of a research base for studying middle school effectiveness.

4) A review of recent national reports on school reform that identified agreement about appropriate areas of reform, including clarification of goals and objectives, core curriculum, tracking, dropout prevention, implementation, writing, and critical thinking.

5) Review of the research in elementary and middle schools that indicated the importance of a multitude of variables for student outcomes and the need to develop a fairly elaborate framework of the relationships among those variables to conduct programmatic research.

The information produced by the team activities was presented to all staff through full staff meetings, small group meetings of researchers, and circulation of written materials. Based on the information, the Center's original mission and strategy statement contained in the planning grant was revised and expanded. At the same time, the information (combined with information developed in Activity 2) provided clear indications of the need for three programs of research and clear indications of projects that needed to be included in those programs.

Activity 2: Designing research, development, and dissemination strategies

Three activities were conducted using the team study method. These activities and their results are as follows:

Activity 2.1: Assemble a catalog of relevant existing data sources and new survey data collection opportunities that cover broad-based samples and include important school or classroom contrasts, with cost estimates for obtaining each source.

"Existing surveys of elementary or middle school students available for secondary analyses" (Alexander, Braddock, Crain, Epstein, McDill, McPartland). Conduct an extensive search for and assemble a list of data sets and associated survey instruments, with the date of administration and sample coverage. Focus primarily on studies that include measures of student background (SES), student performance (tests, attitudes, school behavior), and direct measures of interesting variations in school organization or instructional practice.

"Survey enhancement: Adding newly collected measures of school organization and instructional practices to existing or ongoing surveys of students" (Braddock, Crain and McPartland). Explore possibilities for enhancing existing or ongoing surveys with new measures to provide data on priority research areas."

Results of Activity 2.1

Researchers in this activity reviewed existing survey data sets that had potential for use in addressing issues of effective elementary and

middle school effectiveness. The activity was expanded to include classroom observation studies.

The existing survey instruments we studied include the Sustaining Effects Study, the UCLA A Study of Schools, High School and Beyond and its school enhancements, the NIE Safe Schools Survey, the 1966 EEO Survey, the 1972 NLS, Pennsylvania's EQA, the 1983/84 NAEP, NIE's 1977 survey of public and private secondary schools, Phi Delta Kappa teacher surveys, the University of Pittsburgh Instructional Dimensions Study, SRI Follow-Through Studies, and survey instruments on middle schools from our own Center including Gottfredson's Effective Schools Battery and Epstein and McPartland's study of open-environment schools. We also examined recent inventories of longitudinal research on childhood and adolescence (Verdonik and Sherrod, 1984) and of national social data series (Taeuber and Rockwell, 1982; Bowering, 1984).

Three specific conclusions were produced through this activity: (1) the need for a new scientific nationally representative survey of middle school organization, practices, and student outcomes; (2) the need for classroom observation studies in middle schools to determine the effectiveness of identified components of effective teaching in elementary schools, and (3) the potential of some existing data sets to be useful in effective schools research through secondary analyses and through enhancement of the variables covered in the surveys. Four data sets were designated for use: the National Assessment of Educational Progress (NAEP), the NIE Safe Schools Study, the Pennsylvania Educational Quality Assessment (EQA), and A Study of Schooling (ASOS).

Activity 2.2: Locate practical school improvement experiments currently being conducted by school districts or schools, and evaluate their potential for further study and development.

Due to emphasis on other activities, little work was conducted on Activity 2.2.

Activity 2.3: Establish agreements with appropriate school officials to provide school or classroom settings for Center field experiments or testing of prototypes of Center products.

Under this activity, the Center developed and put into place a Research Partnership Network consisting of 32 public and private school districts and intermediate units in our immediate 5-state area -- Maryland, Pennsylvania, Delaware, Virginia, and Washington, D.C. The Network includes nine urban districts.

The Network was developed through mail, group presentation, and personal contact. Written invitations to join the Network to districts the Center had previously worked with received a good response. Group presentations to instruction/curriculum administrators in Maryland and to the executive directors of intermediate units in Pennsylvania produced district and intermediate unit representation in those states. However, an attempt to work through the Virginia Superintendant's Advisory Council was unsuccessful. In Washington, D.C. and in Pennsylvania, our

building of the Research Partnership Network was facilitated greatly by advice from the respective State Facilitators concerning the appropriate persons to contact and appropriate channels to use.

Our success in conducting this activity reflects the willingness and even the eagerness of school districts to work in partnership with an educational research center to produce effective schools.

Activity 2: Develop internal arrangements and external linkages

Based on the work conducted in Activities 1 and 2 to elaborate our Center mission, identify key issues of research, and identify appropriate research, development and dissemination strategies, Activity 3 consisted of two parts: determining the organization of programs and projects and the implications for staffing and budgeting, and establishing external linkages with researcher and practitioner organizations.

Activity 3.1: Determine the organization of Programs and the priority R and D projects within each Program for the first two years of a new Center on Effective Elementary Schools, assign researcher responsibilities for the Programs and projects, and identify needs for new staff with a plan for recruitment and hiring.

Part II of the report contains our revised mission and strategy statement, which details our reviews of research and our development of an organizing framework and documents a logical progression toward establishing three programs of research -- an elementary schools program, a middle schools program, and a school improvement (implementation) program. The statement also details a logical progression of choices of research projects within the programs.

This activity required that the co-directors of the Center make personnel retention and hiring decisions based on the appropriateness of the work and interests of individual researchers. Several Center researchers were informed that their proposed work and interests did not coincide with the mission of the proposed Effective Elementary Schools Center. At the same time, outside researchers were identified whose expertise and knowledge would contribute much to the Center's mission. For budgetary reasons, the decision was made that these outside personnel could contribute most effectively to the Center mission and objectives through consultation and through "external faculty" status, in which they could conduct specific individual or collaborative projects that would contribute directly to the Center's research.

Activity 3.2: Establish external linkages with researcher and practitioner organizations.

The Center conducted two types of activities in both these areas: first, the maintenance of previous linkages, and second, forming new linkages based upon the needs identified in previous activities.

Previous and current Center linkages included strong ties and interaction with educational research centers and regional laboratories,

research associations (AERA, ASA, APA) and education associations (NEA, AFT, AASA, ASCP, NASBE, etc.).

The new and strengthened linkages produced by this activity include

1) A contractual relationship with the Center for Early Adolescence in North Carolina for synthesis and dissemination activities;

2) Participation in the "invisible college" of elementary school researchers;

3) Collaborative work with the National Education Association on its Mastery in Learning school improvement project;

4 Participation in the AERA Editor-at-Large program;

5) Specific external faculty projects;

6) Collaboration with the State Education Policy Consortium, which includes CCSSO, ECS, NASBE, NEA, and NCSL;

7) Initial contact with NAESP re collaborative activities;

8) Participation in the electronic mail network; and

9) Collaboration with the ERIC Clearinghouse on Elementary Education, specifically on preparation of information for publication in the Bulletin, MicroNotes, and Clearinghouse Digest.

Activity 4: Design, revise and finalize the research and development projects for the first two years of the new Center, as part of a five-year programmatic plan.

Each proposed R and D project by each researcher was submitted as a full first draft and circulated for comment by all Center staff. The researchers also submitted their proposed project drafts to colleagues in their field. At a series of Center meetings, the project drafts were reviewed and critiqued by other Center staff and suggestions made for revision.

The planning grant director, in conference with research staff based on a Center-wide meeting, made final decisions concerning the inclusion of R and D projects in the proposal.

Under the process employed by the Center, which consisted of continuous review and critique by multiple staff, all project proposals went through at least two revisions. The mission and strategy statement went through eight revisions.

Activity 5: Involving underrepresented groups. Establish staff responsibilities and external linkages to obtain advice and critical reviews from representatives of women and minority groups.

This activity was scheduled to occur in two stages -- first, on early drafts of the mission statement and proposed projects, and second, on a full draft of the proposal.

Individual researchers solicited advice and criticism at the early stages; however, a coordinated Center effort occurred at the stage when a full draft was available. At the early stages, women and minority researchers currently and formerly associated with the Center provided reviews and critiques of the mission statement, program statements, and R and D projects.

Activity 6: Evaluation and revision

As noted, internal evaluation procedures were actively in place throughout the proposal development period, as Center researchers continuously reviewed and critiqued each other's work. Hopkins personnel in other departments also reviewed various drafts during this period.

