DOCUMENT RESUME

ED 272 555 TM 860 471

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TITLE A Model for N.C.E.S. Research on School Organization and Classroom Practices.
SPONS AGENCY National Center for Education Statistics (ED), Washington, DC.
PUB DATE Sep 85
NOTE 40p.; In: Invited Papers: Elementary/Secondary Education Data Redesign Project, October 1985; see TM 860 450.
PUB TYPE Viewpoints (120) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Classroom Research; *Data Collection; Elementary Secondary Education; *Information Needs; Institutional Characteristics; *Instructional Improvement; Models; National Surveys; Questionnaires; *Research Design; *School Effectiveness; School Organization
IDENTIFIERS Effective Schools Research; National Center for Education Statistics

ABSTRACT

A model is presented for studying how schools provide instruction to students. A major function of the National Center for Education Statistics is to collect data for understanding and improving how schools provide instruction. The model describes school factors (characteristics, staffing, organization, policy, and student evaluation); classroom operating conditions (instructional quality time on task, and social and learning environment); student inputs (individual needs, abilities, and interests); peer group and community factors; and student outcomes (academic skills, personal development, and attachment to school and good behavior). A number of guidelines for research design are discussed: (1) the school or classroom, not the student, should be the unit of analysis; (2) the sampling unit should be the school and classrooms, and a wide variety should be included; (3) school policy and classroom practices need to be measured appropriately; (4) descriptive data should be collected before causal conclusions can be made; and (5) the impact of school-level treatments on students should be measured and continued as students move on. Fourteen sample questionnaire items are included, as well as a five-page reference list. (GDC)

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# A Model for N.C.E.S. Research on School Organization and Classroom Practices

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TM 860 471

# A Model for N.C.E.S. Research on School Organization and Classroom Practices

N.C.E.S. has two principal data collection functions. The first is to produce, on a regular and recurring basis, important descriptive statistics on the functioning of educational institutions. Recurring descriptive statistics provide comparative and historical measures that help us understand how educational services are provided to people in different places and circumstances.

The second data collection function of N.C.E.S. is to provide information not otherwise available to improve our understanding of the consequences of different ways of providing schooling to students---consequences which, if better understood, could lead to the improvement of the delivery of educational services. It is this second data collection function--gathering data for understanding and improving how schools provide instruction--that is our own primary interest and is the focus of this paper.

The paper has three parts. First, we present a model of important aspects of the provision of instruction in schools that prior research suggests may make the most difference in student outcomes. Second, we describe the type of research that we feel is necessary to answer questions implicit in the model, and we outline a specific research design that addresses these issues in a concrete way. And third, we provide a selection of survey questions that would form a portion of the information needed in a research project such as we have outlined.

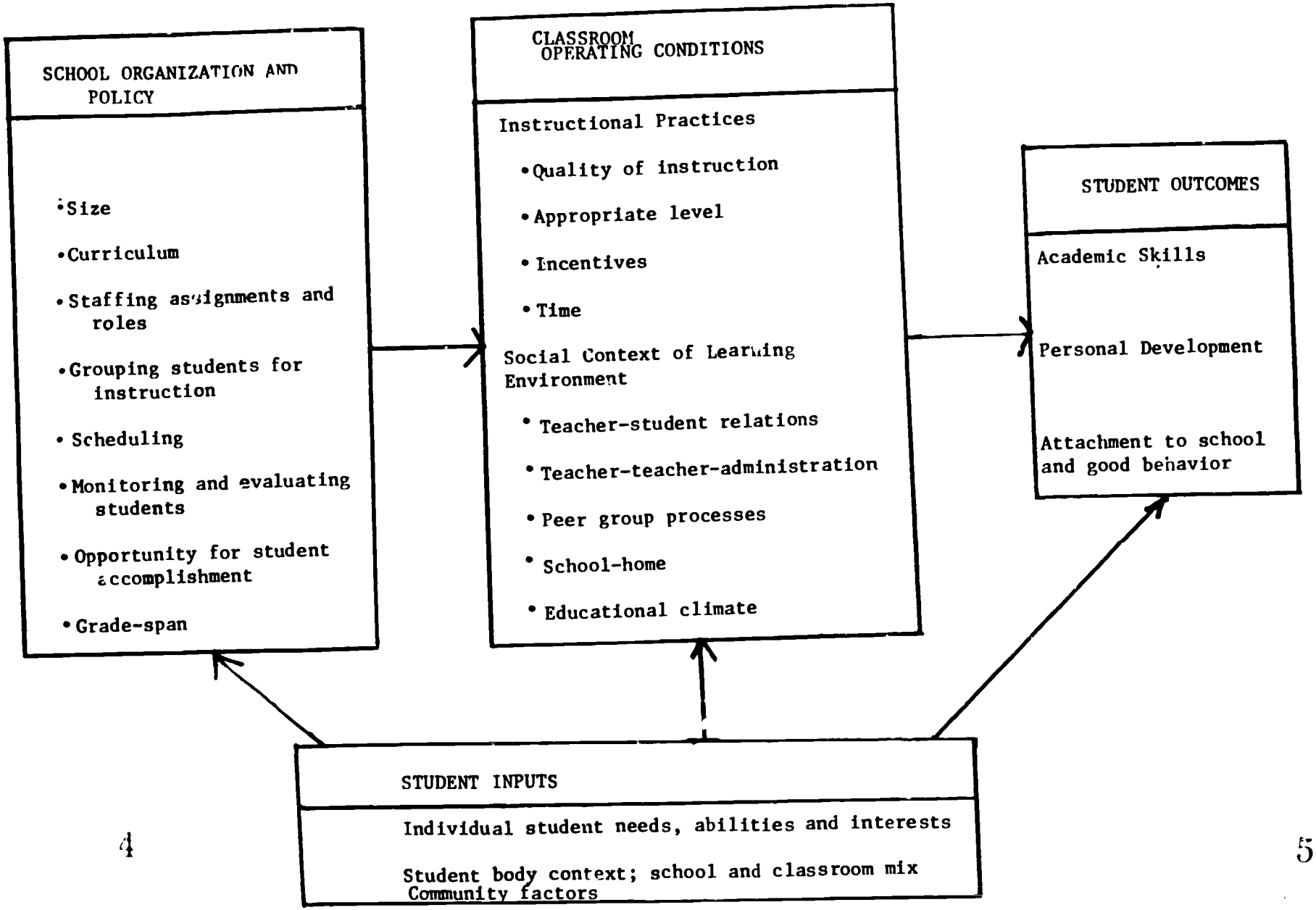
## I. A Model to Guide Research

In order to appropriately discuss data collection strategies and designs for an N.C.E.S. program of providing data for school improvement, we must begin with a model of the dimensions of school instruction that are alterable by policy and training of the participants and for which alterations might be likely to improve at least some important outcomes for students.

Figure 1 presents such a model of school factors and student outcomes. The model includes two key working assumptions. First, student learning is most strongly affected by the most <u>proximate</u> influences on the individual: one's own home and one's own classroom. To represent this, we have separated general school factors from immediate classroom conditions in our model, and we show causal impacts on student outcomes to come primarily from classroom conditions and student inputs, which include home background.

Second, although classroom conditions have the most immediate impact on student learning and development, these classroom conditions are

Figure 1


SCHOOL ORGANIZATION AND POLICY
•Size
•Curriculum
•Staffing assignments and roles
•Grouping students for instruction
• Scheduling
•Monitoring and evaluating students
•Opportunity for student accomplishment
•Grade-span
CLASSROOM OPERATING CONDITIONS
Instructional Practices
•Quality of instruction
•Appropriate level
• Incentives
• Time
Social Context of Learning Environment
• Teacher-student relations
• Teacher-teacher-administration
• Peer group processes
• School-home
• Educational climate
STUDENT OUTCOMES
Academic Skills
Personal Development
Attachment to school and good behavior
STUDENT INPUTS
Individual student needs, abilities and interests
Student body context; school and classroom mix
Community factors

themselves facilitated by school organization and policy. Various combinations of school organization and policy will enable effective conditions to be established and support their continuation, while other combinations of school organization and policy will inhibit effective conditions from taking root and discourage their persistence. We represent this facilitating function in our model by a causal link between school organization or policy and classroom conditions. We have used the word "facilitate" rather than "cause", because the link between school organization and classroom conditions is an enabling or supporting connection rather than a determining connection. Effective classroom conditions, including excellent instructional practices and an appropriate social environment, can sometimes develop in many different kinds of schools using a variety of organizational structure and formal policies. For example, an outstanding teacher can usually function effectively in his or her own classroom regardless of the way the school is organized. Nevertheless, school organization and policy can facilitate the development of effective teaching.

