DOCUMENT RESUME

ED 257 224 EA 017 826

AUTHOR Romberg, Thomas A., Ed.
TITLE Toward Effective Schooling: The IGE Experience.
INSTITUTION Wisconsin Center for Education Research, Madison.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
REPORT NO ISBN-0-8191-4581-5
PUB DATE 85
GRANT NIE-G-81-0009
NOTE 239p.
AVAILABLE FROM Customer Service, University Press of America, 4720 Boston Way, Lanham, MD 20706 (Paperback--ISBN-4581-5, $11.75 plus $1.25 postage; Cloth Cover --ISBN-4580-7, $22.75 plus $1.25 postage; prepayment required; quantity discounts).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Reports - Research/Technical (143)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Ability Grouping; Curriculum Evaluation; Educational Objectives; *Elementary Education; *Individualized Education Programs; Individualized Instruction; Instructional Design; *Instructional Innovation; *Instructional Systems; Nontraditional Education; Program Effectiveness; *Program Evaluation; Program Validation; School Effectiveness; School Organization
IDENTIFIERS *Individually Guided Education

ABSTRACT

This book is a collection of essays by various authors documenting the development and evaluation of Individually Guided Education (IGE), a planned attempt, involving thousands of scholars and practitioners, to produce more effective elementary schools. Part 1, "An Attempt to Restructure Elementary Schooling," consists of three chapters describing IGE. Chapter 1 delineates the assumptions of IGE in the context of school reform efforts of the past quarter century. Chapter 2 outlines the intentions, components, and implementation strategies of the IGE program, while chapter 3 describes the plan for evaluating IGE. In part 2, "The Effects of Planned Change," five chapters summarize the evidence gathered in the IGE evaluation project. Chapter 4 summarizes the data concerning whether IGE "really happened" in schools, while chapters 5 to 8 summarize the findings from each of the four phases of the project: a large sample causal study, on-site validation of IGE implementation, a field study of six IGE schools, and five curriculum studies. Part 3 concludes the book with a single chapter (chapter 9) discussing the implications of IGE and its evaluation. A list of presentations and publications associated with the project is included. (TE)

TOWARD EFFECTIVE SCHOOLING

Edited by

Thomas A. Romberg

UNIVERSITY PRESS OF AMERICA

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University Press of America,™ Inc.

4720 Boston Way
Lanham, MD 20706

3 Henrietta Street
London WC2E 8LU England

Library of Congress Cataloging in Publication Data
Main entry under title:

Toward effective schooling.

1. Individualized instruction—Addresses, essays, lectures. I. Romberg, Thomas A.
LB1031.T68 1985 371.3'94 85-3156
ISBN 0-8191-4580-7 (alk. paper)
ISBN 0-8191-4581-5 (pbk. : alk. paper)

This book is based upon work supported by the National Institute of Education under Grant No. NIE-G-81-0002 to the Wisconsin Center for Education Research. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the Institute or the U.S. Department of Education.

Co-published by arrangement with
The Wisconsin Center for Education Research

To Herbert J. Klausmeier, colleague and friend,
through whose dedication and tireless efforts
the belief that elementary school children
should be taught according to their needs
evolved into the system of
Individually Guided Education.

One principle of education which those men especially who form educational schemes should keep before their eyes is this--children ought to be educated, not for the present, but for a possibly improved condition of man in the future; that is, in a manner which is adapted to the idea of humanity and the whole destiny of man. This principle is of great importance. Parents usually educate their children in such a manner that they may be adapted to the present conditions, however degenerate the world may be. But they ought to give them a better education, in order that a better condition of things may thereby be brought about in the future.

Kant, *Pedagogical Principles*

Acknowledgements

The schools that participated in these studies represent the thousands of American elementary schools that adopted and interpreted Individually Guided Education. I particularly want to thank all the school staff members and students who were willing to fill out questionnaires, take tests, be observed, and be interviewed.

I appreciate the assistance and constructive criticism provided by members of the Advisory Committee: Chester W. Harris, chairman; Arno Bellack; David C. Berliner; David Hamilton; and William Wiersma.

Many staff of the IGE Evaluation project authored or coauthored parts of this volume. I want to thank them for their contribution and patience. I am also indebted to other project staff and graduate assistants for their conscientious work: Anne E. Buchanan, Jacob Evanson, Pamela M. Klopp, and Herbert Vandeventer; Kathleen Densmore, Trudy Dunham, Judith Howard, Terence Janicki, and Ruthanne Landsness. For typing and retyping drafts of the manuscript, I thank Dorothy Egener and Donna Misna. For creating the final copy with her characteristic attention to quality and detail, I am grateful to Teri J. Frailey.

Finally, I particularly want to thank Deborah Stewart. As coordinator of the evaluation project she monitored the details of data gathering and report preparation. And she edited this volume with care.

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Part 1: AN ATTEMPT TO RESTRUCTURE ELEMENTARY SCHOOLING

Desire for change or improvement is natural. All of us are motivated, expected, or even pressured to change our ideas, attitudes, and behaviors. Thus, teachers read journals, go to workshops, and attend professional meetings with the expectation of gleaning an idea or a tactic they might use to improve instruction. Administrators and educational scholars do the same things; and they organize committees and task forces, write essays, develop materials, and carry out research with the objective of improving the practice of schooling. Also, parents, special interest groups, and other social forces expect the schools to change to meet their demands. But what happens when resources are actually provided and literally thousands of scholars and practitioners are involved in a planned attempt to produce more effective elementary schools? This book answers that question for the particular case of Individually Guided Education (IGE).

In chapter 1, an attempt has been made to place IGE within the context of school reform efforts of the past quarter century. From that presentation, the assumed need for a change in elementary schooling and the assumptions upon which IGE was based should be apparent. In chapter 2, the intentions of the IGE program are outlined. Included is a brief discussion of the ideas that evolved and were later implemented in some 3,000 schools. The purpose of chapter 3 is to describe the perspectives and procedures that we adopted to evaluate the IGE program.

CHAPTER 1

EFFECTIVE ELEMENTARY SCHOOLING

Thomas A. Romberg

Mention of the word *school*, particularly *elementary school*, often generates a set of images including red brick buildings; matronly teachers; freshly scrubbed, smiling children; well-worn books in some disarray in desks; dusty blackboards; and boisterous recesses. The images we all have could go on and on. They are a product of our upbringing. Schools in other sections of this country and even in other countries seem familiar because most of the same images are prevalent. The physical surroundings may differ, but children and teachers and books remain and there is a facility called a school. In today's world, elementary schools exist and at least at a surface level share many common characteristics across cultures and settings.

This phenomenon of elementary schooling so familiar to us all, however, is historically recent. Only in the last two centuries have societies seen fit to educate most of their children in schools. Every society educates its young, but for most of history, children received their education through the family, the community, and the church. Much education--the shaping of children's attitudes, behavior, and skills--is still carried on this way today. Schools for educating all children were created in large part to transmit some pre-established knowledge and skills to the young and to enculturate them more quickly and systematically into the prevailing social system.

In the short time since their creation, elementary schools have evolved several primary characteristics. By far the most important features of schools are these:

1. Schooling is goal directed.

Educators are never free from questions or problems related to the aims of education. Most societies view schooling as a vehicle for reaching some worthwhile destination or an instrument for shaping some desirable end product.

2. Schooling is a collective experience.

For the child, being in school means being in a crowd. For the teacher it means being responsible for a group of students. How a small number of adults can organize and

manage a large number of children is the central organizational problem of schools. This problem leads to the third primary feature of schools.

3. Time is the major control mechanism of schools. School is a place where things often happen not because students want them to, but because it is time for them to occur (Jackson, 1968). Scheduling classes, allocating fixed times, and making sure teachers and students adhere to them is a large part of the role of school administrators.

4. Students at a particular age are assumed to be more similar to each other than they are different.

Children are basically grouped by age (all 6-year-olds are in the first grade). Although there is much rhetoric about attending to the individual needs and desires of each child, the actual groupings of children rarely reflect those concerns. In a typical elementary school, all children of an age are subdivided into sets containing 20 to 30 members and assigned to a teacher for a full school year--the self-contained, age-graded classroom. Also, within general content constraints involving grade level expectations in schools, each teacher is given considerable latitude in arranging the schedule.

5. Instruction within a time segment involves children working on a lesson which stresses competition, order, and control.