Full external reviews of a complete draft proposal were conducted over a two-week period, with three weeks remaining afterward for completing revisions based upon the reviews. A list of reviewers is included in the next section. Comments and reviews were solicited from a carefully structured group to include researchers in relevant areas, education association representatives, practitioner administrators, principals and teachers, and representatives of private as well as public education.

Principal and teacher reviewers were identified by working through the National Association of Elementary School Principals, the National Education Association, and the American Federation of Teachers. This procedure not only produced good reviewers, but also promoted our collaboration with the three education associations.

As the reviews were received, copies were prepared for all Center personnel and revisions made based on the reviews. In some cases, revisions were extensive, due to the quality of the reviews and the thoroughness of the reviewers.

Participants in the Planning Grant

I. Center and Johns Hopkins University

James McPartland	CSOS/JHU
Edward L. McDill	CSOS/JHU
John H. Hollifield	CSOS/JHU
Karl L. Alexander	CSOS/JHU
Henry J. Becker	CSOS/JHU
Barbara Bennett	CSOS/JHU
Russell Dawkins	CSOS/JHU
Doris Entwisle	JHU
Joyce L. Epstein	CSOS/JHU
Denise Gottfredson	CSOS/JHU

Gary Gottfredson	CSOS/JHU
Linda Gottfredson	CSOS/JHU
John L. Holland	JHU
Nancy L. Karweit	CSOS/JHU
Melvin Kohn	JHU
Nancy Madden	CSOS/JHU
Alejandro Portes	JHU
Robert Slavin	CSOS/JHU
Julian Stanley	JHU
Robert Stevens	CSOS/JHU
Gail Thomas	JHU

II. External Faculty

Robert Crain	Teachers College, Columbia University
Gary Natriello	Teachers College, Columbia University
Jeannie Oakes	University of California at Los Angeles
Mary Rohrkemper	Bryn Mawr College
Barak Rosenshine	University of Illinois at Champaign

III. External Reviewers

Robert Anastasi	Principal, Rosemont Elementary School
Linda Anderson	IRT, Michigan State University
Richard Arends	University of Maryland
Gilbert Austin	University of Maryland
Patricia Bauch	Catholic University of America
Wilbur Brookover	Michigan State University
Suzanne Pinnella	Teacher (NEA)
Virginia Koehler	University of Arizona
Joan Lipsitz	Center for Early Adolescence
Rebecca McAndrew	Teacher (AFT)
Elliott Merenbloom	Principal, Pikesville Middle School
Robert Smith	Council for American Private Education

Performance Report: Part B

Technical Report on R & D Mission

This section presents the revised mission and strategy statement for a Center on Effective Elementary Schools. It describes the research base on effective elementary and middle schools, a framework of research variables, central assumptions that should guide research, proposed research programs and strategies, and central issues that should guide Center collaboration and dissemination activities.

Mission and Strategy

The primary mission of the proposed Center on Effective Elementary and Middle Schools is to produce useful knowledge about how elementary and middle schools can foster growth in students' learning and development. The work of the new Center is expected to produce (a) better scientific understanding of how elementary and middle schools can foster student learning of academic knowledge and skills and student development of valued personal characteristics such as strong self-concept, civic values, and independence, (b) research-based practical methods for improving the effectiveness of elementary and middle schools, and (c) specific strategies for implementing effective research-based school and classroom practices.

This mission and strategy section describes the multiple objectives under our mission and our proposed strategies for attaining those objectives. Part 1 describes the research base on effective elementary and middle schools upon which we will build. Part 2 presents our framework identifying the variables with which we will work. Part 3 presents the central assumptions that will guide our research within the framework. Part 4 presents our three proposed research programs, the research strategies they will use, and how they relate to one another. Finally, Part 5 describes central issues that will guide our dissemination work and collaboration with other institutions.

Part 1: The Research Base for School Effectiveness

This proposal is being written at a critical time in American education. A series of national reports, notably the National Commission on Excellence in Education (1983), have called attention to serious problems in our nation's schools. As Americans, we like to find pragmatic solutions to problems, and the first place we look is to science. To an unprecedented degree, legislators, school boards, school administrators, teachers, and parents are looking to educational research to provide answers to one central question: How can we achieve excellence in our schools?

Research over the past decade has enhanced our understanding of what is required for effective schools and classrooms, and much of this research has been widely applied to school improvement throughout the country. An important part of our mission will be to maintain the momentum toward research-based school improvement that this research has produced, to significantly extend its scope, and to get it into everyday use by schools.

Five major lines of research have most significantly advanced our understanding of elementary and middle school improvement. Three of these relate to classroom instruction: Teacher effectiveness research, instructional strategies research, and research on

cognitive processing of information and meta-cognitive learning strategies. Two relate to the school as a whole: Effective schools research, and research on school improvement processes.

Teacher Effectiveness Research

A series of studies of effective teaching have produced a remarkable consensus on behaviors critical for instructional effectiveness. In summary, teachers should:

-- direct their instruction toward well-specified learning objectives, use closely related instructional materials, and maintain a fast instructional pace consistent with high mastery by all students (see, for example, Cooley & Leinhardt, 1980; Good, Grouws, & Ebmeier, 1983: Bloom, 1976; Durkin, 1978).

-- spend most instructional time actively teaching, with little time spent on unsupervised seatwork and in procedural activities (e.g., Brophy & Evertson, 1974; Evertson, Emmer & Brophy, 1980; Good & Grouws, 1977). During seatwork, they must be sure that students know what they are to do, are actively monitored, and are held accountable for completing their work (Good, Grouws & Ebmeier, 1983; Medley, 1979; Doyle, 1983).

-- organize class lessons well, maintain momentum, and move smoothly with clear transitions from topic to topic (Belgard, Rosenshine, & Gage, 1971; Walberg & Anderson, 1968; Smith & Cotton, 1980; Maddox & Hoole, 1975; Clark, Gage, Marx, Peterson, Stayrook, & Winne, 1979; Kounin, 1970; Brophy and Putnam, 1979; Arlin, 1979; Doyle, 1979).

-- present lessons with enthusiasm, warmth, and humor (Coates & Smidchens, 1966; Solomon & Kendall, 1979; Abrami, Leventhal, & Perry, 1982; Kaplan & Dascoe, 1977).

-- express and actively show high expectations for students (Cooper & Good, 1983; Rowe, 1974).

-- obtain constant feedback on student performance by regularly checking for understanding with questions (Stallings & Kaskowitz, 1974; Dunkin & Biddle, 1974; Rosenshine & Stevens, in press) and frequent quizzes (Peckham & Roe, 1977); give frequent instructional feedback to students as soon as possible after desired behaviors occur (Brophy & Evertson, 1976; Coker, Lorentz, & Coker, 1980; Gage, 1978), and use praise (Brophy, 1981) and other reinforcers for appropriate behavior (O'Leary and O'Leary, 1972).

-- maximize their own time and use classroom management strategies to maximize student time-on-task (Karweit, 1981; Denham & Lieberman, 1980; Stallings & Kaskowitz, 1974).

-- regularly assign, check, and include homework as part of students' grades (Marshall, 1982; Keith & Page, 1984; Austin, 1978; Rickards, 1982).

Implications for further research. The research on teaching has significantly advanced research-based instructional improvement and widely influenced teaching practice and teacher education programs. There are several directions that future research in this area must explore. Randomized field experiments of instructional programs using the set of principles established in this research have found positive but inconsistent effects on student achievement (e.g., Good, Grouws, & Ebmeier, 1983; Anderson, Evertson, & Brophy, 1979; Slavin & Karweit, in press; Stallings, 1985; Gall, Fielding, Schalock, Charters, & Wilczynski, 1984). We need to further evaluate these programs and design and evaluate other specific programs incorporating these principles. We also need specific strategies for introducing and monitoring instructional improvement based on research on teaching.

Also, most of this research is limited to elementary school reading and mathematics. We need to extend these investigations to other subjects and into the middle school. Research at the middle/junior high school level (e.g., Evertson, Anderson, Anderson, & Brophy, 1980; Doyle, 1985; Emmer & Evertson, 1980) has not found the same consistency of effective teacher behaviors.

We also need to expand the effective teacher research beyond its emphasis on whole-class instruction and instruction to reading groups, to determine how different instructional formats (e.g., whole-class, ability grouped, individualized) influence effective teacher behaviors.