There is practical as well as theoretical significance to the distinction we make between "school organization and policy" factors and "classroom operating condition" factors of effective learning environments. We believe it is possible to change either set of factors in a school improvement plan, but the changes in each involve different kinds of problems.

"Classroom operating condition" factors include instructional practices of teachers and social context variables such as interpersonal relations and normative climates. We have learned through recent efforts at school improvement that it is possible to directly improve the instructional practices of teachers through staff development programs with explicit training in improved practices (Gage, 1984). But because many of the improved techniques for teachers require professional judgments in constantly changing classroom situations (for example, discipline management techniques), the success in changing these operating conditions will depend in part on the professional capabilities of each individual teacher. Even more problematic are direct improvements in social context and interpersonal factors of classroom operating conditions. Workshop and staff development materials are available (Brookover et al, 1982) but their impacts on change have not been carefully evaluated, and even strong advocates of the "effective schools" movement will admit that social context factors such as "teacher expectations" or "the educational climate" are difficult to change directly.

Thus, one practical approach to school reform is to improve the proximate classroom operating conditions that are most important for student outcomes, but this approach must be able to directly alter teachers' (often idiosyncratic) instructional behaviors and the elusive informal and interpersonal context of instruction.

A second complementary practical approach to more effective education is to work on "organization and policy" factors in the school. In our model, we list eight general factors in this category, ranging from

school size and grade-span to policies on how to staff, schedule and group for instructional activities. While it may be no easier to change organizational and policy factors than to improve classroom operating conditions, the problems are different. With policy and organizational change, the problems are more likely to be political and bureaucratic (changing formal regulations, rearranging spheres of influence, overcoming inertia). With change of classroom practices, the problems are more likely to involve limitations of individual competencies or personalities.

But there are some clear advantages to making improvements at the level of policy and organization, because these changes often will last through the inevitable changes in personnel of a school, they often will facilitate improvements in a large number of proximate classroom conditions, and they often can be coordinated at the state, district and school levels. Making these improvements, though, requires a clearer understanding of how school organization and policy changes can facilitate improvements in the classroom operating conditions, and what practical approaches can induce reliable changes in the relevant school organization and policy factors.

The distinction between the school and classroom levels is, of course, more complex, because organization and policy factors can be at the classroom level as well as the school level (for example, instructional grouping practices in the classroom) and proximate operating conditions of learning environments can also involve school level factors (for example, relations between teams of teachers who come from different subject-matter departments).

We next discuss the specific variables within each of the major parts of our model, as well as the major potential causal relationships among the variables.

## Student Inputs

We include student inputs in our model, not because these are alterable factors, but because the effectiveness of a school depends upon how well it is designed to meet the special needs, interests and abilities of its students.

We believe the design of effective schools requires close attention to student heterogeneity, to peer group influences, and to the socioeconomic composition of the student body.

Heterogeneity. For any given age, students will be at a wide variety of different stages of biological development, cognitive growth, and personal and social maturity. The extent of this heterogeneity grows greater with increasing age. A classroom may contain pairs of students of the same age and sex whose academic and extra-curricular performances less resemble each other less than they do others who are significantly younger or older than themselves.

This student diversity has important implications for the staffing and operation of schools. School organization and instructional policies may need to permit flexibility in learning arrangements and activities to facilitate teacher efforts to effectively engage the attention and effort of these diverse students.

The peer group. The peer group plays a powerful role in students' social and psychological development. The school may affect the direction and power of peer group influences (Epstein and Karweit, 1983) by the way it creates conditions for particular associations to form through the demography of classroom student assignments and extra-curricular memberships. The strength of the norms of any single peer group can depend upon the number and variety of peer groups to which an individual is attached, which also may be affected by school practices that promote or allow student contacts. The way classroom rewards are structured, especially the interdependencies of student tasks and evaluations, may also affect the relative priority placed on academic and non-academic pursuits by student peer groups (Slavin, 1983).

Student-body composition. Student-body composition is the race, sex, and social class mix of the students enrolled in the school. Research has strongly suggested that student body composition is a major influence on the normative climate of a school (Coleman et al., 1966), and may constrain the types of policies and structures that can be established in a school (McPartland and McDill, 1982). Similarly, community influences can be important inputs that affect school programs, (Gottfredson and Gottfredson, 1985) including the level of support or opposition given by the community to school officials.

In research, it is always necessary to control for the influence of student background when estimating the effectiveness of school programs. But it is also important to attend to the ways that school programs and student inputs interact so that identical school programs produce dissimilar effects on students from different backgrounds. Thus, it is important to discover what particular learning experiences are most effective for individual students with specific needs or interests.

## Student outcomes.

Several different classes of student outcomes are important for research to consider. Besides student learning of academic skills and attaining of academic competencies which is the main goal of education, student outcomes on a variety of measures of personal development and attachment to school take on special meaning as students get older.

Academic skills. Student learning of basic knowledge and skills in the main academic areas is a primary outcome. Instruction in academic subjects is the main purpose for which schools are established, and society expects the schools to accomplish this goal.

The curriculum requires attention to both basic skills in the mechanics of reading, writing and arithmetic and the development of

higher order academic skills in the major subjects such as comprehension, problem solving, expository writing and critical thinking. There is some evidence of serious general problems of school effectiveness on both aspects of academic growth and development. For example, many local school officials believe their basic skills test score results show a noticeable drop-off in success at grade 5 and the subsequent middle grades that is not well-understood. At the same time, results from the National Assessment of Educational Progress on recent tests of mathematics, reading and writing suggest that improved performance may be especially evident on those exercised more easily learned by memorization and taught by rote drills, rather than on exercises calling for more complex thinking and measuring the ability to apply concepts to problem solving (National Center for Education Statistics, 1984).

Personal development. Schools may help students develop such psychosocial maturity outcomes as growth in self-discipline and self-regulation supported by a positive sense of self and well-developed internal goals, values, and standards.

In addition, one can think of a long diverse list of other non-academic talents and coping skills that are valuable to the individual and may be fostered in effective schools. These include abilities in music or the creative arts, leadership and interpersonal skills, work habits of industry and accomplishment, and coping skills in a variety of organizational and social settings. Our scientific knowledge is not well-developed of the numerous human non-academic talents that are needed and rewarded in adult life (e.g. Coleman, 1980). Consequently, researchers have not usually tried to measure non-academic talents in their studies of school effects (exceptions include the diverse checklists of student activities and accomplishments regularly used on National Merit and ACE surveys of college bound students).

Attachment to school and good behavior. How students react to their school life is an important outcome in its own right (Epstein, 1983), but it is also instrumental for other school effects on students. If students are chronically absent because they lack positive feelings toward the school, little learning is likely to occur. If a students are frequently having serious disciplinary problems with teachers and school officials, the school experience is not helping them develop the personal maturity needed later to successfully fill adult roles in work and community settings.

Chronic absenteeism by significant numbers of students occurs at the secondary school level, especially in large urban districts. Serious problems of violence and delinquency in school also begin in the middle-school years.

Drug and alcohol abuse, teenage pregnancy and the tragedy of teenage suicide are also serious problems where educational factors contribute to their later occurence. We have elaborated elsewhere how success or failure in school plays a unique role in the etiology of serious teenage problems (McPartland and McDill, 1977).

Classroom operating conditions.

The third of the four major elements of the model in Figure 1 is the group of "operating conditions" that directly affect student development, learning, and performance in classroom settings. We specify two broad categories of classroom operating conditions: specific instructional practices and the social context of learning.

Instructional practices include the way teachers design their lessons, deliver their instruction and manage their classrooms to create effective learning activities. A great deal has been learned in recent years on this topic as educational psychologists have established specific components of effective instructional practice in the elementary and middle grades.

The social context of learning includes the social and interpersonal conditions that operate during classroom learning activities. These conditions include student-teacher relations, peer group processes, relations among teachers and between teachers and administrators, school-home relations, and normative climates. Educational sociologists and social-psychologists have shown that these elements are important for effective schools, but much less is known about how to capture or direct these forces in schools than is known about how to train teachers in effective instructional practices.