Regardless of the ingredients of a lesson, the dominant pedagogy in American schools involves intragroup competition. Competition is fostered because it is both a method of motivating learning and a means of differentiating students. Accomplishing an assigned task and perhaps doing it better or faster is rewarded. Competing for grades, or a spot on a team, or to be a cheerleader is training for competition in adult life. Going to school also means being evaluated. Children are constantly having their words and deeds judged by others. The job of teaching becomes in large part one of creating competitions and judging the results. Order and control are necessary because the collective experience requires the subordination of individual to institutional objectives. Some institutional objectives are culturally determined and constitute the "hidden curriculum" of the schools. Order and control also ensure that the lessons (competitions) proceed according to schedule.

6. The knowledge and skills to be transmitted to the children are expressed in cognitive terms rather than in terms of social or vocational development.

The concepts and skills of reading, mathematics, history, science, and so on define the expressed curriculum of schools. The individual lessons are selected by teachers to cover an aspect of a concept or skill within a given time slot. In practice, however, teachers' decisions about what to select are often limited in spite of the apparent latitude to arrange schedules and select activities. In most schools the concepts and skills which are to be taught in a discipline are provided for teachers via a curriculum guide, a syllabus, or most often a textbook. Such materials rarely give teachers many alternatives. Thus, the knowledge to be transmitted to children is largely determined by commercial publishing companies that tend to be educationally conservative and slow to respond to pressures for change.

These six characteristics are the traditional ones that define *school*. The real picture of an elementary school is that of a work place. Teachers work, for the most part, independent of other teachers with one group of students for a year. Their job is to assign lessons to their class of students, start and stop the lessons according to some schedule, explain the rules and procedures of each lesson, judge the actions of the students during the lesson, and maintain order and control throughout. Furthermore, the lessons which define the knowledge to be transmitted are prescribed by a syllabus (or text) and are organized into content-time segments. For students, the job is to be active participants in each lesson, attend to the explanation of rules and procedures, work independently on tasks, and try to do better than others.

Schools, of course, differ because of the locale, the type of parents, the particular school's history, and other factors. But these differences are only of degree, not kind, and for most schools are probably trivial compared to the uniform characteristics. In fact, elementary schools are very stable social institutions; it is difficult to change any of the fundamental characteristics of schools significantly. The basic problem facing reformers is to challenge the traditions upon which schooling practice is based. As Popper (1949) has argued, the role of traditions in society is twofold: first, traditions create a certain social structure; and second, traditions are things we can criticize and change. Schooling traditions such as the age-graded, self-contained classroom provide regularities in the social structure of schools. The

mere existence of these regularities is more important than their merits or demerits; they bring order and rational predictability into the social world of schools. But traditions sometimes outlive their usefulness. Traditions in this sense are similar to theories. They provide a framework to be examined critically and to be altered over and over again. Significant reform movements are characterized by challenges to widely held traditions; in education such traditions are the work of teachers, the work of children, the way in which operating decisions are made by the professional staff, the structure of the knowledge to be transmitted. That many reform movements have failed is not surprising. The traditions which have evolved give the participants a sense of order which is essential. Superficial attempts to change schools have praised the "new" without challenging the "old" and the traditions upon which the old rested. Thus, one way of judging the effectiveness of a reform program is to determine the extent to which the traditions of schooling have been challenged and altered, and one way of understanding the complexity of schooling is to study reform attempts.

Periodically, in the history of educational thought, reformers have tried to change schools which, they believed, were failing to respond to societal changes. Malcom Skilbeck (1975) argued that such actions emerge during periods of upheaval or rapid social change; for example, the plans in France and America in the late eighteenth century for using schools as nation builders, more recently the widespread interest in using education to accelerate economic progress in developing countries. In the past 25 years, a number of proposals have been made attacking the traditional characteristics of schools, programs have been developed based on those proposals, and alternate forms of schooling have been adopted. It is not the purpose of this chapter to examine in detail the conditions underlying the school reform movement of the last quarter century of which IGE is a major example. However, it is worth noting some of the major events.

IGE is a product of the mid-1960s and as such is an exemplar of the "modern-school" reform movement which began in the 1950s, a decade of political turmoil and technological upheaval. The cold war, the Korean war, and the potential of nuclear holocaust kept military preparedness and continual development of sophisticated armaments a high national priority. Conservative retrenchment on the one hand, exemplified by Senator Joseph McCarthy's attacks on "potential Reds," and the emergent civil rights movement on the other were focal points of America's internal political turmoil during that era.

Furthermore, the rapid development of computers along with a series of spectacular basic inventions such as the transistor were creating new opportunities for giant corporations and reshaping most industries. The need for a large cadre of scientifically trained personnel was critical and defined primarily in terms of national survival.

Schools fit into the arguments of this period in three ways. First, one set of educational critics claimed that few of the graduates of our schools and colleges had an adequate mathematics, scientific, or engineering background. The culprits were seen to be the progressive education movement, the life-adjustment curriculum, and, in particular, education professors. The critics of post-World War II schooling at first were dismissed by educators as "cranks," "witch hunters," "super-patriots," and so on. But by 1952, Hollis Caswell argued that "what was happening was not merely a subversive attack on the schools but rather a searching reappraisal of [schooling] (p. 12).

Arthur Bestor, an American historian, became the most noted spokesman for the critics. His principal book, *Educational Wastelands*, published in 1953, was widely reviewed and commented upon. His argument may be summed up under three broad headings: a theory of education, a conception of the historic role of the public school, and a notion of the "great subversion" of American education. The purpose of education is "the deliberate cultivation of the ability to think." Intellectual training may not be the only function of the schools, but it is their *raison d'être*. Intellectual training is given through the academic disciplines. True education, then, is the deliberate cultivation of the ability to think through training in the basic academic disciplines: history, English, science, mathematics, and foreign languages.

Bestor then argued that the function of the public school is to give such a basic education to all citizens. Democratic education differs from aristocratic education only in the number of persons with whom it deals, not in the values it seeks to impart. To educate the common man through other than systematic intellectual training is to rob him of his birthright; it is to vulgarize culture under the guise of democratizing it. By training all in the ability to think, the schools distribute intellectual power widely among the people. This alone is the distinctive way schools contribute to social progress.

Finally, Bestor believed that the great subversion of American education had been the divorce of the schools from scholarship and of teacher training from the arts and sciences. Bestor's arguments found considerable support within the academic community, the press, the military, and even the public. In essence, there was a growing belief that the lessons children were engaged in failed to reflect the essential content of the disciplines and that students in competition with one another were not being judged in terms of "ability to think" but on other criteria.

During this time several study groups began to produce curriculum materials which emphasized the structure of the disciplines. When the Soviets launched the first space satellite in the autumn of 1957, our shocked nation realized that its technological supremacy had been challenged. What followed was the "modern curriculum" movement in which the federal government spent considerable sums to have new discipline-oriented materials developed and to have teachers retrained. The new curricula were deliberately developed under the direction of scholars from the disciplines. Experienced classroom teachers were junior partners in the endeavor. Professors of education, both mathematics or science educators and educational psychologists, were expressly excluded.

A second group of educational critics during the 1950s argued that schools were psychologically alienating. Spokesmen for low-income and minority groups, for example, pointed to a pattern in the lack of achievement of school children. Critics sharing these concerns made insistent demands that schools become more accountable for the learning of all pupils. As Charles Silberman (1970) so convincingly argued, "On almost any measure, the schools are still failing to provide the kind of education Negroes, Indians, Puerto Ricans, Mexican Americans, Appalachian whites--indeed, the poor of every color, race, and ethnic background--need, and deserve" (p. 62). In particular, Silberman argued that slum schools were failing "to teach the intellectual skills and academic knowledge that students need if they are to be able to earn a decent living and to participate in the social and political life of the community" (p. 62). Furthermore, he argued,

> it would be unreasonable, perhaps to expect absolutely equal results from different schools. Lower-class youngsters start school with severe educational deficiencies for which the school cannot be blamed; moreover, the school as we have already argued, is only one of a number of educating

> institutions and influences that affect a youngster's academic achievement. It is not unreasonable, however, in a society that prizes (or claims to prize) equality of opportunity, to expect the schools to be a *significant* influence--to expect them to make the opportunities open to its students less dependent upon their social origins. And that means making it possible for students from every social class and every ethnic and racial group to acquire the necessary basic skills. (p. 62)

Finally, based on this concern about "equality of opportunity" an array of federal policies and programs were developed, based "on the assumption that differences in school inputs largely explained the differences in outputs, i.e., student achievement, the main thrust of educational policy has been to equalize the inputs--to provide the resources and programs necessary to bring below-average and average schools up to the level of the best" (Silberman, 1970, p. 70).