Instructional Strategies Research

Research on instructional strategies to improve student learning has also made great strides in the past decade. Studies of mastery learning (Bloom, 1976; Block & Burns, 1976; Levin, 1985; Arlin, 1984) -- methods which combine prescribed quizzes at pre-established criterion levels with corrective instruction -- have found substantial increases in student achievement when additional time is given for corrective instruction (Bloom, 1984; Guskey, 1985), but no such clear effects when corrective instruction is given during regular class time (Slavin & Karweit, 1984; Arlin, 1984).

Research on cooperative learning methods -- in which students work in four or five member learning teams to master material initially presented by the teacher -- has found increased student achievement when students are individually accountable for their own learning and when the teams are rewarded based on their members' learning (Sharan, 1980; Slavin, 1983a,b). These methods also improve student self-esteem, intergroup relations, and attitudes toward mainstreamed classmates (Slavin, 1983a). Recent research on Team Assisted Individualization (Slavin, 1985b) -- a combination of cooperative learning and individualized instruction in mathematics -- has found improved student achievement, self-esteem, and other outcomes.

Also, instructional strategies based on the effective teachers research -- Active Teaching (Good and Grouws, 1977) and systematic instructional programs (Stallings and Kaskowitz, 1974; Becker and Carnine, 1980) -- have, as noted earlier, positive effects on student achievement.

Implications for further research. Development of various instructional strategies is primarily an attempt to accommodate student heterogeneity -- to organize and deliver instruction effectively for students at all ability levels.

Much additional research is needed on alternative ways to accommodate student heterogeneity. Recent research on within-class ability grouping and structured individualized instruction in mathematics (Slavin & Karweit, in press) has found surprisingly strong positive effects of these means of accommodating student differences in prior knowledge and learning rate, raising the question of whether whole-class instruction is optimal in hierarchically organized basic skills.

Also, more research is needed on instructional strategies that help teachers use available resources, especially such potentially powerful resources as technology and parents. We need strategies for using computer-assisted instruction (Ragosta, 1983; Kulik & Kulik, 1985) and for effectively integrating computers into ongoing classroom instruction (Becker, 1983, 1984b), and we need strategies for effectively involving parents in supporting school goals and supporting their children's schoolwork and homework (Epstein & Becker, 1982; Becker & Epstein, 1982; Epstein, 1985c; Barth, 1979; Natriello and McDill. in press).

Cognitive Research

During the past ten years, basic and applied research in cognitive science has provided a rich theoretical base on which to build effective teaching practices and instructional programs. This research emphasizes that learning is a dynamic, interactive process in which students actively construct meaning from information presented or read, based on prior knowledge and experience (Kintsch & van Dijk, 1978; Rumelhart & Norman, 1978; Shank & Abelson, 1977; Spiro, 1977; (Chi, Glaser & Rees, 1981; Perfetti & Lesgold, 1978).

Cognitive science has helped educators understand the cognitive components and underlying cognitive processes of school tasks (Anderson, Spiro & Montague, 1977; Doyle, 1983; Anderson & Pearson, 1984; Resnick, 1976; Spiro, Bruce & Brewer, 1981; Wagner & Sternberg, 1984); and students' perceptions of these tasks and the cognitive strategies they employ in learning (Baker & Brown, 1984; McConkie, 1977; Peterson, Swing, Stark & Waas, 1984; Spiro, 1981).

Research on cognitive strategies, metacognitive (self-monitoring) strategies, study strategies, and writing processes has been applied to teaching reading comprehension skills and related metacognitive strategies to monitor their use (Palinscar & Brown, 1983; Hansen, 1981; Stevens, 1985; Raphael & Pearson, 1985; Brown and Palincsar, 1982); to

teaching general strategies for solving arithmetic problems (Carnine & Stein, 1981; Cullinan, Lloyd & Epstein, 1981), and to mathematical problem solving (Larkin, Heller & Greeno, 1980).

Cognitive research has also advanced our knowledge of strategies for student learning of domain-specific knowledge. Research on study strategies of text material has indicated the particular effectiveness for elaboration techniques (Dansereau, 1985; Weinstein, Underwood and Cubberly, 1979), for self-questioning (Andre & Anderson, 1978-79; Singer and Donlon, 1982), for taking notes (Larkin and Reif, 1976), and for graphically representing examples found in text (Armbruster, 1979).

And the cognitive research has improved our understanding of writing instruction by describing the process and by analyzing students' problems (Bereiter & Scardamalia, 1982; McCatchen & Perfetti, 1983; Hillocks, 1984); and developing writing programs that use a cognitive approach to the writing process (Caulkins, 1983; Graves, 1983; Bay Area Writing Project, 1979). These writing programs include exciting instructional procedures which seem to be supported by the rich theoretical and descriptive background, but need to be more extensively evaluated at the elementary level.

Implications for further research. The research on cognitive and meta-cognitive processes has a major general implication: each student must be recognized as an individual learner who confronts and interacts with each learning opportunity from a perspective of prior knowledge and experience.

Specifically, the applied studies have begun to provide teachers with prescriptions on how to teach or remediate specific skills. However, in order for these prescriptions to significantly affect classroom practice, we need to integrate them into viable, coherent programs, and evaluate these new programs and existing programs in comparison to traditional instructional methods over extended periods of time (Brown and Palincsar, 1982; Resnick and Ford, 1981).

Further work on study strategies is particularly important because most learning in later elementary and middle school focuses on domain-specific knowledge, which these study strategies help students to learn. Learning to learn is important for students' future success and independence as learners (see Brown, Campione, and Day, 1980). We need further research on producing effective study strategies programs for school use.

At the same time, reading and writing are so vital to student success in any endeavor that these subjects must receive intensive attention at a Center for Effective Elementary and Middle Schools. Based on the research of the . ng, Writing, and Learning Centers, we need to develop effective grams of reading and writing instruction, evaluate them carefully, a isseminate them for school use.

Effective Schools Research

Effective education depends not only on teacher behavior and classroom instruction. Many factors at the school level create a climate for effective administration, teaching, and student learning and development. The effective schools research has identified schools that produce student achievement beyond that predicted by the social class and academic ability of their students, and identified the basic features (Edmonds, 1979) of these schools as:

(1) strong administrative leadership

(2) high expectations for children's achievement

(3) an orderly atmosphere conducive to learning

(4) an emphasis on basic skills, and

(5) frequent monitoring of pupil progress.

Many researchers using a variety of methods have produced their own lists of sensible-sounding features of effective schools (cf, Brookover and Lezotte, 1979; Levine and Stark, 1981; Purkey and Smith, 1983; Weber, 1971; Wynne, 1980), adding such factors as effective use of class time and use of parent involvement.

The effective schools research suffers from some acknowledged weaknesses, including inadequate controls for student inputs, narrow and small samples of students, errors in methods of identifying effective schools, and inadequate attention to whether school features are alterable (Purkey and Smith, 1983; Ralph and Fennessey, 1983; Rowan, Bossert and Dwyer, 1983).

Implications for further research. The elements of effective schools need to be confirmed and elaborated through further research that uses more sophisticated research designs and focuses on alterable variables, those policies and practices that can be most easily altered at the school level. Perhaps most important for achieving current school improvement, we need to examine how principles of effective schools can actually be put into practice. What specific actions can schools take to create strong leadership, high expectations, an orderly atmosphere, emphasis on basic skills, frequent monitoring, and other features of effective schools? The effective schools research indicates to schools what they should look like, and the research task now is to help schools achieve that look through specific practices. This brings us to our fifth category of our major lines of research -- school improvement processes.

School Improvement Processes Research

Over the past decade, it has become increasingly clear that school improvement efforts to adopt research-based innovations such as effective schools prescriptions have been less than successful -- effective

innovations are not actually used by schools, are used inappropriately or sporadically, or are used for brief periods and then abandoned (Berman & McLaughlin, 1978; Cowden & Cohen, 1981; G. Gottfredson, 1982, 1984a; Gottfredson, Gottfredson & Cook, 1983; Grant & Capell, 1983; Hall & Loucks, 1977; Johnson, Bird, & Little, 1979; Sarason, 1971).

Two advances in research are occurring in this area, however. First, research on effective diffusion of innovations indicates that schools can successfully adopt innovations if sufficient support systems are available and if the innovations are well specified (Crandall and Loucks, 1983; Hollifield and Slavin, 1983; Showers, 1984; Baker and Showers, 1984; Hall and Loucks, 1977, 1978).