Associated with Figure 1, we will discuss four different elements of instructional practices and five different elements of the social context of learning.

Instructional practices. Four elements of effective instructional design have been clearly identified: (1) quality of instruction (2) appropriate level of instruction (3) incentives for learning and (4) time utilization (Slavin, 1984; Rosenshine and Stevens 1984. Carroll, 1963; Karweit, 1982; Brophy, 1983; Anderson, et al, 1985; Brophy and Good (in press); Doyle (in press).

Quality of instruction is the degree to which the proper information or skills are presented to students in an appropriate form, sequence, and pace. Research evidence is clear that students learn more when the pace of instruction moves through more material in the same period of time, without sacrificing student comprehension. While content coverage is a strong predictor of achievement, we do not yet fully understand the interplay of classroom practices that maintain both a fast pace and a high rate of successful student mastery (Commission on Reading 1985, p. 88). However, many of the key elements appear to be potentially under the control of the classroom teacher -- such as establishing a clear plan of steps with appropriate materials for specific learning objectives, and the effective use of feedback fo increase student mastery.

The appropriate level of instruction is the degree to which material is presented to students at a level where individual students have the prerequisite skills to understand the material but have not already learned it. Some methods of targeting instruction go hand-in-hand with

teacher practices that establish high quality instruction, such as the frequent assessment of students' level of mastery to link new material to previously learned concepts and to present materials that students can handle with a high success rate. But the appropriate level of instruction is also affected by the way students are grouped, whether whole-class, subgroup or individualized instruction. Again, researchers disagree about the efficacy of ability-grouping practices and the extent of the problems of management and motivation in using various individualized approaches.

Incentives for learning is the degree to which students are motivated to work on instructional tasks and to retain what is taught. Student motivation has been a major topic in educational psychology over the years and can be approached from a number of different directions (Ames and Ames, 1984). The sources of student motivation are many, but they usually include elements potentially under the control of the classroom teacher, especially in terms of how student performances are tied to formal and informal evaluations and rewards (Natriello and Dornbush, 1984). We now understand some useful motivational principles of incentive systems, especially related to the frequency and accessibility of valued rewards, and can incorporate these principles into teachers' classroom practice (Slavin, 1984). But, except for research on group incentives in the classroom and the use of home-based reinforcers, there has been little scientific study of alternative classroom evaluation and incentive systems as they affect student motivation and learning.

Time for learning is the degree to which students are given adequate time to learn what is taught. More time does not directly equal more learning, but more time in high quality instruction that is at the students' appropriate instructional levels will produce more learning. It is the "engaged time," when a student is productively involved in appropriate learning tasks, that matters. This depends upon the allocated time plus the teachers' skill in managing the class. Effective classroom management will minimize discipline problems and will minimize disruptions to learning activities from discipline problems that do arise. Skilled teachers will have efficient routines for managing potentially time-wasting chores that can accompany instructional activities (Karweit, 1983, 1984).

Social context of learning. Effective schools also include key elements of classroom processes that may not be so directly under the control of a classroom teacher as the components of instructional practice just described. These elements include, among others, the interpersonal relationships that occur among students and adults in the classroom, and the social climates that develop to produce different reputations and expectations for performance. The interpersonal aspects of learning environments have received special attention from many educators seeking to create schools that meet the developmental needs of their students (e.g. Lipsitz, 1985; Alexander and George, 1981), but few arrangements for changing interpersonal relations of students and teachers have been carefully evaluated.

For example, many critics of traditional junior-high schools focus on teacher-student relationships as a significant problem in these schools. The "middle school movement" developed in part as a reaction against formalized teacher-student relationships found in junior-high schools, which were seen as an outcome of modeling instruction for intermediate grade students on similar structures used in senior high schools. Instead of the typical secondary school's "subject-matter orientation" that emphasizes teacher expertise in a curriculum specialty, a "pupil-oriented" environment was called for to permit a closer teacher-student relationship to foster student personal development. The early adolescent is moving toward more self-regulation and autonomy during this period but, according to this view, still needs close personal contact with at least one adult in the school to support this growth. These more personalized and supervised teacher-student relations reflect typical elementary school practices, but advocates of this position expect teachers to also meet young adolescent needs for independence and self-direction. Little research exists on the dynamics of adult-student relationships that work well for the personal development of young adolescents who are at different stages of self-reliance.

Teacher-to-teacher relationships are also important aspects of the learning environment. The instructional flexibility needed to meet the diverse needs of students depends upon teachers cooperating with one another. Many educators advocate creating teams of teachers to work with shared student groups. They reason that teams can (1) more correctly diagnose individual needs and tailor learning experiences to meet those needs; and (2) more creatively develop lively learning activities that will appeal to children's and adolescents' sense of action, fun, and fantasy, which will better hold their attention and promote enthusiastic effort.

Advocates of teachers working as teams expect greater coordination of learning activities across formal subjects. However, no research has carefully and scientifically compared the actual advantages of different uses of teaching teams with the possible disadvantages that may occur if individual teachers do not get along, do not share common educational views, or do not effectively use common time to diagnose student needs and coordinate instructional responses.

Relationships among students in peer groups also can greatly influence the kind of learning environment that is created. Peer support is highly valued in the growing up process for most young people, but the peer influences can vary greatly in strength and direction for different individuals.

Which students an individual associates with may have a powerful effect on personal development. How many peer groups and close friends an individual is attached to may determine how influential any particular circle of friends may be. The overlaps among a student's associates in class, in extra-curricular activities, and outside of school may also influence peer group effects. Some research has examined these topics (Epstein and Karweit, 1983), but much more needs to be learned about how to coordinate the forces of the peer group to help students achieve academic and developmental goals.

The general climate or ethos of a school is also important to an effective learning environment. This factor includes the goals and normative expectations for behavior that develop in the school, and the collective reputation or image that can influence how an individual identifies with the school and is guided by its norms. Important dimensions of a school's climate include the strength and direction of the shared goals and expectations, and their clarity and consistency for subgroups of students and teachers.

Although there is agreement among researchers that more effective schools stand out from others in their educational climates, how different climates develop in schools that enroll similar student populations is not well understood.

School organization and policy.

To reliably create appropriate instructional practices and learning environments in schools, we need to understand how classroom operating conditions depend upon the enabling and support structures -- the organization of the school and its administrative policies. These school organizational and policy variables include school size, curriculum policies, staffing patterns and roles, grouping of students for instruction, scheduling, student monitoring and evaluation procedures, opportunities for student accomplishment, and grade-span.

To emphasize how schools may differ on these organizational and policy factors, it is helpful to compare the "typical" elementary and secondary school. Data should be collected on the actual distribution of school organization and classroom practice factors by educational level, since no reliable national data now exists on these matters. For this discussion, we will speculate on the differences between elementary and high school levels, and consider some other possibilities between these extremes. We will also discuss how each organizational and policy component may affect instructional practice or learning environments and what major research now exists on these effects. Table 1 was prepared to accompany these discussions.

School size: Size is a potentially important element of school structure at all levels because the number of students in a school can affect (a) student-teacher relations, (b) relations between teachers and school administrators, and (c) the types of peer contacts that result from classroom assignments and participation in extra-curricular activities.

Large schools may reduce the chances for positive student-teacher interactions, by making it less likely that students will feel closely supervised by teachers or that each student will develop a close personal relationship with an adult in the school (Garbarino, 1978; McPartland and McDill, 1977). Compared to a small school where most teachers would recognize most students by name, a student is more likely to "get lost" in the depersonalized environment of a large school.