The third aspect of the educational debates was less a criticism of schools than a prescription of how to produce a better system. American belief in science and technology had reached a peak in the years following World War II. Many believed that the same rational procedures that enabled the military and industry to conduct a massive war and then provide for an affluent consumer society could be enlisted to solve the most pressing social and political problems that confronted the United States.

In 1957 another group of scholars, the psychologists, also reacted to the national crisis. Many scholars who had never worked in the area of classroom learning volunteered their services. Lee Cronbach's presidential address to the American Psychological Association that year set the tone. In that speech he argued that the historic separation of experimental psychology from the study of individual differences impeded psychological research. He called for a crossbreeding to bring forth a science of aptitude by treatment interactions (Cronbach, 1957). The psychologists brought to the curriculum revolution the constructs, tools, and conflicting theories of their discipline. Of the variety of ideas they applied to the school reform movement, three major themes gradually emerged:

1. Emphasis should be on the cognitive processes which underlie the acquisition of the concepts and skills of mathematics, science, and other disciplines.

Initially, attention was drawn to taxonomic categories of behaviors (e.g., Bloom, 1956), behavioral objectives, and learning hierarchies (e.g., Gagné, 1962). These constructs were grounded in the behaviorist traditions dominant in the psychology of the time. Later, the constructivist psychologists joined the fray, led in spirit if not in actuality by Jean Piaget. More recently, ideas from the emerging field of information-processing have been in vogue. As Shulman and Shroyer (1978) have pointed out, the roots of this theory come from independent publications by Jerome Bruner, George Miller, Noam Chomsky, and others during the mid-1950s. Indeed the invasion of cognitive psychologists into the field of instruction is nearly complete.

2. Systems analysis founded on behaviorist ideas can be used in an engineering model appropriate for curriculum development.

This approach had its roots in the military training procedures developed in World War II and the ensuing cold war. Educational psychologists who developed military training programs returned to major universities and introduced engineering models for curriculum development with the same fervor that was seen in the larger political realm. Applying principles of systems analysis, they gave attention to identifying taxonomies of learning, organizing hierarchies of behavioral objectives, constructing objective-referenced tests, and developing elaborate flow-diagrams of school organizations as a part of the effort to use human engineering for school improvement. In *Essentials of Learning for Instruction* (1974), Robert Gagné argued that all forms of learning are hierarchically organized in relation to one another, with classical and operant conditioning as the foundation for the hierarchy and problem solving at its peak. Thus, any form of learning could be reduced to its components and these could be systematically taught in a guided fashion to ensure learning. Programmed instruction was the first product from this approach which later yielded a variety of programs to provide differential instruction for students. The rationale of the systems analysts was and continues to be to improve the efficiency of the instructional system.

3. Individual differences among students, particularly in learning rate and aptitudes, are of major interest.

The work of a number of educational psychologists during the 1950s had been to extend and document the Thurstone tradition of distinct mental abilities (Anastasi, 1958). By 1963 this interest in differences in individual aptitudes led to concerted efforts to create curriculum materials that could be adapted to take into account these differences. Recall Cronbach's (1957) plea for individual differences research in the design of instruction. These materials were labeled programs of individualized instruction, and the schools reorganized to use these programs were labeled individualized schools. IGE is one of the most extensive programs designed to deal with individual differences of students.

By taking the impetus to change the curriculum content and adding to it the influence of psychologists, some reformers hoped to change the prevalent characteristics of schooling. A variety of instructional programs had previously been constructed as alternatives to the age-graded, lock-step system in which all student studied the same materials at the same time. Gibbons (1978) pointed out that such programs date from the post-Civil War period. Correspondence courses began as early as 1873, and self-paced units of instruction in 1888. Most of those programs for changing traditional instruction were also referred to as individualized. But in the early 1960s, after a decade of clamor for educational reform, individualized programs were returned to the scene with new enthusiasm. Today it is hard for us to reconstruct the euphoria of that period. John Kennedy had just been elected President; the space program had just started; and new monies for educational research and development were forthcoming. The prevailing opinion during that era was "given time and resources, Americans can do anything."

Unfortunately the resulting variety of programs using the label *individualized* constituted a diverse family, since they were based on different theoretical notions about knowledge and learning and different technologies. The label *individualized instruction* is ambiguous because it involves two basic ideas stemming from different intellectual traditions: the recognition of individual differences in modern psychology and education, and individualism as an ideological construct in American political history.

The study of individual differences grew with the increasing sophistication of the testing movement. It was clear that people differ on a variety of physical, intellectual, and personality traits. Psychologists assumed that these traits were biological in origin and therefore stable. The argument was

that these differences, when identified, should be considered in schooling. The implication was that, by attending to such differences, instruction would be more efficient. In fact, what was being argued is that the traditional classroom is an inefficient arrangement for appropriate instruction. However, note that this idea challenged neither the hidden curriculum of the schools nor the expressed knowledge and skills to be transmitted by them; it challenged only the fundamental grouping practices in schools. The content of lessons, the nature of competition, and the work of children in schools were not to be different because the teacher understood how individuals differed: for example, teachers who were aware of individual differences in rate of learning could only make variations in allocated time for students or provide alternate materials; teachers could not restructure the group of students under their tutelage.

The discussion of individual differences by learning psychologists came from two distinct philosophic schools of thought (Bourne, 1966). One pictured the learner as a passive recipient of information from his environment (associational learning); the other saw the learner as an active participant who entertains and tests hypotheses (constructive learning). Both schools have their merits, but the work of children would clearly differ under the two philosophies. Thus, the goal of providing more efficient instruction by attending to individual differences is not simple to define or to attain.

Individualism as an ideological construct in political thought involves the liberal belief in the autonomy of the individual against the demands of the system. Cagan (1978) suggested there are three distinct components of this belief:

1. self-determination--the individual is in control of his own destiny;
2. self-actualization--the good life is attained through acting on one's personal needs and desires; and
3. self-direction--one is free from social constraints.

Individualized programs based on this construct challenge the control mechanisms of schools (both time and the hidden curriculum) and the expressed knowledge and skills to be transmitted. From this standpoint the traditional classroom with its hidden curriculum of competition, evaluation, order, and control is seen as an organization which fosters inappro-

priate instruction. This attack has come both from advocates of social individualism demanding more self-direction and from socialist educators demanding a collectivist pedagogy that would emphasize interdependence and cooperation rather than independence and competition (Cagan, 1978). Individualism assumes the existence of individual differences but does not consider identification of those differences particularly relevant. In fact, radical reform proposals (Gross & Gross, 1969) often attack the engineering of individualized programs as just more sophisticated means of social control.

The distinctions between "individualization" and "individualism" are subtle but important. Programs of "individualization" are based on assumptions about biological traits and associational learning. "Teacher-proof" materials are the outcome of most programs of individualization. The teacher is seen as the operator of a complex engineered system. "Individualism" on the other hand is based on assumptions related to constructive learning paradigms. The teacher is viewed as a guide who provides students a rich environment in which to grow and mature.

In summary, reformers in the early 1950s believed that the knowledge schools were transmitting was out of date and that the competition of instruction was not sufficiently related to thinking. Toward the end of that decade children's intellectual differences took on more importance and systems engineering was thought to be a technique for developing more efficient schools.

We are beginning to understand that challenges to one or more primary characteristics of an institution bring about new attacks, both on the assumptions of that challenge and on other primary institutional characteristics. Thus, the proposed changes which seemed so straight-forward in the immediate post-Sputnik era now are viewed as complex and even chaotic. The object of study in this book, IGE, grew out of the turbulence of the past quarter-century. IGE was conceived and evolved during the period of enthusiasm for rational planning and was believed to provide a significant alteration of schooling practices in elementary school. It was based on three assumptions.

First, it was assumed there was tacit consensus among all educators on the goals of elementary education. The term "effective education" was used to describe an "education that yields high student achievement, develops the abilities under-

lying those achievements, and contributes to healthy personality development" (Klausmeier, 1977, p. 7). Put bluntly it was "assumed that the learning of each individual child must be the focal point of the school" (Romberg, 1969, p. 1).

Second, because American schools and school systems differed, at least on the surface, what was needed to reach the agreed upon goals for elementary schools was not a product but a process, a problem-solving procedure which would allow each school to respond to local conditions.