Second, research on school change processes has produced many models of school improvement procedures for identifying problems, setting goals, developing objectives, developing, adopting or adapting innovations, evaluating results -- in essence, instituting a total school improvement process (Blum and Butler, 1985; Lofquist, 1983; Howard, 1978; Fox and associates, 1974; Brookover et al, 1982; Hall, 1979; Klausmeier, 1985; Schmuck and Runkle, 1985).

One comprehensive method for structuring programs to increase school effectiveness is Program Development Evaluation (PDE), developed and tested at The Johns Hopkins University (G. Gottfredson, 1982; G. Gottfredson, 1984a; G. Gottfredson, Rickert, Advani, & D. Gottfredson, 1984; D. Gottfredson, 1985a, 1985b; G. Gottfredson, D. Gottfredson, & Cook, 1983). This method uses "theory" as one of the bases for defining programs, selecting interventions, and evaluating progress; and the method itself is based on a theory of organizational effectiveness. It calls for detailed attention to the problem of implementation.

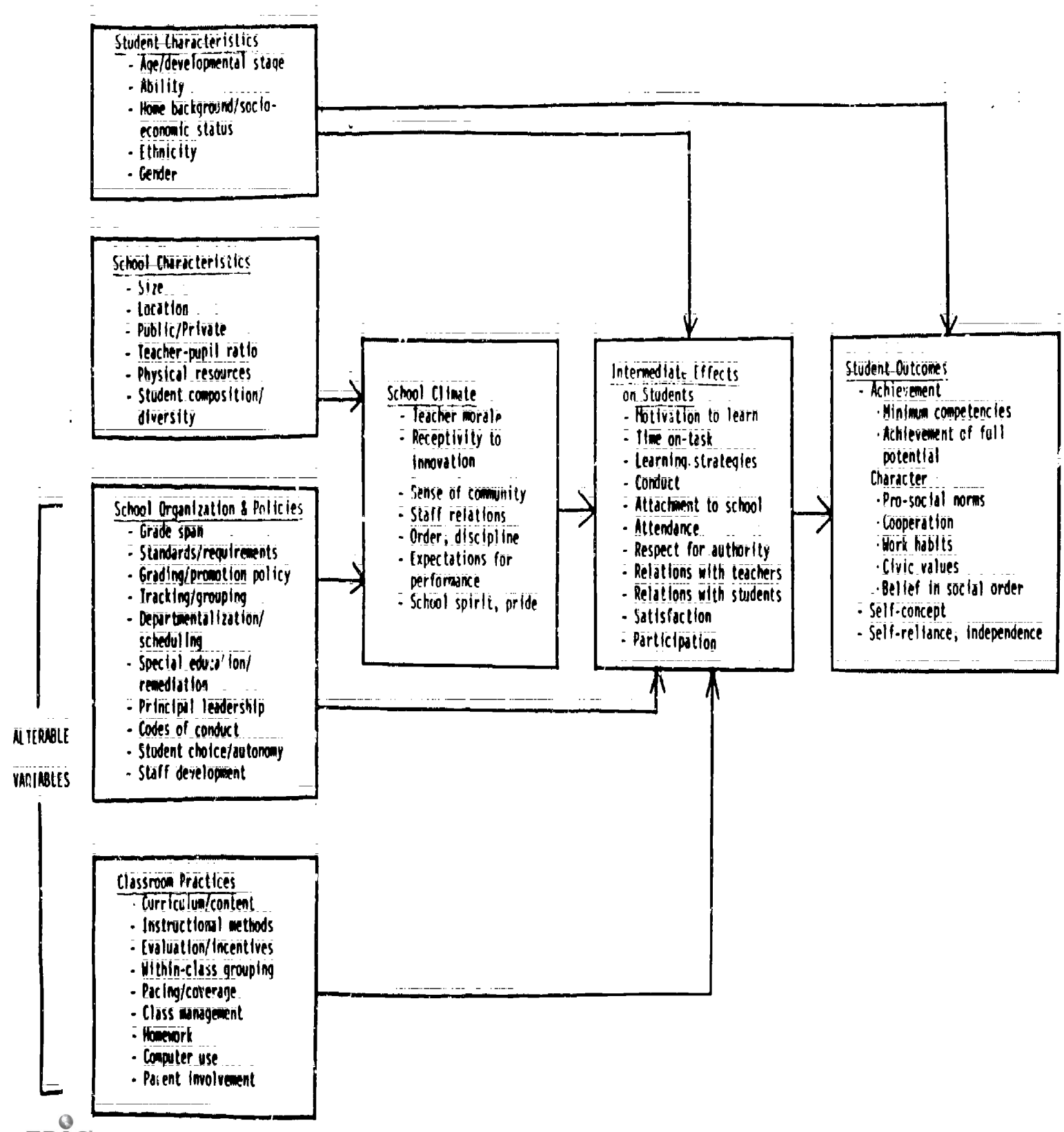
Implications for further research. Additional research is needed to better understand how to accomplish effective and lasting diffusion of innovations and school improvement. We need studies that investigate the effectiveness of using recently-developed models to help schools improve. Can schools successfully adopt research-based innovations if researchers and developers improve their quality and provide assistance procedures? Can schools initiate and maintain a cycle of self-improvement based on current models that have been developed?

Part 2: An Organizational Framework for School Improvement

The research briefly summarized above provides a base for the research we propose to do as the NIE Center for Effective Elementary and Middle Schools. Over the past decade, we have learned a great deal about the conditions that characterize effective schools and classrooms, especially in elementary schools and in basic skills. We now need to conduct the basic and applied research necessary to understand how to actually make elementary and middle schools effective.

FIGURE 1

FRAMEWORK FOR RESEARCH ON EFFECTIVE ELEMENTARY & MIDDLE SCHOOLS



Our conception of school improvement focuses on a set of alterable variables, policies and practices that can, at least in principle, be changed by schools. Alterable variables can be divided into two major categories: school organization and policies, variables typically under the control of the school or district-level administration, and classroom practices, variables typically under the control of the teacher. Examples of alterable variables relating to school organization and policies include grading practices, tracking/grouping policies, provision of special education and remediation services, and staff development practices. Examples of classroom practice variables include the content of instruction, instructional methods (pedagogy), and within-class grouping and evaluation practices.

Figure 1 shows that alterable school and classroom variables (and other factors) are hypothesized to affect ultimate student outcomes such as achievement, character, and self-concept, in the following ways:

First, both school and classroom variables can directly affect ultimate outcomes of student learning and development.

Second, both school and classroom variables can have any of several intermediate effects on students, which lead to effects on ultimate outcomes. For example, improved evaluation or incentives in the classroom might increase student motivation and time on-task, which would in turn increase student achievement. Similarly, classroom instructional methods emphasizing metacognitive strategies might make students' learning of studying strategies more effective, thereby increasing student achievement and general ability to learn. At the school level, improved attendance policies may improve student attendance, which may in turn increase student achievement.

Third, many school organization and policy variables may first have an impact on school climate. For example, improving codes of conduct and making disciplinary practices more consistent and fair could create an orderly climate and sense of school community that could affect student conduct and attitudes toward school and, ultimately, student character and other outcomes.

Although these relationships quickly become complex, Figure 1 is nonetheless a simplified model of how student outcomes are affected by school and classroom practices. For example, it shows how the variables on the left-hand side of the figure affect intermediate and final student outcomes, but does not show how these outcomes in turn affect the alterable variables, as when enhanced principal leadership improves school climate which in turn makes possible many other changes in school and classroom practice, or when improved student conduct, achievement, and work habits improve school climate and make other positive changes possible. Also, Figure 1 contains a box called student characteristics, but does not indicate the major effects that student background and developmental stage may have on all other relationships in the model. Nor does the framework show how, over time, schooling will have a cumulative effect on student learning and development. In summary, although each of our research projects will take many further complexities into

account, Figure 1 provides a useful framework in which to locate the primary variables we will study in the Center for Effective Elementary and Middle Schools.

Our framework incorporates and locates the major lines of research reviewed earlier and shows how they will be prominent in our work. The variables central to teacher effectiveness, instructional strategies, and cognitive research are primarily represented under "classroom practices" and "intermediate effects on students." The variables central to effective schools research and school improvement research are reflected in the relationship between student outcomes and elements of school climate such as teacher morale, expectations for performance, and school order.

Given our framework of school improvement and our understanding of the research base, our research will be primarily devoted to examining how the directly alterable variables on the left-hand side of Figure 1 affect ultimate student outcomes, intermediate effects such as time-on-task and conduct, and school climate factors such as teacher morale, expectations, and school order. Based on our framework and the research background, we will establish three programs of research -- an Effective Elementary Schools Program, an Effective Middle Schools Program, and a School Improvement Program.