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Table 1

SCHOOL ORGANIZATION AND POLICY OF

TYPICAL ELEMENTARY SCHOOL AND TYPICAL HIGH SCHOOL

| | SCHOOL ORGANIZATION OR POLICY | "TYPICAL" ELEMENTARY SCHOOL | "TYPICAL" HIGH SCHOOL |
|---|---|---|---|
| 1. | Size | Small | Large |
| 2. | Curriculum | basic skills, required courses courses | higher order skills, some electives |
| 3. | Staffing assignments and roles | | |
| | a. number of different students per teacher in a typical week. | one class (20-30 students) "self-contained classroom" | several classes (100 or more students) |
| | b. number of different subjects taught per teacher | all major subjects in the grades | one subject-matter specialty "departmentalized" |
| | c. number of different teachers per student | one | several |
| | d. Principal's role | instructional leader | school manager |
| | e. Advisory/guidance role | classroom teacher assumes responsibility for diagnosing student needs and providing or funding assistance | students are more responsible for seeking help when needed; adult guidance specialists are provided |
| 4. | Grouping of students for instruction | | |
| | a. homogeneous groups | within-class ability grouping | tracking and program differentiation (between-class grouping) |
| | b. low-achieving students | corrective instruction within class | separate remedial classes special teachers |
| 5. | Scheduling | | |
| | a. Time-schedule | flexible timing under control of teacher | fixed schedule of periods as students change classes |
| | b. student-schedule | intact classes of students remain together (self-contained classroom or block schedule) | students regroup for each period as they change classes |
| | c. required/elective courses, classwork | courses are required, teacher assigns classwork | combination of requirements and student electives of courses and classwork from teacher defined alternatives, occassional independent study |
| 6. | Monitoring and evaluating students | | |
| | a. grading practices | balance positive evaluation for both student performance and effort. | evaluations based on performance comparisons |
| | b. discipline | classroom variations in discipline management are permitted within school rules and procedures (personal authority) | school-wide rules, codes and procedures are in force (bureaucratic authority) |
| 7. | Opportunities for student accomplishment | limited or no extra-curricular activities | extensive program of clubs, teams and activities |

According to this view, students will more often be left to their own unsupervised activities in the anonymity of large schools.

Administrative practices are more likely in large schools to rely on bureaucratic processes, such as reliance on standard rules and regulations for governing teacher and student behavior. Relations between school staff members may be more impersonal and inflexible, which can create lower morale and an unwillingness by the staff to respond in innovative ways to problems (Garbarino, 1978). According to this view, in larger schools communication among staff is more difficult, school administration is more cumbersome, cooperation between faculty and adminstration in planning and implementing new programs is reduced, and clear well-understood policies are less likely. Some research does show smaller school size to be related to teachers' positive perceptions of school administration (Ebert, Kehoe and Stone, 1984; Gottfredson, 1985), to the absence of attendance problems among teachers (Winkler, 1980) and to cooperative educational activities among the teaching staff (Bridges and Hallinan, 1978; Bridges and Hallinan, 1978).

Smaller schools may also produce different peer groupings of students because extra-curricular offerings and tracking practices are affected by the size of the student body. Research at the high school level has shown that small schools often induce a higher percentage of students to get involved in extracurricular activities (Baird, 1969; Barker and Gump, 1964; Grabe, 1981; Kleinert, 1969; Wicker, 1969), which in turn connects the average student to a more diverse personal network of peers.

The track levels in a small school may also expose each student to a more diverse set of peers than would occur in a large school with the same range of abilities in the student body. A large school that tracks students according to test scores or previous academic achievement will often create more homogeneous classes with greater differences between the top and bottom classes in student abilities than will be found in a small school with the same range of student abilities. This occurs because the small school have fewer sections of each course, so each class will be closer to the mix of students in the school at large. Also, there will be fewer very bright or very slow students in a smaller school to be assigned to exclusive classes. Thus, when the student mix in the school is about the same in large and small schools, extra-curricular activities and tracking will often produce more diverse peer contacts in the smaller schools.

On the other hand, larger schools will ordinarily draw from a larger and more diverse attendance area, so the student body as a whole is likely to be more heterogeneous by family background, race and other characteristics. Whether an individual student in a large school will actually come into contact with peers from different backgrounds depends in part on school policies concerning tracking and extra-curricular activities. More direct research is needed on how school size changes the opportunities for diverse peer contacts and the actual formation of peer groups.

Large schools may have some advantages in variety and quality of curriculum offerings (Conant, 1969). A large school is more likely to have enough students interested in certain unusal courses -- such as some foreign languages, technical courses, or advanced level offerings -- to justify the expense of staff and equipment to provide these courses.

Some structures may offset the disadvantages of the impersonality of large schools by creating smaller identifiable units within a section of the same building: a "school-within-a-school." In these subgroups, teacher and student assignments and activities emphasize identification with the smaller unit and its members. Educators have suggested various ideas about how to conduct activities with and between different subunits of a large school to achieve good interpersonal relations and student attachment. Little careful research has been conducted on these issues.

Staffing patterns and roles: Elementary school teachers are usually assigned to a self-contained classroom where a single teacher is in charge of instruction in all major subjects for an intact class of students. High school teachers usually are "departmentalized" by subject-matter area, and assigned to teach courses in one specialty area of the curriculum to different classes of students during the school day and school week. Teacher certification regulations in most states reflect this difference: Teachers are certified by level at the elementary grades without subject-area distinction while teachers are certified by subject-matter specialties at the high school grades.

Thus the typical elementary school student receives almost all instruction from one home-room teacher, while the typical high school student receives instruction from several different teachers. And each elementary teacher is responsible for a single class of 20 to 30 students but must prepare lessons in a number of subjects, while each high school teacher may see well over 100 students in a given week but can concentrate on teaching in one curriculum specialty.

Both the high school and elementary modes of staffing offer advantages and disadvantages. Departmentalization and subject-matter orientations may increase the quality of instruction by allowing teachers to increase their competence in a curriculum speciality, provide outstanding learning activities for a limited number of separate daily preparations, and bring a special enthusiasm to particular areas of the curriculum that is sustained by departmental colleagues. On the other hand, the self-contained classroom of the elementary grades is believed to achieve strong "pupil-orientation" due to the close and concentrated associations between a single teacher and a fixed small group of students.

Various structures have been proposed to strike a balance between these two poles -- to achieve a personalized learning environment while allowing individual teachers to develop high quality curriculum specialties. These include a variety of teacher team arrangements, such as

special roles for the homeroom advisor in a modified-departmentalized school. (See, for example, Alexander and George, 1981, Chapters 4 and 5.) For example, a team of two or three teachers could serve 50 to 75 students, with each teacher specializing in a broad curriculum area such as math and science or language arts and social studies. The team would work together to diagnose student needs, establish student instructional groups, and coordinate and schedule learning activities. Provision for team planning time would be built into the weekly schedule. Another example would be to have larger teams of subject-matter specialists (5 or 6) serve larger common groups of students, but also provide a personalized guidance program in which each student is assigned to one particular teacher in an advisor-advisee capacity.

Although creating teacher teams with scheduled time to diagnose students and plan instruction would seem to be a way to achieve desirable instructional practices and interpersonal environments, there is no guarantee these opportunities will be taken advantage of by teachers. How much does the success of teacher teams depend upon how well team members like each another, on how the use of team planning time is supervised, on the roles defined within the team, or other operational factors? Research has not carefully investigated these questions, or other issues related to staffing patterns and the effectiveness of the resulting learning environments and instructional practices. We do not even have good descriptive statistics on the use by schools of different staffing patterns at the elementary, middle and secondary levels.

The role of the principal is another key issue of staff roles where interesting comparisons have been made between elementary and high schools (Farrar, Neufeld & Miles, 1984; Firestone & Herriott, 1982; Purkey & Smith, 1985). The elementary principal is more frequently seen primarily as an instructional leader (assisting and evaluating individual classroom teachers; establishing the school climate). The high school principal is more frequently seen primarily in an adminsistrative or bureaucratic role, who helps maintain priorities on learning, is in charge of the rules and their enforcement, and involves teachers appropriately in decisions on school-wide matters.

Grouping students for instruction: Elementary schools are more likely to randomly assign students to classes but to group students within the classroom for instruction. Within-class ability grouping usually involves creating three homogeneous groups of students who have similar current levels of achievement. Within-class ability grouping in elementary school rooms is almost always used in reading instruction and is often used in math instruction. (Peterson, Wilkinson and Hallinan, 1984).

In contrast to elementary schools, high schools create more homogeneous instructional groups by placing students in programs and tracks by achievement level. High schools separate students according to entire programs -- such as academic or college preparatory, general, vocational or technical, and commercial or business -- and according to course track level within the program -- such as high, medium, and low sections

of English courses at the same grade. Because students are placed into separate programs and courses by achievement levels, there is rarely any use of within-class ability grouping at the high school level.