And third, it was assumed that the major impediment to more effective schooling was the organizational constraints of the age-graded, self-contained classroom. The staff of a typical elementary school building in the mid-1960s was organized in a way that prevented teachers from developing or executing an effective educational program. Herbert Klausmeier summarized this point as follows:

> As the Wisconsin R & D Center got underway in 1964-1965, it was found that the usual elementary school environment hampered, rather than facilitated, cooperative research and development by school people and the Center staff. The usual elementary school had a building principal and a number of certified teachers, each equally responsible for the instruction of about thirty children, and each being involved with children throughout most of the instructional day. The whole staff spent most of its energy and time in keeping school going, not in curriculum improvement, research, development, or innovation. The atmosphere was one of frustration. The staff wanted to move ahead, but could not.
>
> Four limitations of this environment merit brief attention. *First*, teachers busy with children with no time to share in identifying research or development projects, in planning the projects, or in carrying them out, properly recognized that little constructive work could be done after school hours as an unpaid overload. *Second*, each teacher had to be treated as equally capable of carrying out research and development activities. Differentiated responsibilities had not been worked out whereby some teachers could take greater initiative and responsibility than others. *Third*, working and

other conditions did not permit principal and teachers to mount an effort within the building to utilize available knowledge or best practices in developing excellent programs. For example, many schools in 1964-65 had moved only partially from traditional to modern mathematics after ten years of effort; some teachers were still using 1925 methods with 1965 textbooks. *Fourth*, each classroom, operating as an independent unit, did not allow for appropriate research designs, especially "randomization" of children or teachers according to instructional treatments. (Klausmeier, 1970, pp. 49-50)

The three assumptions on which IGE was based directly challenge the traditional characteristics of schools. For example, the assumption about consensus among educators on goals was made by the IGE developers in spite of the fact that educational goals then (as now) were expressed in a bewildering array of statements made from many ideologically divergent, personal standpoints. Some schools' goals were stated for individuals: to learn a useful trade, to make life interesting and enjoyable, to acquire basic knowledge and skills, to become independent. Other goal statements were public oriented: to contribute to an informed citizenry, to promote social efficiency, to create a stable world order.

A realistic appraisal of consensus on the aims of schooling was made difficult by other factors as well. First, there is no national system of education; instead there are even now about 16,000 separate school systems each reflecting in part the social characteristics of the cultural groups it serves. And second, stated goals often are mere rhetoric and not reflected in schools. In fact, the expression of high-sounding but unattainable aims often is misleading, for similarly stated goals often reference different actions. To know what schools are about, one needs to know what teachers and students do. The distinction between means (actions) and ends (goals) has been common in educational discourse, but as John Dewey (1916) so forcefully argued, the first thing to look to when there is a question of aims is the nature of work both of teachers and students. It was claimed by the IGE developers that what most schools did was maintain an existing and ineffective instructional program (Klausmeier, Morrow, & Walter, 1967), and this needed to be changed.

Nevertheless, and perhaps paradoxically, it was believed that educators agreed that schools could be focused on individuals, could be more efficient and more effective. In essence, they could provide each student an effective education. All that was needed was help, and help was on the way in the form of findings and products from the newly established research and development centers with support from federal funds. If the focus of schools was to be on the learning of individual children and if school staffs used rational procedures to plan for their instruction, common aims could be met. The instructional activities might be different because of individual or cultural differences, but an effective education for all was possible.

In the next chapter, IGE is briefly described as it was conceived and as it evolved in response to these assumptions. In particular, the evolution of a rational system of schooling which directly challenges the traditional organizational and procedural characteristics of elementary schools is presented.

Finally, for the evaluation project, our intent has been not only to describe the features of practicing IGE schools and their empirical effects, but also to examine the assumptions and relations of the reform movement itself. The design of the study, outlined in Chapter 3, began by considering the complex dual forces of stability and change. In particular, the question of how the six characteristics of schools summarized earlier were actually affected by IGE guided the overall evaluation design.

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CHAPTER 2

ONE AT A TIME TOGETHER: THE IGE APPROACH TO ELEMENTARY SCHOOLING

Thomas A. Romberg

In this brief chapter, it is impossible to identify all of the ideas proposed by various scholars and practitioners or to report all of the events which led to the IGE system of elementary education. Rather, some of the guiding principles of the system are pointed out; the components of the system are outlined; the steps taken to implement the IGE system nationwide described; and the resulting ideal system is examined in terms of its challenge to the traditional characteristics of schools discussed in chapter 1.

In the 10-year evolution of IGE, three characteristics were constant. First, while there was a vision about effective education, about what schools could be like, and a belief that the vision could be realized, IGE was not an ivory-tower product. The ideas were not merely logically derived by scholars from a philosophically rigorous model of instruction or schooling. The IGE system of elementary education gradually developed as scholars from the Wisconsin R & D Center cooperated with local school administrators and teachers who were attempting to provide effective education for all students.

Second, as ideas were put forward, they were tested in the cooperating classes and schools. What evolved was a set of practical suggestions about how to operate a school and how to carry out instruction. These suggestions, stated in terms of IGE components and performance objectives, were all related to actions which had been tried out in schools, and subsequently revised if necessary, and were believed to be importantly related to the underlying notion of effective schooling.

Third, as aspects of the system became fixed in the cooperating schools (IGE components identified and performance objectives specified), it seemed that other schools could adopt the same features. Implementation of the IGE system of elementary schooling in other sites across the nation became a major goal of the U.S. Office of Education and the National Institute of Education as well as the Wisconsin Center.

IGE AS EFFECTIVE EDUCATION

The staff of the Wisconsin Center believed schooling could be better. Effective education was assumed to be the outcome in schools where

> ie individual students learn at rates appropriate to each student and in a manner suitable to each student's learning style and other intellectual and personal characteristics. Students, upon completing IGE elementary schooling, should have achieved more than in other kinds of schools, should have acquired higher-level conceptualizing skills and other abilities which enable them to continue to learn, and also should have developed healthy self-concepts. (Klausmeier, 1977b, p. 7)

This notion is focused on three aspects of schooling: first, that students differ, as discussed in chapter 1, and their differences should be considered in schooling; second, that the purpose of schooling is for students to acquire predetermined cognitive skills; and third, that the problem facing schools is to create a facilitative environment where such learning is possible.

It was assumed that teachers and administrators wanted improved instructional programs. With the increase in school-related research, the extensive "modern" curriculum development efforts, and a variety of creative instructional innovations, all that seemed necessary was to provide schools an alternative organizational plan and a set of procedures to follow. In 1965-66, the second year of the Wisconsin Center, a project called Maximizing Opportunities for Development and Experimentation in Learning in the Schools (Project MODELS) was begun "to improve student learning and also to provide a facilitative environment for school related research, development, and innovation" (Klausmeier & Quilling, 1967, p. 1). It is from that project and the related work in schools that the ideas of IGE evolved.

Over the ensuing ten years it became clear that the following conditions were together necessary in order to produce high quality instruction focused on students: "clearly defined roles and responsibilities, shared decision making, continuous pupil progress, personalized instruction, active learning, evaluation related to instructional objectives, involvement of parents and support from the community, and support by responsible education agencies" (Klausmeier, 1977b, p. 7).

THE COMPONENTS OF IGE

The conditions listed above became incorporated into a total system of schooling as seven components:

1. instructional programming for the individual student;
2. multiunit organizational-administrative arrangements;
3. evaluation for educational decision making;
4. curricular materials compatible with IGE;
5. home-school-community relations;
6. facilitative environments for IGE; and
7. the continuing research and development required to improve IGE.

The following descriptions of six components are abbreviated from those provided by Klausmeier (1977b, pp. 10-22). The description of curriculum materials is based on Romberg (1976a, pp. 232-234).

The Instructional Programming Model

To adapt instruction to the needs of the individual, a model of instructional programming was conceptualized to facilitate each student's development (Klausmeier, Sorenson, & Quilling, 1971). The purpose of this model, shown in Figure 2-1, is to portray each individual student in terms of an initial level of performance, rate of progress, style of learning, motivational level, and other characteristics, and to situate this portrayal of each student in the context of the educational program of the school. Thus, the information base for interaction begins with knowing a lot about each individual student. Second, this knowledge is to be used in light of the school's goals to teach a predetermined set of cognitive skills. The model is used with explicitly stated instructional objectives and related criteria of attainment which indicate that every student should attain mastery of certain objectives before completing elementary school. Instructional programming for the individual student should not be interpreted to mean that all students engage in the same number or kinds of activities, or reach an identical level of achievement, interest, or motivation. It does imply that objective-referenced instruction may proceed differently for different kinds of objectives within the same curricular area and also across various curricular areas.