Before discussing the rationale for these programs and their work, however, it is important to clarify some central assumptions derived from the research base and the framework that will guide our work as the Center for Effective Elementary and Middle Schools.

Part 3: Guiding Assumptions

There are some central assumptions that a national research center for effective elementary and middle schools must emphasize if the research is to be inclusive, credible, and valuable to our audiences. Our research topics and procedures will be based on the following assumptions.

1. Schools must be simultaneously concerned with minimum competence and with increasing all students' achievement.

Schools must simultaneously seek to attain two related but distinct achievement goals. One is to ensure that all students attain an acceptable level of competence in critical basic skills. The other is to ensure that all students can achieve their full learning potential. Thus school and classroom practices that increase average student achievement must also greatly diminish the number of students lacking basic skills, and school and classroom practices that bring low achievers up to acceptable levels of achievement must not require that more able students be held back. It is both possible and necessary to pursue the dual goal of raising achievement floors and raising achievement ceilings at the same time.

2. Achievement is not the only important outcome of schooling -- schools can affect both academic and non-academic outcomes.

Emphasizing student learning as the primary goal of schools does not decrease the importance of other goals upon which schools must focus. One set of goals might be grouped (as in Figure 1) under the heading "character." We expect schools to promote such values as concern for others, cooperation, the need for citizen participation in a democratic society, and respect for society's laws and for persons in positions of authority. Schools must develop in students the ability to take responsiblity, to work well independently as well as cooperatively, and to get along with others. It is important that schools accomplish their achievement goals, but they must also help students develop pro-social moral and civic values, good work habits, and positive self-concepts.

3. The heterogeneity or mix of students in a school must be considered in establishing effective school policies and classroom learning practices.

Students in any school represent a considerable range of interests, needs, and prior preparations. School policies and classroom practices to deal with student diversity, especially grouping practices and evaluation systems, will affect students' learning and motivation.

The need to work with student diversity in all areas of the school and classroom is probably the largest problem faced by most administrators and teachers. Students' differences in prior achievement make the classroom teacher's task a continuing challenge. The different needs and interests of students and the equitable treatment of special populations of students from different backgrounds create difficulties for the principal trying to manage an effective school. Student heterogeneity is a pervasive feature of American schools that must be carefully considered in programs of school improvement. We need to examine how different school policies and classroom practices deal with student heterogeneity and influence the motivation and learning of individuals with different interests, needs, and prior preparations.

4. The developmental stage of the students to be served by the school should guide the design of school and classroom practices.

Perhaps the most important aspect of student heterogeneity to take into account is developmental stage. Obviously, students gain in skills, knowledge, and ability to make decisions and take responsibility over the school years. However, a major divide occurs between middle childhood and early adolescence, about the time students enter middle or junior high school. In early adolescence, several changes take place which have great implications for schools. First, adolescents do not accept the teacher's guidance or authority as easily as do elementary students. Second, adolescents are more peer-oriented. Third, most adolescents enter the formal operational stage of cognitive development, enabling them to deal with abstractions and difficult concepts. For these reasons, paramount issues for middle and junior high school students are authority, motivation, independence, and choice. These

issues, although important, are less of a concern in elementary schools. Thus, elementary and middle schools share many issues, but effects of students' developmental stages become much more prominent in the middle school years.

5. Classroom learning processes develop within the context of school policy, structure, and organization.

This assumption emphasizes the central position of three boxes in Figure 1 -- school organization and policy, classroom practices, and school climate. Most current approaches toward effective schools emphasize changing school climate and using specific teacher classroom practices to improve student outcomes, but do not pay much attention to the school organizational context. Our work will emphasize these approaches, but we will also emphasize the influence of the school organizational context for improving climate and pedagogic elements. These aspects include size of school and its operating subunits, school policies on grouping of students, assignment of teachers, codes of conduct and consequences, school level evaluation and grading policies, use of the incentives available at home and at school, the mix and timing of curriculum requirements and choices, the formal standards for routine school behavior, and the approaches for remedial instruction that are instituted.

Part 4: Center Programs of Research

The research of the Center on Effective Elementary Schools will be organized in three programs: (1) Effective Elementary Schools, (2) Effective Middle Schools, and (3) School Improvement.

The Effective Elementary Schools Program and the Effective Middle Schools Program will conduct research on alterable school and classroom variables and will develop and evaluate new organizational forms and classroom practices. The School Improvement Program will study the processes by which schools can successfully implement change.

Our Plan of Operation section includes a detailed overview of each Program, followed by the specific research projects that each Program will conduct. In this section, we provide a brief summary of each Program's work, our rationale for these program designations, and our strategies for conducting the research in each program based on a natural progression of methods in educational research.

Program Descriptions

The Effective Elementary Schools Program will conduct research on the effects of alterable school and classroom variables on school climate, student motivation, achievement, attitudes, and personal development. The research will include the development and evaluation of new organizational forms and improved classroom practices, including grouping and remediation practices, instructional processes in reading, mathematics and writing, and processes for teacher practices of parent involvement.

The program's focus on classroom practices will require close collaboration with teachers and administrators.

The Effective Middle Schools Program will conduct research on the current school organization practices of middle/junior high schools and some specific classroom practices, and examine how these practices interact with characteristics of early adolescents to improve student learning and development. The Program has three goals: to describe the range of alterable school and classroom variables in middle schools and identify their effects on students; to link the school practices and policies to the developmental characteristics of middle school students; and to use the knowledge gained to develop and evaluate effective programs for improving school and classroom practices in middle schools.

The School Improvement Program will conduct research on how schools, as organizations, can implement research-based innovations effectively and develop the capacity to generate a continuing cycle of improvement from within. This research will examine the performance of schools as organizations and how school personnel can become more effective on short-term performance measures in order to effectively accomplish long-term school improvement objectives. The program will work specifically with increasing the leadership capabilities of middle school principals and testing a model of school improvement in urban middle schools.

The three programs will work collaboratively. They will share some research personnel, jointly administer several projects, and share data bases for analyses. Some projects will overlap -- for example, the parent involvement, homework, and computer use projects will work at both the elementary and middle school levels. Also, in the last three years of the grant, the School Improvement Program will work closely with both the Effective Elementary and Effective Middle Schools Programs on major culminating projects for school improvement.

Rationale for Program Arrangements

Our rationale for organizing our research into these three programs derives from our review of the research base, our framework of variables presented in Figure 1, the developmental levels of students, and the research perspectives of our personnel.

In our research review, we found substantial existing knowledge to support development and evaluation of effective classroom practices at the elementary level, but much less to support such activity at the middle school level, indicating that these two levels of schooling require separate emphases. In fact, we found little supportive research at all for specific practices to make middle schools more effective, indicating that the middle school needs a program of research that will provide such a knowledge base.

Also in our review, we found evidence that school improvement models may be effective in helping schools implement the large body of effective schools research that exists, indicating that a school improvement

program would be extremely valuable in bridging the gap between our research on effective elementary and middle schools and the realities of actually bringing about positive lasting change in schools.

In our framework of variables (Figure 1), we identified two major categories of alterable variables which influence student outcomes and which need extensive study (school organization and policy, and classroom practices) and a third major category that is influenced by both and also has substantial effects on student outcomes (school climate). Our Effective Elementary Schools Program emphasizes primarily the study and development of effective classroom practices, the Effective Middle Schools Program addresses primarily the need to study school organization and policies in middle schools in order to establish a research base of school effects, and our School Improvement Program primarily relates to how schools can develop an effective school climate.

Our assumption that the developmental stage of students must be a major consideration in our research contributed heavily to the creation of a specific program for middle schools. The middle school is neither an overgrown elementary school nor a miniature high school; it serves students at a unique developmental stage and has an institutional history quite different from the histories of elementary and high schools.

The research that needs to be accomplished in elementary and middle schools, and in school improvement, correlates well with the research perspectives of our personnel. Our elementary school research needs to primarily (but not exclusively) draw on the perspective of educational psychology, focusing on classroom-level instructional methods. Because so much less is known about middle schools than about elementary schools, our work on middle schools will begin with analysis of national survey data as well as process-product studies to identify effective instructional practices at the middle school level. This program requires a perspective influenced by the sociology of education as well as educational psychology, focusing in the early years more on school-level than classroom-level variables. The School Improvement Program takes a perspective strongly influenced by organizational psychology. Much is known about how to make organizations more effective in defining and meeting their goals, but little of this knowledge has been applied to schools.