The approach to corrective instruction for low-achieving students in elementary and high schools usually mirrors the above grouping patterns. Elementary schools frequently use with-in-class corrective instruction; high schools separate remedial classes with specialized teachers. However, elementary schools have often used Federal support (Title I and Chapter I funds) to provide separate remedial teachers and programs that pull out low achievers from their regular classrooms for special instruction.

Judging from the volume of published articles, tracking and ability grouping would appear to be among the most thoroughly researched topics in education. And there seems to be considerable agreement among researchers about the impact of grouping practices: a poll of researchers would probably show that a large proportion believe that grouping practices have been proved to have a negative effect on the development of students in the lowest groups. <1>. But, because there have not been many randomized experiments in research on tracking or ability grouping, and because correlational research cannot convincingly control for the different student rates of learning that are usually related to the group assignments, we believe it is too soon to draw scientific conclusions about the effects of alternative grouping practices. Additional experimental research is needed to compare different methods of grouping students for instruction, and this research must pay special attention to how actual classroom practices are adapted to different instrutional groupings.

The research should examine detailed practices within various subgroups and establish convincing scientific controls on initial student differences. Recent studies of elementary and junior high classes by Johns Hopkins researchers and others strongly suggest that certain grouping practices, accompanied by appropriate classroom activities, can yield learning benefits for all levels. (Slavin and Karweit, 1984, 1985; Doyle, 1984; Evertson, 1982; Filby et al, 1982; Bossert et al, 1984)

While there is much consensus about grouping practices at elementary and high schools, good data on grouping practices at the middle grades is not now available, even to describe the distribution of alternative approaches in our nation's middle and junior high schools. We need surveys to determine how middle grade classrooms now use or don't use between-class tracking and/or within-class ability grouping. We also need to address major questions of relationships and causality. How do

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<1> We also suspect there is majority agreement among teacher about the effects of grouping, but with an opposite conclusion. We predict that a majority of teachers would report their belief that homogeneous grouping of student produces greater learning because instruction is targeted to students' current needs.

middle-school grouping practices depend upon the subject-matter area of the course and the staffing patterns in use? How do intermediate grade teachers adapt their instructional practices to the needs of each group, including provision for student initiative in learning tasks? What relationships between students and teachers and among students develop with different instructional grouping arrangements? What student outcomes are more likely to occur when alternative grouping structures are coupled with particular classroom practices?

The opportunities created by alternative instructional groupings for more efficient instruction depend upon the actual tasks established in the classroom (Bossert, Barnett and Filby, 1984; Bossert and Barnett, 1981; Bossert, 1979). Bossert's analyses of how within-class ability grouping may be associated with a variety of actual classroom practices can be extended to questions of how between-class grouping level may foster different instructional management and learning environments within the classroom. The goal of this research is to show how the positive effects of particular grouping policies depend upon the actual classroom practices that are used to take advantage of the policy.

Scheduling: The manner in which school schedules are made, --dividing the school day into different periods for instruction in separate courses and assigning teachers and students to different classroom locations during the day -- is closely related to the decisions on staffing and instructional grouping we have discussed.

In elementary schools, the teacher in a self-contained classroom usually schedules the mix of time devoted to each curriculum area, within general guidelines provided by the school. There are no fixed periods announced by the ringing of bells throughout the day to signal the time for teachers of students to change locations. Teachers use their professional judgment to arrange instructional activities of different durations to fit the changing demands of curriculum topics or changing needs of students.

At the high school level, the forms of tracking and staffing used will be related to the type of scheduling. Since teachers must meet different classes throughout the day and since each student receives instruction each day from different teachers, a centralized schedule is necessary to divide the school day into fixed periods of time and provide lists to locate where each teacher and each student is to be each period for instruction in specific courses. The change in periods is usually announced by the ringing of bells and signals the movement of teachers and students through the school corridors. These regular sounds and traffic have come to symbolize for some the over-regimentation of the American high school.

The schedule may vary in complexity depending upon the flexibility of instructional time periods, the variability of student groups, and the number of elective courses permitted, as well as other local complicating circumstances. For example, a "block schedule" keeps student groups together as intact classes for most periods of the day with

departmentalized staffing providing different specialists to teach each course. This approach is used in high schools that assign students to programs and tracks based on a single test score or criteria. Other high schools may design more complex student schedules that allow each student to be grouped differently in each major subject, or to permit elective courses for students at several points in the week. Other high schools may define instructional periods by smaller modular time units so some courses can be formed using multiple modules to provide more instructional time on certain days.

Appropriate scheduling for the lower grades depends upon decisions that are made about staffing, grouping and curriculum flexibility. Some middle school educators advocate using (a) interdisciplinary teaching teams to achieve curriculum quality and flexibility, with (b) student assignments that keep classroom-sized groups together as a unit for most of the day to establish a more secure peer group identification for each student. (See, for example, Alexander and George, 1981). One suggested scheduling structure is a modular version of the blocked schedule that allows time for teacher team planning and coordination. Other scheduling structures exist to help accomodate particular goals of curriculum and learning environments. (See, for example, four interesting cases of middle school operations described in Lipsitz, 1984.)

We agree with educators that scheduling structures should be devised to best support the desired instructional program and learning environments, and should ordinarily follow decisions about the approaches to curriculum design, staffing and instructional grouping that are expected to produce these practices and environments. But designing and applying various structures of staffing, grouping and scheduling, and testing their impact on student outcomes are matters for direct study and scientific evaluation.

Student monitoring and evaluation procedures: The "pupil-orientation" of the elementary school and the "subject-matter orientation" of the high school may also be reflected in procedures for monitoring and evaluating students through policies on grading, discipline, and advising. Just as we expect many elementary teachers in self-contained classrooms to have more latitude for scheduling time for different instructional topics and more flexibility in grouping students for alternative learning activities, compared to departmentalized high school teachers following centralized schedules, we expect elementary teachers to be less affected by school-wide constraints on grading, disciplinary and advising practices. Since elementary teachers are thought to be more "pupil-oriented," we expect their grading practices to strike a more conscious balance between a student's effort at school work and a student's rank-in-class on tests and other measures of academic performance, so that a low achieving student who tries hard would receive some positive feedback. Grading at the high school level is more likely to be looked at as a way of sorting students that as a way of motivating students. Grading in secondary schools is also often tied up with tracking practices, where different floors and ceilings for assigning marks are maintained in low or high track classes.

Opportunities for student accomplishment: High schools provide a wider range of ways that students can gain recognition than do lower level schools. Extra-curricular activities in high schools permit many individuals to develop and demonstrate competence in athletics, in musical and artistic performance, in producing a school newspaper or yearbook on some publication outlet for creative writing, in working with others on projects that require organizational and interpersonal skills, in assuming decision-making or representative roles where political skills are useful, and in enjoying a variety of special interest and hobby activities where individuals can develop unique knowledge or skills. Various reports on high schools have called for expanding the opportunities for students to assume initiative and responsibility by providing services to others or their community (Boyer, 1983; Coleman, 1974; Newmann, 1981).

The need for a wide range of opportunities for accomplishment is also vital for middle-school students, because early adolescence is a time of striving for achievement and competence. To develop a positive self-concept and to mature in self-confidence, young adolescents need to develop general abilities to function successfully in a variety of situations and expand the particular talents that bring them special pleasure or accomplishment.

To identify ways to provide more opportunities for student accomplishment, research is needed on both (a) how to make rewards for academic development accessible to more students, and (b) how to provide a wider range of activities that require and recognize a diversity of human talents. For the first question, we need to study alternative academic evaluation systems that are responsive to individual effort, improvements in performance, or alternative modes of demonstrating competence. For the second question, we need to identify a wide range of extra-curricular, co-curricular and service activities and evaluate their effects on student development and self image to provide a knowledge base for expanding the range of opportunities for student accomplishment in schools.

Grade-span: There is also a school organizational question that must be met on the district level rather than approached within each school: the appropriate structure of grade-span organizations for schooling children between ages 5 and 17.

For example, there has probably been more written on the advantages or disadvantages of different grade-span structures for the intermediate grades with less clear research guidance than any other single topic about schools for young adolescents. In 1983, the Educational Research Service (ERS) published a 200-page summary of research on the organization of the middle grades that used 424 separate references. Few consistent findings emerged from the review. The ERS conclusion that "the quality of the school program is more important than grade level organizations" echoes our view that structural features such as grade-span are important only in so far as they enable or support those instructional practices and learning environments that produce desirable student outcomes.