It also implies that, while instructional programming is done for each individual student, instruction (Step 5) is provided for groups of students with common learning needs. In practice such grouping of students usually led to in-

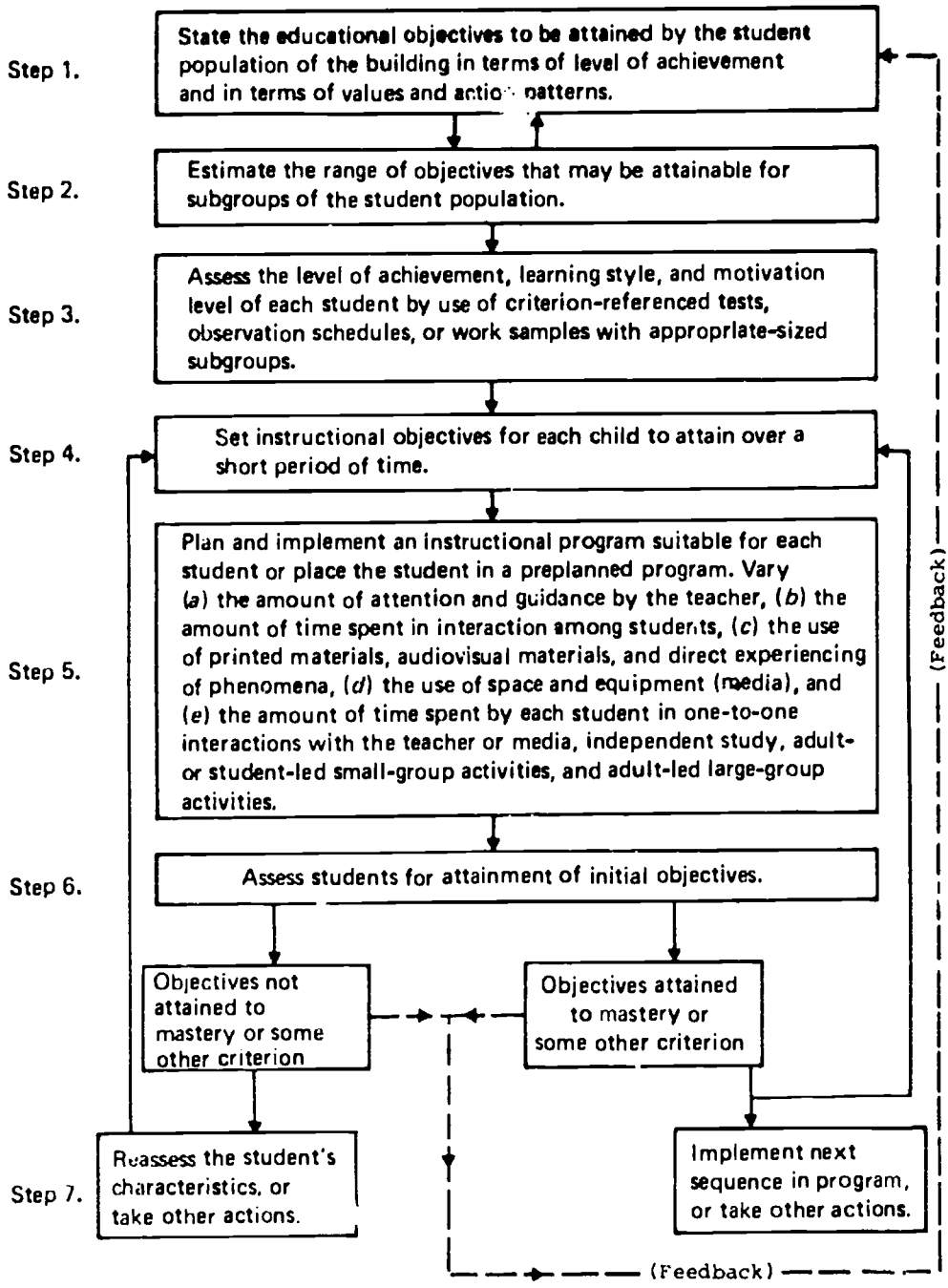
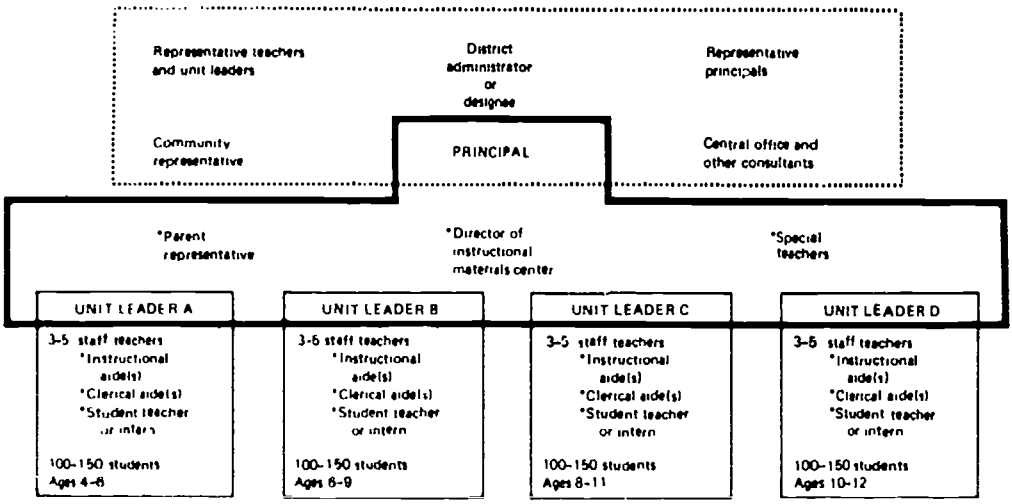


Figure 2-1. Instructional Programming Model in IGE (Adapted from Klausmeier, Quilling, Sorenson, Way, & Glasrud, 1971, p. 19).

struction on a content unit for two to three weeks, followed by post-assessment, some regrouping of students, and instruction on another content unit.

Multiunit School (MUS)

The multiunit school organizational structure emerged initially through cooperative problem solving by personnel of the Wisconsin Center and local school districts. The problem to be solved was how to group and regroup students with common learning needs for effective and efficient instruction. The procedural steps of instructional programming for each individual student are unmanageable by teachers in the typical self-contained classroom. The organizational structure, shown in Figure 2-2, replaces the age-graded, self-contained classroom organization for instruction and the related administrative relationships. The instruction and



*Inclusion of these persons will vary according to particular school settings.

Figure 2-2. Multiunit organization of an IGE school of 400-600 students (Adapted from Klausmeier, Morrow, & Walter, 1968, p. 19). ——— Instruction and Research Unit; ——— Instructional Improvement Committee; ..... Systemwide Program Committee.

Research (I & R) Unit replaces the self-contained classroom organization for instruction. A Unit is comprised of a group of teachers who plan and carry out the steps of instructional programming for each student and provide instruction to groups of students with common learning needs.

The Instructional Improvement Committee (IIC), composed of the principal and the Unit leaders, replaces the principal as the sole educational decision maker at the building level. The main functions for which the IIC takes primary initiative are formulating the general educational objectives for the entire school building, interpreting and implementing system-wide and statewide policies that affect the educational program of the building, coordinating the activities of the I & R Units to achieve continuity in all curricular areas, and arranging for the use of the time, facilities, and resources that are not managed independently by the Units. The IIC thus deals primarily with planning, decision making, and coordinating the activities related to instruction.

The Systemwide Program Committee (SPC) is a new organizational arrangement at the school district level. Its decision-making responsibilities are identifying the functions to be performed in each IGE school of the district, providing for the recruiting of personnel for each IGE school and for their inservice education, providing the essential physical resources and instructional materials, planning an effective program of home-school-community relations for the district, and providing for the transition of students from the IGE elementary school to middle school or junior high school.

These three groups--the I & R Unit, the IIC, and the SPC--assume responsibility for planning, decision making, and evaluation at the three respective levels and also for communication within the school setting and between the school and the community.

Evaluation for Decision Making

The third major component of IGE is a model of evaluation leading to decisions which will facilitate student learning through use of the instructional programming for the individual student. In IGE, the evaluation of the student's learning characteristics and achievements is aimed at providing information at three times: prior to being grouped for a unit of instruction, during the instructional sequence, and

at the end of a unit of instruction. The IIC, interacting with the staffs of the I & R Units, is responsible for formulating objectives and criteria at the building level, and the I & R Unit staff is responsible for gathering the information. Three aspects of evaluation evolved for this component. The first are criterion-referenced tests related to the instructional objective; these are used to identify needs and determine instructional groups. The second is a set of motivational procedures called *Individually Guided Motivation* (Klausmeier, Jeter, Quilling, Frayer, & Allen, 1975), used to determine the motivational level of each child and to encourage each student to reach agreed upon objectives. The third encouraged judgment by teachers about how students best learned so that efficient groups could be formed. The evaluation procedures are planned by the same groups, and most measuring is done by the individual teachers. Individual teachers are involved in relating measurements of particular students to the criteria that have been set. Teachers make judgments and act upon them in the daily instruction of children; the staff of the I & R Unit do so for the children of the unit; and the IIC for the child population of the school.