Program Research Strategies

Our research strategies for particular projects in all programs will depend upon the questions being asked, but are also related to the stage of current knowledge in a given research area. Different research methods vary in appropriateness at earlier and later stages of the research progression.

The progression is not totally linear. Research may be proceeding on two or three levels of the progression at once, and research that is out-of-step with the progression may nonetheless contribute important findings. Still, the progression provides a coherent ordering of a

research process. Ideally, educational research on improvement of practice should proceed as follows:

1) Basic research on learning and motivation;

2) Exploratory descriptive studies of classrooms and schools, such as ethnographic and survey studies;

3) Correlational studies of alterable school and classroom variables, such as process-product and school effectiveness studies;

4) Randomized field experiments of theoretically or empirically derived school and classroom practices;

5) Development and evaluation of school-wide improvement programs.

At each of these five stages, synthesis activities are appropriate and provide coherence as the research builds.

The research we are proposing as a Center for Effective Elementary and Middle Schools uses methods that depend upon the "state of the art" in each of our program areas. The research on classroom practices at the elementary level is relatively mature; there is a great deal of basic, descriptive, and correlational research on effective teacher behaviors. We now need randomized field experiments of classroom practices directed at solving important instructional problems; we can then proceed to school-wide improvement programs.

In contrast, the research in middle/junior high schools, and the research on school-level practices at the elementary level, is much less mature. We thus need to first study these areas through descriptive and correlational methods, the results of which will provide a base for moving on to randomized field experiments and school-wide program development.

Finally, the School Improvement Program will focus its efforts on school-wide improvement programs, using methods from organizational psychology to help schools create more effective school climates and use previously developed effective innovations.

Part 5: Institutional Activities

We recognize that good research alone does not make a national research center. We will conduct a program of institutional activities that provides for collaboration with other researchers, practitioner groups, and practitioners; provides for effective Center management and evaluation, and provides for widespread dissemination of research findings and products.

The specific activities we will conduct are described in our Plan of Operation. This overview discusses issues that relate to and guide our specific institutional activities.

Relationship with other NIE Centers and Educational Laboratories

As a national research center whose mission includes bridging the gap between research and school improvement, we view the other NIE Centers as important resources of basic and applied research on teaching effectiveness, school and student testing and evaluation, student learning processes, reading, writing, and technology. We will stay aware of and blend their work into our research, development, and dissemination of effective school and classroom practices. We will maintain close contact with these Centers, share information, and work collaboratively in areas where their research can contribute to our mission to improve schools. In turn, we can and will provide them with much information about how their research can be more effective for practice.

We will need to establish a close relationship with the Effective Secondary Schools Center, and coordinate our work on middle schools, especially, with their work on middle/junior high schools. We will need to coordinate our work on middle schools with their projects on high schools, especially to locate and collaborate on issues of the alignment between the two areas.

We view the NIE Regional Laboratories as major dissemination outlets for our work and will emphasize the use of their expertise and regional orientation. At the same time, we will respond to their needs for targeted materials. We also recognize that many of the laboratories will have strong research capabilities, and we will examine how their research programs and ours may interact.

We are confident that excellent collaborative arrangements will be established between our proposed Center on effective elementary and middle schools, the other NIE Centers, and the Regional Laboratories, in part due to the numerous colleagialties that already exist between members of our research staff and the staffs of the continuing Centers on reading, technology, and teaching and the staffs of most of the planning grant winners in the present Center competitions. We will build on existing relationships and establish productive future collaborations.

Relationships with practitioners

Close partnerships between researchers and practitioners are essential to design research and development programs that will assist school improvement. An otherwise valuable improvement in classroom instructional design can falter if it is much more difficult for the teacher than conventional practice, if it is costly to install, or if it fails to meet other classroom realities. These impediments, which often make the difference between the success and failure of moving research into practice, can be addressed and overcome by working closely with educational practitioners in the design, development, and implementation phases that follow basic research.

Close working relationships with practitioners can also help researchers identify basic and applied research that will lead to useful knowledge. Practitioners can suggest topics that are of high priority

for school improvement and help to evaluate and elaborate basic social science theories about effective school approaches. Our experience has been that good ideas and designs for high priority basic research come from many sources, and that educational practitioners are one of the most valuable sources.

This proposal was strongly guided by discussions with teachers, principals, and school administrators in many locations and types of schools. We will continue frequent two-way communication and collaboration with practitioners; to this end, we have established a Research Partnership Network composed of 32 public and private urban, suburban, and rural districts and intermediate units in our area, and plan to establish a National Effective Schools Network (these programs are described under Plan of Operation). A primary purpose of these networks is to help us learn about the problems practitioners see as most pressing and to hear the ideas they have for solving these problems. We will meet regularly with our Research Partners for free and open discussions of research findings and directions, and involve these districts in our field research as full partners in the investigations.

The importance of dissemination

The mission of the Center is to produce scientific knowledge and apply this knowledge to the improvement of elementary and middle schools. The second part of this mission -- application of knowledge -- requires that we devise and carry out strategies for disseminating the results of our work so that schools have the opportunity to use our research to improve student outcomes.

We will conduct a specific program of institutional dissemination activities that identifies the nature of the research to be disseminated (research findings and research products); determines the nature of the audience for the research and the appropriate formats for reaching those audiences, determines the available organizational channels for reaching these audiences, and determines the best strategies and materials for working through those channels. Our institutional dissemination efforts will be based on three key principles:

a) Dissemination will be a priority of our work,

b) We recognize and will act on the need to translate, interpret, and present research results in useful language and formats for application, and,

c) We will work with other organizations who share our dissemination and school improvement objectives, and who can facilitate our efforts to reach various education publics and contribute to our knowledge of effective dissemination strategies.

a. Priority of dissemination. Throughout the history of NIE's educational research centers, we have maintained our belief that research knowledge must be moved forward into educational practice and must eventually be reflected in improvement of school practice. Thus we have

maintained dissemination as a high priority and worked to build our institutional capacity to disseminate educational research findings and products in effective ways. This high priority is reflected in the following:

-- Dissemination by project directors is specified at the individual project level, but results from each project are also disseminated at the institutional level through the Support Services unit.

-- Special financing is provided by the University to support the Educational Research Dissemination Office (ERDO) in the Support Services unit, specifically created to disseminate education research findings.

-- The results of the Center's dissemination activities are documented and evaluated annually on the basis of activities conducted and audiences reached.

b. Translation, interpretation, and model building. The results of education research are published in research reports, books, book chapters, and journal articles, and are presented by researchers at scientific conventions and annual meetings. These publications and presentations establish a base of research knowledge and are effective dissemination outlets to reach other researchers and the scientific community, who will use the research to inform their own work.

But these strategies and materials are not appropriate for reaching the practitioner audience -- the state, district, and local administrative and classroom personnel who will use the information as as a base for improving practice. For this audience, the research findings must be translated into practical terms and language, and must be interpreted to reflect how their use can benefit school practice. The Center strategies for accomplishing this task include:

-- Applying the skills of a professional writer/editor to produce translations and interpretations of research findings in the form of news releases, summaries of research, and articles for publication.

-- Emphasizing the translation and interpretation of research findings by the researchers themselves, and assisting them in preparation and publication of interpretive articles in the education media.

-- Initiating ideas for interpretive articles in association and education media, and assisting the writers and editors in these media with the preparation of informative articles about Center research.

-- Assisting project directors in translating their research findings into prototypic models and suggestions for school use, when the findings have practical significance.

-- Preparing inservice and staff development workshops and activities that translate and interpret research findings and provide practical suggestions and training for school use.

c. Working collaboratively with other organizations. The primary function of many existing education organizations is the dissemination of information to specific education audiences and memberships. Among these organizations are the NIE regional laboratories, the ERIC Clearinghouses, other federal agencies and state agencies, and the many private associations that represent people with particular interests in education. These organizations represent "appropriate channels" for research Centers to work with and through in order to disseminate their research findings and products (Hollifield and Slavin, 1983).

This dissemination process, however, requires more than a simple linear approach in which research centers produce findings and other organizations willingly disseminate them. One of the emerging principles of school improvement is that the personnel involved must have some degree of ownership of the plans to be carried out and the work to be done. This principle, applied to effective dissemination, implies that early active involvement of all channels will promote effective dissemination by providing some degree of ownership of the research findings and their applications to schools.