We believe further research is warranted on how alternative grade-span structures may be related to instructional practice, learning environments and important student outcomes.

First, past research on these issues has usually not applied careful statistical controls on differences in student inputs. Second, there is a reasonable basis to think that grade-span may directly affect some variables, especially peer group environments and their consequences. For example, advocates of the 6-8 grade-span argue that ninth graders are much closer developmentally to tenth graders than to eighth graders, and a less desirable ("too sophisticated") environment is produced when ninth graders are left in the same school with younger adolescents and pre-adolescents. More careful research is needed on peer group reference groups and educational climates in schools with different grade-spans (Blyth, Hill and Smyth, 1981).

Third, a small number of well-designed studies find impressive effects of schools with different grade spans on good school attendance (Slavin and Karweit, 1982) and self-esteem (Blyth, Simmons and Bush, 1978).

Fourth, other grade-span sequences may deserve careful examination for their support of learning environments that are well suited to the needs of young adolescents. The traditional two-stage 1-8 elementary and 9-12 secondary school structure should be carefully studied -- it remains the modal pattern today among private schools.

## II. A Design for Research

### Some General Design Considerations

The model presented in the previous section is a comprehensive account of instructional and organizational choices made by schools and school districts that are likely to have important consequences for student academic achievement, personal growth, and school-related attitudes and social behavior. As such, a single research project or research design could never adequately measure and test all of the parameters and hypotheses in the model.

A mixture of research designs and projects is clearly needed. An appropriate mixture would include systematic observational studies, so that "dense" measurements can be made where quick-and-dirty survey questions would produce severe distortion. It would include repeated measurements on the same students over many years, so that longer term outcomes of schooling could be followed. And it would include using multiple instruments and multiple respondents at the same site, so that special expertise and complementary perspectives would contribute to the final information product.

Yet it would also be useful for the multiple projects and designs to build upon one another, using the same sample of schools and students, and the same theoretical framework, so that each project could gather data not only to answer questions that it posed but so that it could inform remaining projects in the series, avoid duplicative data gathering, and optimise the data collection method to the kinds of information needed.

Particular research questions drawn from the common theoretical framework may require specific variations in a common study design. However, following the model's emphasis on school and classroom factors as independent or "treatment" variables and student academic performance, personal development, and school-related attitudes and behavior as outcome variables, we see the following as general considerations that should be followed for much of the research that is needed.

First, the analytic unit to most of the specific studies should be the school or the classroom, not the individual student. Where the concern is with school-level policies that affect instruction and learning, such as between-class ability-grouping, or departmentalization of the teaching staff, the unit of analysis is the school. Where classroom instructional practices are the concern, the unit of analysis is the individual classroom. Even where long-term outcomes are the issue, the students followed over a several year period continue to be valid measurement points for the study of the consequences of school organizational or classroom instructional treatments. Longitudinal student data is merely the means by which appropriate data is gathered to study the effectiveness of school and classroom practices and conditions.

Secondly, it is also appropriate that the sampling unit be the school and sub-samples of its classroom groupings (e.g., 5th period, room 120, Monday). Again, the student-based survey instruments are a means of obtaining measures of the effect of the classroom treatment, whether this be the grading and incentive practices of the teacher or practices of school-home cooperation.

Third, measurements of school policy and classroom practice need to be made at appropriate points and with sufficient investment so that measurement error on individual cases is reduced to a manageable point. Asking teachers or school administrators to describe policies will be generally accurate if those policies are conscious, public, stable, and explicit. The more that questions deal with behavior patterns determined by custom, internal politics, or general agreement, and the more that the patterns vary according to the characteristics of the specific instance, the more that attention has to be paid to obtaining multiple sources of data about the factor in question, measuring the behavior or policy at different points during the school year, and using judgments of external observers rather than relying solely on self-reports of school practitioners.

One of the most important "givens" of school research is that schools and classrooms providing differing treatments often start with student

groups that hardly resemble one another. Thus, it is important to devote resources to measuring both the "starting" and the "ending" attributes of students that may be affected by the type of school or classroom treatment being provided. Although single cross-sectional survey designs have been the norm for most studies of school "effects," our understanding of the consequences of differential educational treatments has been immeasurably harmed by using "socio-economic-status" and other background variables to stand in as surrogates for student "starting" characteristics. It is time that all major studies of school practices be done with both "pre-test" and "post-test" points of measuring student outcomes, at the very least.

Not only do students have differing backgrounds that affect school performance and attitude, but each student has a prior history of school experiences and exposure to various school and classroom practices. A study beginning at one point in time should also, if possible, attend to issues of prior school experience, including gathering data about previous teachers and previous schools attended.

In analyzing the effects of instructional practices in individual classrooms, research must take into account that in most secondary schools and in many elementary schools, students are taught in more than one classroom setting by multiple teachers applying different practices in different ways. Studies of the impact of classroom practices must consider how these simultaneous multiple treatments are likely to affect the outcome measures of interest. Often, it may be valuable to obtain comparable survey instruments about classroom practices from each teacher in the school who also teaches some of the students who are in the "sampled" teacher's classroom.

Many questions about the consequences of schooling relate to student adjustment, attitudes, and behavior in subsequent school and work experiences--for example, questions about how experience in one school affects students' disciplinary habits, school attendance, and school performance at a subsequent school attended. Such questions require that the students be followed for at least several years beyond the treatment being studied. In addition, for many schooling processes, it may be that only consistent treatment applied in successive schooling environments has important and measurable consequences. Thus, where such "small, cumulative impacts" are hypothesized, it is important that the research design plan from the start to be a longitudinal one, wherein similar school and classroom treatment variables are measured on successive occasions along with student outcome variables.

Finally, we need to mention one other important consideration that should guide the design of a research plan for studying the effects of school and classroom practices on student outcomes. Although the most important questions on this topic are causal in nature--how do different organizational and instructional practices affect the achievements, attitudes, and behaviors of different groups of students--we still lack basic descriptive data about the factors discussed in the model.

An important contribution of N.C.E.S. would be to provide this descriptive information as part of an effort to understand how these factors affect schooling outcomes. We need descriptive information about how instruction is organized and conducted for different subjects and at different grade levels in different kinds of schools serving different student populations. The need for descriptive data requires that increased attention be given to sample representativeness and sampling strategy. <2>

## A Suggested Research Design.

The theoretical model guiding this discussion is a broad one, implying a wide variety of research needs and plausible research strategies, and covering the full range of organized schooling from kindergarten through college. Even the design for an "umbrella" study, under which specific research questions on specific school and student populations could be studied in more detail, must leave out some of the possible topics and coverage of schools and students. What we suggest below, then, constitutes a selection from among the universe of designs that might inform the questions posed in our model.

Because we are interested in school and classroom "treatments," we propose sampling schools and classrooms rather than students. However, because our interest is in outcomes for groups of students of particular ages or grade levels, stratified samples need to be drawn that take into account student grade levels, and student data should be collected for students in a particular grade in sampled classrooms.

Five major goals affect the choice of schools, classrooms, and students to be sampled. The first is to maximize the variety of types of schools (grade-level ranges, student size, public vs. non-public control) included in the sample. This goal suggests that stratifying schools by size, grade-span, and control, and drawing samples of similar size for each stratum would be preferable to solely sampling schools with probabilities in proportion to their size.

The second goal is to obtain descriptive data on the methods of classroom instruction used at as many grade levels as practical. This goal suggests that at least teacher data be collected from teachers of all grade levels.

A third goal is to measure the impact of school-level treatments on students. This suggests sampling classrooms with students in their first year of being exposed to such a treatment--e.g., sampling 7th grade students in 7-9 junior highs, and 6th grade students in 6-8 middle

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<2> By itself, causal studies are less dependent upon having a representative sample because associations between school practices and outcomes and causal relationships involving these variables are likely to be much more stable over different sub-populations (of schools) than are descriptions of school characteristics and practices themselves.

schools. This maximizes how long each student sampled will be "exposed" to the school's treatment during the study period.

A fourth goal is to measure the effects of classroom instructional practices on students. In the many schools in which students are taught by more than one teacher, this requires that teacher data be collected from each of the teachers whose instructional patterns might affect individual students whose outcomes are being measured.