Compatible Curriculum Materials

It is at steps 4, 5, and 6 of the IPM (see Figure 2-1) that decisions are made about grouping children for instruction. It was evident that the availability of curriculum materials that help professional staffs carry out these three steps of instructional programming makes the real difference in whether or not IGE works.

Early attempts at carrying out the steps of the IPM were hampered by five characteristics of most available curriculum materials:

1. They had no clearly specified instructional objectives. Content to be covered was implied by the basal texts in use, but outcomes were not well identified.

2. They had no objective-referenced assessment procedures.

3. Suggested instructional activities were not keyed to objectives.

4. They lacked a variety of instructional activities which could be used for children with different styles of learning.

5. They did not have efficient ways of keeping records of children's progress.

There were two basic ways to overcome these deficiencies. One was to have IGE school staffs independently develop the needed materials. There are several examples of excellent sets of materials developed in this manner. However, such efforts often resulted in a 'cut-and-paste" program which had an inadequate and incomplete set of objectives, poor tests, and incomplete sets of instructional activities. Preparing good curriculum materials which overcome the five handicaps listed above, and at the same time are conceptually sound and comprehensive, is an expensive, time-consuming task.

The second way of developing curriculum materials was to have a staff of content experts and practitioners with adequate resources prepare materials that could be readily adapted by professional teachers for their students. This was the approach taken by the curriculum development projects at the Wisconsin Center.

The three principal curriculum projects of the Center produced the *Wisconsin Design for Reading Skill Development* (WDRSD) (Otto & Askov, 1974), the *Pre-Reading Skills Program* (PRS) (Venezky, Pittelman, Kamm, & Leslie, 1974), and *Developing Mathematical Processes* (DMP) (Romberg, Harvey, Moser, & Montgomery, 1974, 1975, 1976). In developing each program, the project staffs were faced with the same basic problem--overcoming the five handicaps above. However, due to differences in content and availability of instructional materials, the final sets of curriculum materials differ significantly from each other.

All three projects carefully developed lists of objectives and criterion-referenced assessment procedures and specified record-keeping procedures. But because of different ways of organizing content, and different patterns of objectives (common or variable objectives, full or variable attainment, and invariant or variant sequence), the programs differ from one another in these features.

The biggest difference, however, is with respect to instructional materials. In reading, it was decided that sufficient materials for teaching most of the essential skills were already available. Consequently, WDRSD includes resource files for teachers which provide a means of

organizing existing materials and activities. The published files include only a sample of appropriate resources related to each objective. Teachers are expected to add other resources they judge to be relevant to the objectives and to the needs of their pupils.

In developing both PRS and DMP, it was decided that materials for teaching most of the objectives had to be created. Since prereading skills was a new content area, very few materials even existed. In mathematics, almost all existing materials reflected the modern structural approach to mathematics which had proven to be inappropriate for elementary school children (Romberg, 1976b). DMP was developed from a modeling-process approach to mathematics, using measurement as the basis of modeling. Furthermore, it was assumed that knowledge, skills, and values are not simply put into students, rather they are are acquired through active participation. Sensing, manipulating, and self-directed participation are reflected in the activities developed for both PRS and DMP. These include games, manipulatives, experiments, and materials for learning stations. Both PRS and DMP are complete instructional programs which are packaged in kits for convenient use by teachers.

The organization of materials in all three programs, WDRSD, PRS, and DMP, encourages teachers to recognize and meet the needs of each child. The teachers' materials emphasize flexibility in grouping children, sequencing instruction, and varying instruction for individual children. The assessment procedures enable teachers to determine each child's progress and plan appropriate instructional activities.

It should be noted that reading and mathematics were the two areas of primary concern. It was assumed that other instructional materials suitable for use in IGE schools were being developed. In addition to the Wisconsin Center, other centers, regional educational laboratories, and nonprofit and profit-making organizations were producing a wide variety of high quality curricular materials. The following procedures for identifying and using appropriate materials were recommended: terminal educational objectives related to the major curricular areas were to be formulated at state and school district levels. Then, available printed and audiovisual instructional materials were to be identified by a representative committee of teachers and administrators. From this list, the IIC and I & R Units of a school were to select the

materials which were appropriate for each student to attain specified instructional objectives. Each building staff was to continuously recommend to the district committee the specific materials needed for the students in a particular school and community.

Home-School-Community Relations

The success of any school program depends in large measure on relations with the community it serves. In IGE schools, there should be three general aims of a home-school-community relations program: first, that the staff be aware of available resources and be responsive to the educational expectations of the community, parents, and students; second, that the community, parents, and students be aware of and responsive to the requirements for implementing IGE; and third, that both staff and community be involved in the changeover and refinement of IGE.

At the level of the school district, the larger community controls the schools through its willingness to expend its power and resources on programs which reflect its values and interests. If the values held in the broader community are communicated, and if the school is responsive to these educational expectations, then the community will use its power and resources to support the instructional program.

At the local school level, particular attention should be accorded parents. Parents often hold expectations for the school which are more specific, and perhaps less objective, than those of the wider community. Because of their intense interest, the parents collectively constitute the most influential school-related group; they have the greatest impact on actual awareness and potential political actions within the larger community.

At the instruction level, parents must have a clear understanding of the school's aims regarding the development of their children. Because roles and functions may differ in the IGE school, parents also must understand the organization, programs, and procedures used. To develop such understandings, the Unit staff must provide an effective program of home-school-community relations. At the level of instruction, the family directly affects the individual student's abilities, skills, and attitudes.

Facilitative Environments[1]

A system of supportive and facilitative environments is required to maintain and strengthen each IGE school so that, in fact, each school becomes increasingly self-renewing. Facilitative environments, consisting of human and material resources, are both intraorganizational and extraorganizational. The intraorganizational environment is represented in the multiunit organizational structure, and the focus is on providing the physical and material resources needed for learning and instruction. Extraorganizational facilitative environments are represented in the state education agency, intermediate educational agencies, teacher education institutions, and other groups such as teachers' associations and parents' organizations.

Continuing Research and Developments

The seventh and final component of IGE, a program of continuing research and development, ensures the continuous improvement of IGE. Without this component, IGE, like any other form of schooling, will become sterile, unresponsive to the changing nature of society, and incapable of adapting to the needs of individual students (Klausmeier, 1972b).

GENERAL OBJECTIVES AND PERFORMANCE OBJECTIVES

To provide guidance to school staffs implementing each of the seven components, two kinds of objectives were developed. The first were 11 general objectives related to four implementation phases: one for the awareness phase, one for commitment, seven for changeover (one for each IGE component), one for refinement, and one for renewal (Klausmeier, Kargas, & Krupa, 1977). The second were detailed performance objectives to guide school staffs in specific actions and help them evaluate their implementation of the IGE components.

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[1]The meaning of the term *facilitative environments* changed in the IGE literature from 1966 to 1977. Initially the Unit was seen as a "facilitative environment" for research, development, and innovation. Later the term was used as in this section to refer to a supportive system both within and outside the school.

For example, for the changeover phase one stated performance objective dealing with the I & R Units' use of the IPM is:

> Each unit assigns each student to an instructional group on the basis of assessed level of attainment of specific instructional objectives, learning styles, and level of motivation. (Klausmeier, Kargas, & Krupa, 1977, p. 349)

Over 80 similar performance objectives were developed. It is against these performance objectives that a school staff can judge whether or not their school is truly an IGE school. The implication was that the more of these performance objectives that were met, the more "IGE" the school; and in fact, an *ideal* IGE school would be one that met all the objectives. Also, it is from a consideration of these performance objectives that we were able to study variations in performance in this study.

IMPLEMENTATION OF IGE

Because in the IGE Evaluation Project we planned to gather information from a sample of schools that had been attempting to implement the components, some information about the implementation strategy seems warranted. In fact, both the IGE system of elementary schooling and the implementation procedures are of necessity being evaluated in this study.