In our institutional activities, we propose specific collaborations that include active participation by other organizations in our research agenda -- especially various education associations and the ERIC Clearinghouse on Elementary Education. Similar collaborations with other centers and the regional laboratories will be initiated as NIE determines where these institutions will be located and helps develop collaborative mechanisms among them.

Performance Report: Part C

A Futures Paper

This section presents a description of work needed to accomplish future desirable goals in elementary and middle school education. It describes the work needed in three areas -- elementary schools, middle schools, and overall school improvement -- based on the conclusions reached in the previous mission and strategy section.

Improving Elementary and Middle School Education by 1990 through Educational Research and Development

How can educational research and development help elementary and middle school education become more effective for students in the near future? This paper describes research, development, and dissemination programs that will be conducted in the next five years by the Center for Effective Elementary and Middle Schools to achieve the goal of improved school effectiveness. Work will be conducted in three areas: elementary school effectiveness, middle school effectiveness, and overall school improvement through increasing the capacity of all schools to implment innovations effectively.

In summary, this five-year period of work will (1) build upon previous research about effective elementary education to extend the research base and develop organizational and instructional processes for effective grouping for instruction, effective remediation, effective reading and writing instruction, and effective use of school resources such as technology and parents; (2) provide an indepth research base for what constitutes effective schooling at the middle school level, and develop research-based organizational and instructional processes that produce effective schooling in middle schools and (3) at the same time, work with schools to build and evaluate a school improvement process that schools can apply to use research-based information and products successfully and achieve the capacity to generate self-improvement.

(1) Effective Elementary Schools

The Effective Elementary Schools Program will identify the alterable elements of elementary school and classroom practice that are most central to educational practice and most likely to affect student learning and development, will investigate these elements in rigorous field experiments and correlational studies, and develop and evaluate prototype programs based on our findings and those of other researchers. We will write syntheses of research issues central to effective elementary education, report the results of our research in practitoner-oriented as well as research-oriented publications, and actively disseminate our programs and findings.

A major part of the elementary school student's life is spent in the classroom, thus the improvement of classroom instructional processes is a major goal of this program. We will work with four elements of effective instruction that support one another, interact with one another, and interact with the individual characteristics of students to create effective instruction -- quality of instruction, appropriate levels of instruction, incentives for learning, and adequate time for learning. In an ideal situation, all four elements would be in place, and one objective of this program is to develop research-based instructional practices that seek to optimize all four elements. At the same time, however, we will seek to better understand the effects of the interactions that occur and how they can be used in instructional practice.

Quality of Instruction.

Quality of instruction refers to the set of activities most people first think of when they think of teaching: lecturing, calling on students, discussing, helping students with seatwork, and so on. When instruction is high in quality, the information presented makes sense to students, is interesting to them, is easy to remember and apply.

Curriculum influences quality of instruction. How can different subjects and daily content within those subjects be integrated and taught so that they make sense to students? Also, teaching students to use cognitive or meta-cognitive (self-monitoring) strategies to learn from classroom instruction and using instructional methods that help students use relevant prior knowledge may improve instructional quality and effectiveness (see Brown, Campione, & Day, 1980). A research synthesis will explore the implications of cognitive psychology for classroom instruction, and the Elementary Reading and Writing Instruction Project will systematically apply the findings and perspectives of cognitive psychology to elementary reading and writing instruction.

Staff development also influences quality of instruction. Staff development practices to improve teachers' use of research findings will be examined as part of a synthesis on effective dissemination of research findings to elementary schools. And workshops for staff development in various issues will be created as part of our institutional activities in dissemination.

Appropriate Levels of Instruction

Perhaps the most difficult problem of classroom organization and management is dealing with the fact that students come into class with different levels of prior knowledge, skill, learning rate, and motivation. Teaching a class of twenty to thirty students differs fundamentally from one-to-one tutoring. If one lesson is taught to the whole class, some students will already know the material or learn it quickly, some will learn slowly, some will learn partially, and some will not learn at all, because each student differs somewhat in prerequisite knowledge, ability, aptitude, and interest.

Recognition of these instructionally important differences leads many teachers to search for ways to individualize instruction, adapt instruction to meet students' different needs, provide additional instruction to remediate deficits in skills or background knowledge, or group students to reduce the range of instruction they have to provide. However, these solutions may create serious management and motivational problems (Slavin and Karweit, in press).

Because methods for accommodating student heterogeneity are so important, but poorly understood, we will include several projects on these topics. At the classroom level, methods of accommodating student heterogeneity include the use of individualized instruction, within-class ability grouping (e.g., reading and math groups) and mastery learning. Three research syntheses will review research on these issues; one on

between- and within-class ability grouping, one on individualized instruction, and one on mastery learning. The Grouping for Instruction Project will contrast whole-class, ability-grouped, individualized, and homogeneous/heterogeneous student groupings in mathematics instruction to investigate the consequences of each for accommodating student differences. This project, and the Reading and Writing Instruction Project will also investigate effective class management using ability grouping. And a Survey Research on Elementary School Organization and Practice Project will include a detailed examination of the national prevalence and effects on students of between- and within-class ability grouping in the elementary school.

Remediation of learning deficits is another facet of the problem of accommodating student heterogeneity. How do schools deal with students who fall behind their classmates in critical skills, and what strategies can bring students up to grade level so they can profit from regular classroom instruction? Several projects will address this problem. A research synthesis will examine the evidence on alternative means of dealing with student deficits, including special education, Chapter I/Title I, summer school, and retention in grade. A Remediation Project will develop and evaluate specific ways to use special education, Chapter I, and other remedial resources (including microcomputers) to correct specific student deficits in understanding routine classroom lessons before these small deficits accumulate into large ones. The project on Elementary Reading and Writing Instruction also studies appropriate uses of special education and Chapter I teachers to support students' success in the regular classroom, and the School and Family Connections Project explores how teachers can involve parents to help students having difficulties in mathematics. We will also survey current remedial practices in elementary schools and assess their correlates and effects.

Our study of School and Family Connections also includes a longitudinal study of students as they pass through the first, second, and third grades, that examines family influences on the students' success or failure in school and the process by which some students begin to fall behind in the early grades. A similar theme is carried into the upper elementary grades in a project that will interview low-achieving students in upper elementary and middle grades to determine how self-concept of ability and self-expectations change over time for students who receive repeated negative feedback on their academic efforts. Finally, another project will examine how school resources can be used more effectively to ensure that all students in the early grades attain an acceptable level of skills.

Incentives

Student motivation to learn may come from personal characteristics (such as their curiosity, desire to please, or positive orientation toward learning), from characteristics of tasks (such as the interest value of the material being learned), or from rewards provided by the teacher or the school, parents, peers, and others (such as praise, grades, and certificates).

Classroom strategies for increasing student motivation include using praise and feedback to students effectively (Brophy, 1981), expressing positive expectations for students and using instructional strategies to make these expectations come true (Cooper and Good, 1983), and involving parents in their children's schoolwork (Epstein, 1982). One critical issue of incentives is that the traditional grading system makes success more available to some students (those with high ability and prior preparation) than to others. We have found alternative incentive systems -- reward-for-improvement and continuous-progress systems -- to be effective supplements to traditional grading, allowing all students to receive academic rewards (see Slavin, 1980, in press). Also, the use of cooperative learning methods, in which students work in small groups and are rewarded on the basis of all group members' individual learning, has been found to increase student achievement (Slavin, 1983a,b).

At the school level, grading policies and systems are primary issues. The bases on which students are evaluated, the perceived legitimacy of the evaluation, the frequency with which assessments are given, and other aspects of grading have been found to affect student motivation (Natriello and Dornbusch, 1984).

Our proposed research will use these earlier findings on effective incentives in our development of effective instructional strategies. Cooperative learning strategies and continuous-progress evaluations will be included in the Grouping for Instruction and Reading and Writing projects to increase student motivation to learn. Motivation also plays an important part in our studies of computer-assisted instruction and school-family partnerships.

Time.

Instruction takes time. But more time spent teaching a subject does not always mean more learning (see Karweit, 1981; 1985).

If teachers prepare and organize well, and students behave, want to learn, and have a sense of purpose and direction, there should be adequate time for students to learn. However, if interruptions, behavior problems, and poor transitions between activities occur often in the classroom, the time available for learning becomes less adequate (see Arlin, 1979; Karweit, 1981).