A fifth goal is to obtain measures of school effect on student outcomes measured across transitions to new schools and schooling levels. This goal suggests sampling students so that as many as possible will have moved to a new school or non-school environment for a similar, limited duration (e.g., one year) prior to a follow-up survey. If, for example, we sample students in their first year at a school with three grades, we could follow-up these students, say, in base-year plus 4--that is, in the second year after entering their next level of schooling.

Although some of the goals suggest somewhat contradictory principles for choosing measurement points of classrooms and students, the following design maximizes attainment of the five goals as much as possible. In particular, it takes into account the number and size of schools of various grade-level ranges to maximize diversity of school selection; it maximizes the length and purity of a school "treatment"; and it maximizes the number of students for whom we can measure the impact of school and classroom treatments on a school transition experience.

According to this design, schools would be stratified into the following groups according to grade-span and student enrollment per grade-level. (See Table 2.) In addition, the sample would be further stratified by public vs. non-public control, although this is not reflected in Table 2 below. Sample sizes for these strata need not be identical--that is, other factors may need to be considered as well--but the sizes should reflect a primary interest in obtaining as diverse a sample as possible along the stratification dimensions.

School-level data should be collected from appropriate administrative persons at each sampled school. Teacher data--both self-reports of classroom practices and "informant" data about school conditions--should be collected from simple random samples of the full-time teaching staff. The sample sizes per school should reflect both a minimum number (e.g. 10) and decreasing fractions for larger schools. In addition, however, the sample of teacher data should be supplemented in order to obtain reports from each teacher responsible for the instruction of students in the classroom(s) sampled for longitudinal follow-ups (see below).

Classrooms selected for studying the impact of school organization and classroom practices on student outcomes should be selected according to the grade-level of the plurality of their students; they should be

Table 2:

Number of Schools Serving Grades 5 - 12,
by grade span, by enrollment per grade*

| Grade Span | Number and Percent of Schools by Enrollment Per Grade | | | | |
|---|---|---|---|---|---|
| | <25 students per grade | 25 - 70 per grade | 71 - 150 per grade | 151+ per grade | Total Schools |
| PK,K,1 - 12: | 3592 (64%) | 1779 (32%) | 197 ( 4%) | 12 ( 0%) | 5580 |
| PK,K,1 - 8: | 7311 (47%) | 7243 (46%) | 994 ( 6%) | 32 ( 0%) | 15580 |
| PK,K,1 - 6,7: | 3911 (16%) | 13981 (56%) | 6612 (27%) | 254 ( 1%) | 24758 |
| PK,K,1 - 5: | 738 ( 7%) | 5586 (51%) | 4395 (40%) | 227 ( 2%) | 10946 |
| 4 - 6: | 20 ( 2%) | 155 (16%) | 510 (53%) | 273 (28%) | 958 |
| 5 - 8: | 48 ( 4%) | 260 (22%) | 588 (50%) | 281 (24%) | 1177 |
| 6 - 8: | 26 ( 1%) | 286 ( 7%) | 1072 (25%) | 2774 (67%) | 4152 |
| 7 - 8: | 13 ( 1%) | 126 ( 5%) | 389 (14%) | 2238 (81%) | 2766 |
| 7 - 9: | 12 ( 1%) | 74 ( 3%) | 281 (11%) | 2148 (85%) | 2515 |
| 7 - 12: | 580 (17%) | 1503 (45%) | 986 (30%) | 275 ( 8%) | 3344 |
| 8 - 12: | 70 (13%) | 130 (24%) | 187 (35%) | 154 (28%) | 541 |
| 9 - 12: | 644 ( 6%) | 1758 (17%) | 2598 (25%) | 5535 (52%) | 10535 |
| 10 - 12: | 45 ( 2%) | 151 ( 7%) | 299 (14%) | 1723 (78%) | 2218 |
| Other spans incl. 5 - 12: | 1086 (21%) | 987 (19%) | 1317 (26%) | 1747 (34%) | 5137 |
| Spans incl. PK - 4 only: | 1002 (12%) | 2793 (34%) | 3276 (40%) | 1017 (13%) | 8088 |
| Total, U.S.** | 19098 (19%) | 36812 (37%) | 23701 (24%) | 18690 (19%) | 98301 |

* Source: Data tape of U.S. School Universe, 1984, Quality Education Data, Denver, Colorado.

** Excludes 3,348 schools classified as voc-tech, alternative, or special education and others for which grade spans were not available.

restricted to classes of academic subjects; and they should be sampled in proportion to the number of hours during the school year that the students meet that class. At each school, only specific grade-levels should be sampled; and these should be determined by the grade-span at the school. Our preference for the grade-levels to be sampled is shown in Table 3. This choice takes into account both the goal of sampling students early in their experience at the school and the goal of providing for follow-up studies to be conducted at appropriate points in the students' schooling careers (see below).

Table 3:

Grade-Levels Sampled by Grade Span of the School

| Grade-span of school | Grade-level of classes sampled (Base year) | Grade-level in Year 3 follow-up (Base yr. +2) | Grade-level in Year 5 follow-up (Base yr. +4) |
|---|---|---|---|
| P,K,1-12 | 4,7,10 | 6,9,12 | 8,11,(14)* |
| P,K,1-8 | 4,6 | 6,8 | 8,(10) |
| P,K,1-6,7 | 4 | 6 | (8) |
| P,K,1-5 | 3 | 5 | (7) |
| 4 - 6 | 4 | 6 | (8) |
| 5 - 8 | 6 | 8 | (10) |
| 6 - 8 | 6 | 8 | (10) |
| 7 - 8 | 7 | (9) | (11) |
| 7 - 9 | 7 | 9 | (11) |
| 7 - 12 | 7,10 | 9,12 | 11,(14) |
| 8 - 12 | 8,10 | 10,12 | 12,(14) |
| 9 - 12 | 10 | 12 | (14) |
| 10 - 12 | 10 | 12 | (14) |

* Parentheses indicate grade levels that are beyond the grade level range for the base year school.

We acknowledge that sampling classrooms (and thus collecting longitudinal data on students) according to the grade-span of the school is a design that conflicts with the pattern used in previous studies. However, we strongly feel that the research design should be determined by the substantive questions; that the important substantive questions concern the impact of school and classroom practices on students; and that this emphasis requires that the school grade-span rather than some arbitrary choice of grade levels should determine the selection of student groups whose outcomes are to be measured over time.

In addition, in order to measure the diversity of instructional practice, the notion of a "classroom" should be defined so as to incorporate a cluster of teachers who provide "teamed" teaching--that is, a coordinated teaching practice--to a common group of students. Classrooms (or clusters of classrooms) should be sampled inversely in proportion to the number of teachers involved. Thus, a team of five teachers teaching a group of 125 students would be sampled together, but with only 1/5 the probability of an individual teacher teaching a self-contained group of 25 students.

During the base year, each classroom should be studied near the beginning of the school year, and again near the end of that school year, with teacher questionnaires, student questionnaires, and possibly a classroom observation instrument. Then, each student who was a member of a sampled classroom at both points during the first year would be followed up on two occasions--once near the end of the second school year following the base year and once near the end of the fourth year after the base year. Again, the primary instrument at these followup points would be student questionnaires, but teacher practice and school organization survey instruments could also be employed, funds permitting.

Using the initial selection of grade-levels according to school grade-span proposed in Table 3 above, the third year followup (base year + 2) will occur for most students at the end of their final year at their base year school. The fifth year followup (base year + 4) will occur for most students in the second year after their transition to a new level of schooling.

## III. Selected Questionnaire Items

The variables that should be measured in these surveys are those listed earlier in our discussion of the model in Figure 1. For school structure and classroom processes, the survey should include indicators of staffing patterns, grouping practices, scheduling, monitoring and evaluating students, opportunities for student accomplishment, as well as teacher-student relations, teacher-teacher relations, and educational climates. In addition, the surveys should contain measures of peer group processes and normative environments, and student outcome measures of academic skills, personal development, attachment to school and good behavior.

It would also be valuable for the survey to obtain attendance and discipline records and academic achievement score results for each student sampled. Because of the technical problems of establishing comparability between different achievement tests used at different times in various schools systems, it would be best to use a short (20-30 minute) achievement test using NAEP items administered to students as part of a 45 to 60 minute survey. (See Messick, Beaton and Lord, 1983, p.79 on use of NAEP items). Various alternatives could be considered, including basing sampling decisions on the type of test available in school files.