With the passage of the Elementary and Secondary Education Act in 1963 and the start of the r & d centers program, there was an unchallenged belief in what has come to be known as the "research → development → diffusion" perspective with respect to planned educational change (Clark & Guba, 1967). This model of change is characterized by a sequence of planned, coordinated activities and a rather passive target population. The argument for implementing programs of r & d centers began with the claim that the involvement of the federal government as an active partner in education with the state and local schools made available a new source of support. Federal dollars accelerated a program of research and development at all levels resulting in a host of new programs and approaches designed to meet identified educational needs. From this position, leading educational administrators such as William Kahl, Wisconsin Superintendent of Public Instruction, concluded the argument by stating that the state Department of Public Instruction "must be respon-

sible for the installation of improved educational practices in the school districts of the state" (Kahl, 1967, p. 1). The multiunit school organization and then the IGE system were identified as new programs which were a "promising component of a facilitative environment for the individualization of instruction and learning" (Kahl, 1967, p. 1).

The key historical events which led to the national implementation of IGE have been outlined by Klausmeier (1977b) and are briefly summarized here. In 1968, the Wisconsin Department of Public Instruction selected the multiunit school concept for statewide demonstration and implementation during the 1968-69 school year. The Center staff then proceeded, with the assistance of staff members of the Wisconsin Department of Public Instruction and local schools, to develop a book and 15 videotapes for use by state education agencies, teacher education institutions, and other educational agencies interested in assisting local schools make the changeover to IGE.

In 1969, an agreement was entered into between the Wisconsin Center and the Institute for Development of Educational Activities (/I/D/E/A/) providing for /I/D/E/A/ to use the prototype materials in producing a more sophisticated set of new inservice materials. /I/D/E/A/ incorporated into the new materials some insights gained from their study of educational change. In 1970-71 and thereafter, /I/D/E/A/ used these "IGE Change Program" materials to prepare "facilitators" to start IGE schools (National School Public Relations Association, 1972).

In 1970, the Council of the Great City Schools and Teacher Corps decided that the multiunit school was an ideal school environment for their collaborative Portal Schools Project (Lutonsky, 1971).

Early in 1971, the multiunit organization component of IGE was selected by the USOE for nationwide implementation, and the Wisconsin Center started its first large-scale implementation effort. The Center was funded to carry out a comprehensive program to implement various components of IGE during 1971-72 and 1972-73. The National Institute of Education (NIE) funded a small continuing effort during 1973-74 and thereafter, continuing through 1976.

In 1972, the Sears-Roebuck Foundation invited a proposal that led to its funding of the IGE Teacher Education Project at the University of Wisconsin (Klausmeier, 1972a).

This project was to develop seven sets of printed and audio-visual instructional materials for use in undergraduate programs to prepare teachers for IGE schools; one set for use in graduate programs to prepare unit leaders and staff teachers; and another set to prepare IGE school principals and other administrators (Klausmeier, 1975). Since these materials were not available until the 1976-77 school year, the effects of these materials on school practices could not be examined in this project.

Finally, in 1973, the Association for Individually Guided Education was established by the IGE coordinators of 12 states, with support of the Wisconsin Center and the IGE Teacher Education Project at the University of Wisconsin. New theoretical conceptualizations, reports of research, and practical ideas for the implementation and refinement of IGE are shared in programs at its annual meetings and in the organization's publications. As a result of these efforts, the number of IGE schools increased rapidly: 50 in 1969-70, 500 in 1971-72, approximately 700 in 1973-74, and between 2,000 and 3,000 in 1974-75 (Klausmeier, 1977b).

The specific R⟶D⟶D implementation strategy used by the Wisconsin Center had two key features. First, in preparation for the national implementation effort in 1971, a plan was formulated consisting of the following four stages: awareness, first-year changeover, second-year maintenance and refinement, and institutionalization (Klausmeier, 1971). Second, a network of cooperating agents was defined. The term "network" was used to refer to the formal relationship between primary, intermediate, and operational agents to effectively carry out implementation and maintenance of IGE. The primary agent in the network provides the procedures and materials which can be used to change schools. For IGE, the primary agents were the Wisconsin Center and /I/D/E/A/. The intermediate agent was seen as an organization with proven resources and staff to disseminate, demonstrate, implement, and maintain IGE in schools. Depending on circumstances, the intermediate agent was a state or intermediate education agency, a teacher education institution, or the administration of a large school district. It was the responsibility of an intermediate agent to train and monitor the operational agents in implementing IGE. An operational agent was the organization which actually carried out implementing change. For IGE, this was the staff of an elementary school which actually implemented IGE, i.e., the principal, unit leaders, and teachers. Thus, the Center and /I/D/E/A/ worked with the intermediate agents (facilitators)

who in turn worked with local school staffs. Also, since the needed four phases for IGE were seen to take three or more years, the relationship between agents was seen to be long term and mutually supportive.

Scholars involved with IGE were aware of some of the limitations of the R → D → D perspective. For example, Herbert Klausmeier, then director of the Center, argued that there are many sequences relating basic research, development, and improved practice, not just a single linear sequence (Klausmeier, 1968). However, their concerns dealt more with the relationship between research and development than with implementation.

In retrospect, the real problem with the R → D → D perspective is its failure to give heed to the users' own perception of their needs. Thus, as implementation plans were developed, the local problem-solving basis of IGE from which its components were developed gave way to procedural rules, and the R → D → D perspective rather than problem-solving became dominant.

IGE'S CHALLENGE TO SCHOOLING TRADITIONS

The components of IGE and the procedures outlined in those components were seen as means to an end: the aim of IGE was to provide an effective education for each individual student. This "one at a time" theme is a direct challenge to the pervasive group aims in most schools. A different instructional program was to be considered and planned for each student. The plans were to take into consideration both social aims and individual aims and were focused on intellectual growth.

The procedures first involved considering content in terms of "units of instruction." Units were seen as sets of related activities in a content area which could be taught in a short period of time, possibly two to three weeks, with a natural beginning and end point. Each unit was objective-referenced for assessment purposes in that one or more related behavioral objectives were to be identified. Also there should be a wide variety of activities so that individual differences in learning style could be taken into account.

Then an individual's instructional program was to be designed depending on three factors:

(1) whether the objectives incorporated in the unit are to be attained by all students, (2) whether the criteria that are specified for attainment of the objectives are the same for all students, and (3) whether the units of instruction are to be taken in a fixed sequence. (Klausmeier, 1977a, p. 60)

Considering these three factors, there are eight possible patterns, as shown in Figure 2-3. Then when one considers variations in activities within units for different students, it is clear that allowances can be made for each student.

There was a second aim of IGE in addition to effective education and that was to create an environment where research and development could flourish. This is again a direct challenge to traditional practice. Development-based research carried out in schools was seen as the dominant form of schooling research in the coming decades (Klausmeier, 1968).

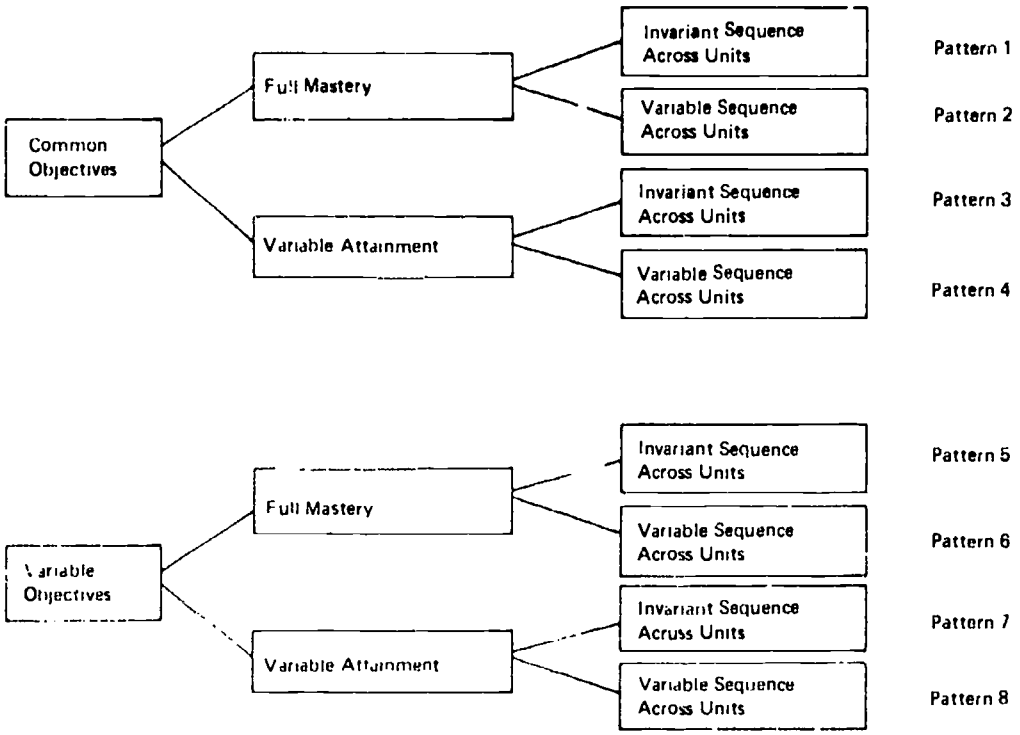

Figure 2-3. Patterns of objectives, criteria of attainment, and sequencing (From Klausmeier, 1977, p. 61).