The teacher's knowledge of the subject matter and ability to teach it influences quality of instruction. Departmentalization, which elementary schools may apply in the upper grade levels, allows teachers to specialize in subjects in which they are most proficient and interested, and should improve instructional quality. However, departmentalization may have drawbacks, such as diffusing teachers' responsiblity for individual students. These issues will be examined in our Survey Research on Elementary School Organization and Practices.

Technology influences the quality of instruction. Effective use of microcomputers stands to improve quality of instruction immensely, but schools and teachers are currently struggling with multiple problems of

integrating microcomputers into their schools and classrooms in effective ways. This issue will be addressed in two projects: Instructional Uses of Computers, and Remediation.

Effective use of classroom time involves management strategies to increase student time on-task, as well as effective time management on the part of the teacher (Brophy and Putnam, 1979; Evertson, et al., 1984; Doyle, 1980). Homework can provide students with additional time to practice skills they learned in class as well as to explore issues beyond those they were taught. More effective use of homework time will make an important contribution to instructional effectiveness (Epstein, 1985c; Keith & Page, 1984; Rickards, 1982; Austin, 1978).

Several of the projects of the Effective Elementary Schools Program relate to effective use of time. The Grouping for Instruction Project will investigate students' use of time during seatwork and loss of time in transition activities in its development of classroom management strategies for classes using whole-class, ability grouped, and individualized mathematics instruction. The Elementary Reading and Writing Instruction Project will examine management of follow-up time in its development of effective strategies for dealing with reading groups. The School and Family Connections Project will examine strategies for extending instructional time beyond the confines of the school day by involving parents in assisting their children with mathematics and science work at home. A homework project at the middle school level will also examine elementary school implications.

A Five-Year Goal

Our objective is to do the research necessary to improve student learning and development by improving school and classroom practice in elementary schools. In the five years of our work, we will provide useful research information for schools to use to improve and we will provide tested practices for improvement.

(2) Effective Middle Schools

Research and development on middle-level schools must begin at an earlier stage than research on other school levels because there is little good scientific information on middle school and classroom differences and their effects. Nevertheless, goals for our work in this Program are similar to the goals of our Program on Effective Elementary Schools. Over a five-year period our goal is to make middle schools more effective for all students by providing and applying research-based knowledge on how the alterable variables of schools and classrooms are linked to school climate, learning processes, and student learning and development.

Building a comprehensive knowledge base

We will, in the next two-and-one-half years, conduct a national survey of middle school organization and educational practices and analyze the data to provide a comprehensive research base on (1) the current ways that education is organized and delivered in middle schools, and (2) the connections at the middle grades between school organization, classroom practices, and important student outcomes. This research base will be supplemented by analyses of existing data sets that provide specific information about the contribution of school grade-span and size to effectiveness at the middle grades, the effects of minimum competency testing and remediation programs on student performance in the middle grades, and the effects of school organization factors on middle school climates and effectiveness.

Thus one of the first objectives of this program is to provide a knowledge base concerning effective middle schools. This base will provide practitioners with concrete information about middle school organization and practices and their effects on students -- information they can apply to policy decisions. The knowledge base will provide researchers with specific indications of areas in which further research is needed. And it will provide both researchers and practitioners with a base from which to develop specific school policies and school and classroom practices to achieve the goals of middle school education.

Specific Issues

Even as we work to build a comprehensive knowledge base, some specific issues of middle school education will be given concurrent attention. These issues include parent involvement in middle schools, homework, use of computers in instruction, evaluation and incentives, and study strategies, each of which will be examined to see how their effectiveness can be increased in middle school education.

Parent Involvement in Middle Schools. This project will investigate this vital but under-researched element of effective schools at the middle school level, analyzing parent involvement data from A Study of Schooling and the Pennsylvania Educaitonal Quality Assessment to identify effective involvement practices, and developing and testing teacher practices for involving middle-school parents in their children's schoolwork.

Instructional Uses of Microcomputers. This project will analyze the 1985 National Survey of Instructional Uses of School Computers to provide a knowledge base on school uses of computers. This research information will guide further work, which will include quasi-experimental studies in schools to produce effective uses of microcomputers in basic math, writing, and problem-solving instruction for elementary and middle schools.

Evaluation and Incentives. Effective middle school use of student evaluation and incentive processes will be examined in a research synthesis of available studies, and a field experiment on increasing student motivation through departmental exam procedures will be carried out.

Study Strategies. This project will develop and test study strategy programs to help students improve their abilities to learn from text materials. The programs will be developed from the existing research base and tested in fifth- and sixth-grade science.

(3) School Improvement

The work of the Effective Elementary Schools and Effective Middle Schools programs will produce a knowledge base on effective schooling and numerous research-based innovations for schools and classrooms. But more is required to achieve school improvement. Schools must be able to effectively implement research-based innovations, and must be able to develop and apply their own school effectiveness programs and procedures using research information.

The work of the School Improvement Program will seek to provide this bridge between research and practice so that the work of the Center for Effective Elementary and Middle Schools will be effectively applied by schools over the next five years. This Program's objective is to help schools develop the capability to not only use that research to improve themselves, but to develop the capacity for continuous improvement from within, either by choosing to adopt external innovations or by systematically developing and evaluating their own improvement procedures through effective organizational performance.

Barriers to implementation

Among the reasons schools have difficulty in replicating innovations or in implementing innovations of their own design are the following:

1. The innovations are not accompanied by detailed behavioral descriptions of the technologies involved; they lack implementation standards that tell implementers whether they have accomplished implementation (Gottfredson, 1984).

2. Limited attention is paid to the organizational context in which innovation is being attempted; and to the behavioral regularities or "culture" of the school (Sarason, 1971; Sarason & Klaber, 1985; Schein, 1985) that maintain the status quo (cf. Griffin, 1983; Hord, Thurber & Hall, 1981; Noblit, 1984).

3. Previous attempts to implement innovations have failed, which has led to a climate of limited expectations for quality implementation. Repeated failure might be avoided by redefining the scope of the problems to be solved (Weick, 1984).

4. National, state or district level innovations receive limited or unrealistic management assistance and support -- often using one-shot training by outside consultants (or district or state facilitators) as the sole impetus for innovation.

5. Implementation attempts include inadequate (or counterproductive) goal, task, observation, and reward structures (Porter & Lawler, 1968) that do not enable effective follow-up on training, lack principal participation in training and principal leadership in follow-through, lack communication structures to convey information thoroughly and accurately horizontally and vertically in the organization, and sometimes reward the suppression of information rather than valuing all information whether it is good or bad news (French & Bell, 1978).

6. Teaching staff and administrator attitudes favor modifying intervention rather than replicating essential features of proven educational technologies, which sometimes result in deviations from key aspects of the technologies necessary for their effectiveness.

How can schools actually use educational research to become more effective and develop their own capacity to increase effectiveness?

The organizational characteristics and programmatic regularities of schools must be clearly addressed to achieve full implementation of a new program. One way of coping with such regularities to manage innovation is to use the Program Development Evaluation method (PDE, Gottfredson, 1984). The method involves explicitly considering the organizational culture surrounding a particular innovation. The method was piloted as part of a nationwide evaluation of school-based delinquency prevention programs (Gottfredson, 1982; Gottfredson, Gottfredson & Cook, 1983) and has been field tested in suburban and urban middle and junior high schools (Abee, 1984; Gottfredson, 1985b). The method appears effective for improving the quality of implementation of school improvement programs.

School Improvement in Five Years

Two projects conducted by this program will provide a base for improving schools. One project will evaluate the implementation of multiple innovations in an urban middle school that uses the PDE method; a second project will develop procedures and modules to train principals to be effective leaders.

Experimental Field Trials of Interventions to Improve Student Behavior. This project will apply a school improvement process to help urban middle/junior high schools implement three research-based interventions for increasing student attendance and school and classroom order. The experimental evaluation will test the effectiveness of the improvement process and the interventions.

Enhancing School Performance in Implementing Innovations: Increasing School Effectiveness by Improving Leadership in Program Implementation. This project will work with the North Carolina Department of Public Instruction's Principal Institute and with the South Carolina Department of Education to research, develop, and evaluate leadership modules for training principals nationally to effectively implement school change.

We would expect two outcomes of these projects: a tested, fully developed process of school improvement that all schools can use to become more effective; and a tested, fully developed process and materials for training principals to produce school effectiveness.

Putting It All Together

The work of the three programs of the Center for Effective Elementary and Middle Schools will produce in the next five years specific knowledge and research-based processes for improving school effectiveness and a research-based method that schools can use to implement the knowledge and processes as well as develop their own inate capacity for improvement.