With a special sub-sample of schools, the survey should be accompanied by two-day site visits to draw a narrative profile of the school and its operation. Our model for this activity is the recent book by Lipsitz (1984) that includes detailed narrative descriptions and analyses of four interesting schools for young adolescents.

The following are some questions that might be used in a study of the impact of school organization and classroom instruction on student outcomes. The questions included here represent only a limited portion of the survey items needed. They are aimed primarily at measuring between-classroom and within-classroom grouping practices, scheduling of students and teachers, and arrangements for teaming or clustering of instructional groups.

## Selected Questionnaire Items for Principals of a Middle-School

(Questionnaire items would differ to some degree according to the range of grade levels at the school.)

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1. Do students at your school stay with the same class group for all academic subjects (English, Math, Social Studies, Science), or do they attend different classes with different groups of other students? (CIRCLE ONE CODE FOR EACH GRADE LEVEL AT YOUR SCHOOL.)

| | Students Stay With The Same Class Group For... | | |
|---|---|---|---|
| | All Academic Subjects | Some Subjects But Not Others | None (Each Subj., Different Groups) |
| Grade 6 | ALL | SOME | NONE |
| Grade 7 | ALL | SOME | NONE |
| Grade 8 | ALL | SOME | NONE |

---

2. For which acadmic subjects are most students assigned to classes by ability (so that some classes are higher in ability than others) FOR EACH GRADE LEVEL, CHECK ALL SUBJECTS GENERALLY ORGANIZED BY ABILITY.

For Which Subjects Are Classes Organized by Ability?

CIRCLE ALL THAT APPLY.

| | | | | | |
|---|---|---|---|---|---|
| Grade 6: | ENGLISH | MATH | SOCIAL | SCIENCE STUDIES | NONE |
| Grade 7: | ENGLISH | MATH | SOCIAL | SCIENCE STUDIES | NONE |
| Grade 8: | ENGLISH | MATH | SOCIAL | SCIENCE STUDIES | NONE |

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3. Some schools organize academic classes to be composed of students of more than one grade level. Other schools place students of each grade level in their own classes. Please answer about each combination of grade levels at your school? CIRCLE ONE CODE PER LINE.

| How Many of the classes attended by ... | ...also have at least several... | | | | |
|---|---|---|---|---|---|
| 6th graders | 7th graders | MOST | MANY | FEW | NONE |
| 6th graders | 8th graders | MOST | MANY | FEW | NONE |
| 7th graders | 8th graders | MOST | MANY | FEW | NONE |

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4. At your school, what kinds of teaching assignments do most teachers of the major academic subjects have? CIRCLE ONE CODE FOR EACH GRADE LEVEL.

| | Self-contained: each teacher teaches all subjects to the same students | Departmentalized: each teacher teaches the same subject to several different classes of students | Mixed: teachers teach some but not all subjects to the same students |
|---|---|---|---|
| Grade 6 | SELF-CONTAINED | DEPARTMENTALIZED | MIXED |
| Grade 7 | SELF-CONTAINED | DEPARTMENTALIZED | MIXED |
| Grade 8 | SELF-CONTAINED | DEPARTMENTALIZED | MIXED |

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5. Some schools use team scheduling in which, for example, four teachers of different subjects teach the same four classes of students. Does your school use this scheduling method for students? (ANSWER FOR EACH GRADE LEVEL.)

| | Team Scheduling Used? | |
|---|---|---|
| Grade 6 | YES | NO |
| Grade 7 | YES | NO |
| Grade 8 | YES | NO |

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IF "YES" FOR ANY GRADE LEVEL:

5a. Is there a specific planning period set aside for each group of teachers who work together?

YES NO

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## Selected Questionnaire Items for Teachers of a Middle-School Class Sampled in the Survey

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1. Which of the following best describes your current teaching assignment? (CIRCLE THE NUMBER TO THE RIGHT OF YOUR CHOICE.)

   I teach one group of students for the entire day..... 1
   I teach one subject to several different classes of students.. 2
   I teach several subjects to more than one class of students... 3

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2. In the table below, list the subjects, student grade-levels, and general ability levels of the classes that you teach during the week. List only academic classes such as English, Math, Science and Social Studies, and their specialties. LIST EACH SUBJECT ON A SEPARATE LINE, even if you teach them to the same class. AND LIST EACH CLASS ON A SEPARATE LINE, even if you teach the same subject to different classes of students in the same grade.

| SUBJECT OF CLASS<br><br>EACH SUBJECT & CLASS<br>ON A SEPARATE LINE | HOURS PER WEEK | STUDENT GRADE LEVELS (K-12) | ABILITY LEVELS<br>High=Hi, Average=Av,<br>Low=Lo, Mixed=Mx<br>(CIRCLE ONE PER LINE) |
|---|---|---|---|
| a) | | | Hi Av Lo Mx |
| b) | | | Hi Av Lo Mx |
| c) | | | Hi Av Lo Mx |
| etc. | | | |

---

3. The remaining questions in this survey concern only one of your classes. The class is shown on the cover of the booklet. by the day-of-the-week and time-of-day that you meet it. Which entry in the above table is for the class and subject that you teach at that particular time? (WRITE ITS LETTER -- "a", "b", etc.)

   LETTER (Q.2) OF THE CLASS SAMPLED FOR STUDY: _____

---

4. Circle all of the other subjects that you teach to the same group of students who are in the sampled class.

| | |
|---|---|
| English..... | 1 |
| Reading..... | 2 |
| Mathematics..... | 3 |
| Science..... | 4 |
| Social Studies..... | 5 |
| None Other: only one subject to this class..... | 6 |
| Other (specify):_____ | 7 |

---

5. Sometimes teachers divide their class of students into groups for instruction based on their demonstrated abilities. Do you do that for any subjects which you teach to the sampled class? (CIRCLE "YES" OR "NO".) If "yes," circle the subjects for which you ability-group for this class.

NO: DO NOT ABILITY-GROUP FOR THIS CLASS

YES: ABILITY-GROUP IN THE FOLLOWING SUBJECTS FOR THIS CLASS: (CIRCLE AS MANY AS APPLY)

| | |
|---|---|
| English..... | 1 |
| Reading..... | 2 |
| Mathematics..... | 3 |
| Science..... | 4 |
| Social Studies... | 5 |
| Other:_____ | 6 |

---

6. Do you use a program of individualized instruction for any subject that you teach to the sampled class? (CIRCLE "YES" OR "NO".) If "yes," circle the subjects for which you use an individualized program of instruction for this class.

NO: DO NOT INDIVIDUALIZE INSTRUCTION FOR THIS CLASS

YES: USE INDIVIDUALIZED PROGRAM IN THESE SUBJECTS FOR THIS CLASS: (CIRCLE AS MANY AS APPLY)

| | |
|---|---|
| English..... | 1 |
| Reading..... | 2 |
| Mathematics..... | 3 |
| Science..... | 4 |
| Social Studies... | 5 |
| Other:_____ | 6 |

---

7. Do you meet with a team of other teachers who teach other academic subjects to the same group of students who are in the sampled class? (CIRCLE ONE NUMBER)

| | |
|---|---|
| No, we do not have such a team (CIRCLE AND SKIP TO ...).... | 1 |
| Yes, we meet at regularly scheduled times..... | 2 |
| Yes, we meet informally..... | 3 |
| There is a team, but we rarely meet..... | 4 |

---

8. Counting yourself, how many teachers are on your teaching team?

NUMBER OF TEACHERS ON TEACHING TEAM FOR THIS CLASS: _____

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9. When you meet with your teaching team, how often do you do each of the following things? (CIRCLE ONE CHOICE FOR EACH ACTIVITY.)

| | | | | |
|---|---|---|---|---|
| a) spend the time grading papers from your own subject | OFTEN | SOMETIMES | SELDOM | NEVER |
| b) prepare your own lessons for your subject | OFTEN | SOMETIMES | SELDOM | NEVER |
| c) discuss the performance of individual students | OFTEN | SOMETIMES | SELDOM | NEVER |
| d) arrange to visit and observe another teacher with the same students | OFTEN | SOMETIMES | SELDOM | NEVER |
| e) plan curriculum so your subject-teaching is coordinated with the other teachers' | OFTEN | SOMETIMES | SELDOM | NEVER |
| f) arrange with another teacher to jointly teach the same class | OFTEN | SOMETIMES | SELDOM | NEVER |

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