As has been previously argued, the traditional way in which children were grouped in elementary schools--the age-graded, self-contained classroom--simply was inappropriate for accomplishing either aim. Instruction in IGE was to be accomplished by periodic regrouping of students for new units of instruction depending upon need. Regular regrouping required that teachers were working with a large number of students. Thus, the I & R Unit was created and then the multiunit school. This change in how students were assigned for instruction also challenged how time was allocated and when instructional units were offered. Shared decision making by teachers to meet individual needs of students was to replace the fixed time periods at prescribed grade levels. The traditions of instruction and content were challenged by focusing on units. Competition and evaluation were still emphasized, but they were referenced to individual needs so students were aiming to master some unit rather than to do better than other students.

In summary, the possibility of providing each student an effective instructional program guided the development of the procedures which together became Individually Guided Education. It was seen as a radical departure from traditional schooling practices. The intent of the evaluation project was to document the implementation of IGE in elementary schools and to understand both how the aims and procedures were given meaning by practitioners and how the assumptions upon which the components of IGE were built were accepted and followed in schools.

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CHAPTER 3

THE PLAN FOR EVALUATING IGE

Thomas A. Romberg

The Wisconsin Center's ability to marshall human and financial resources in an attempt to restructure elementary education in the United States has been pictured as a prime example of the utility of federal financing of educational research and development. Through the efforts of the Center, /I/D/E/A/, and IGE coordinators in 29 states, by 1976 approximately 3,000 elementary schools claimed to be IGE schools. Unfortunately, no comprehensive picture of the extent or effectiveness of IGE was available. This is not to imply that no evaluations of IGE had been done. Katzenmeyer, Ingison, Zajano, and Romaniuk (1976) found approximately 50 different studies that evaluated various aspects of IGE. Each of these studies, however, dealt with parts of the IGE system and offered only a glimpse of the impact of IGE. Also in 1976, responses from over 950 schools to an IGE Schools Questionnaire clearly indicated substantial variance in affiliation, degree of utilization, use of the instructional programming model (IPM), subject matter selected for IPM implementation, staff organization, and so on (Zajano & Stewart, 1976). Obviously, the translation of IGE into practice had taken many forms. Thus, a plan to evaluate IGE was outlined to provide a comprehensive picture of the system in operation and to determine its effectiveness (Romberg, 1976).

BACKGROUND TO THE PLAN

The design of such an evaluation was not easy. IGE is not a product like a washing machine to be judged simply by performance against competitors as in a consumer report. Rather it is a complex system based on theoretic and pragmatic ideas about schooling, children's learning, and the professional roles of school staffs. As described in chapter 2 IGE was the result of a long, collaborative interplay of these ideas by various scholars and professional educators.

A descriptive framework was developed that considered outcomes of IGE as a function of instructional means and of the degree of implementation. This framework, presented in Figure 3-1, was intended to show four types of variables and how they are functionally related. Outcomes were separated into pupil and staff outcomes.

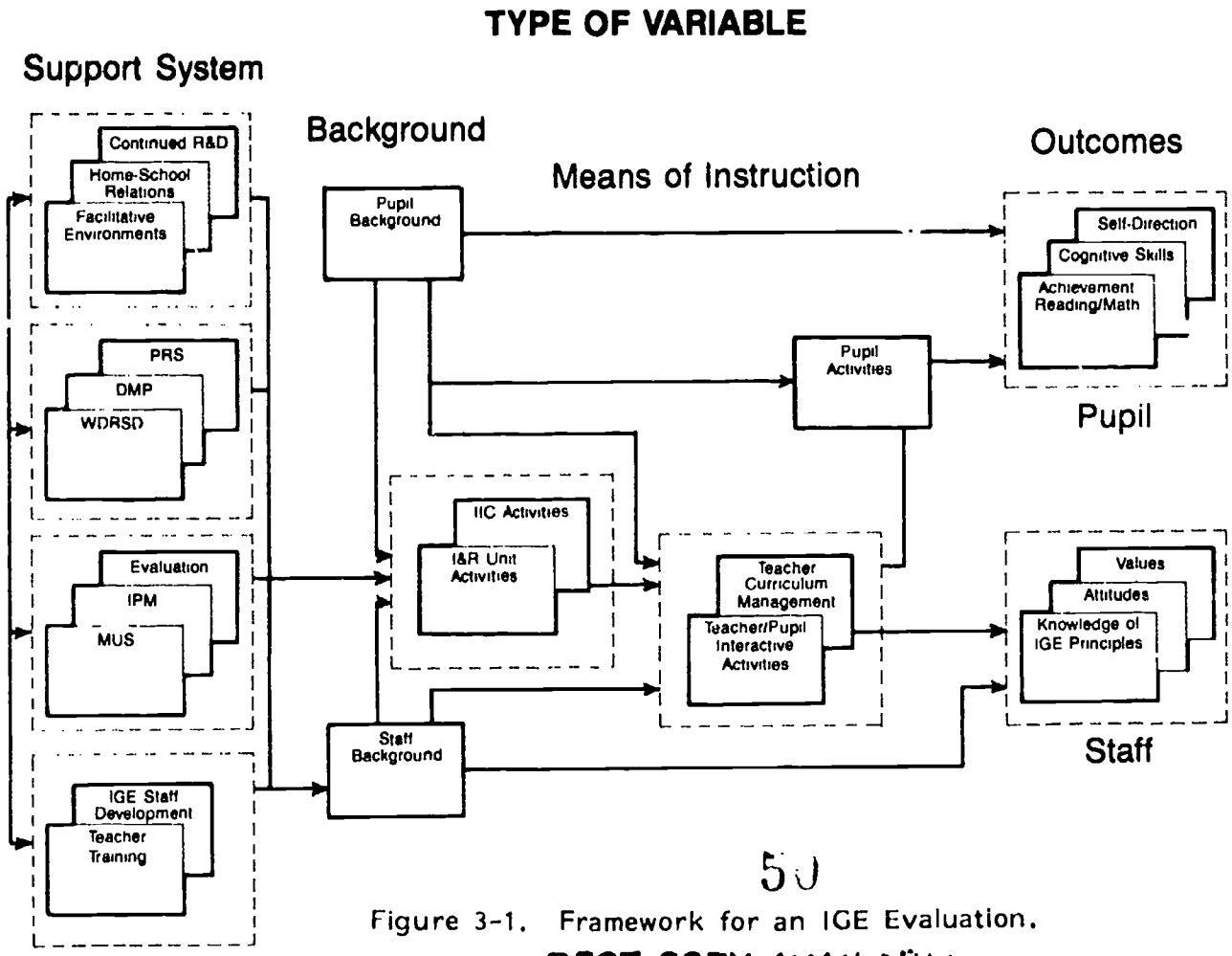

Figure 3-1. Framework for an IGE Evaluation.

The functional relationships illustrated in Figure 3-1 were intended to convey the following: The degree of implementation of the IGE support systems along with pupil and staff backgrounds directly influence the means of instruction in an IGE school. The means of instruction, along with pupil and staff backgrounds, account for pupil and staff outcomes.

Pupil outcomes were the basis of the evaluation plan.

As Klausmeier stated,

> Students, upon completing IGE elementary schooling, should have achieved more than in other kinds of schools, should have acquired higher-level conceptualizing skills and other abilities which enable them to continue to learn, and also should have developed healthy self-concepts. (Klausmeier, 1977, p. 7)

The extent to which these outcomes were attained was basic to the evaluation plan. Measuring attainment proved to be a difficult problem for three reasons. First, conceptually and analytically there is a "unit of investigation" problem. Instructional programming is at the individual student level. Ideally each student has a different instructional program. Thus, to judge the effectiveness of the instructional program the student should be the unit of investigation. However, instruction on content topics is done for groups of students with common learning needs. Effectiveness of instruction should be judged on such groups. And planning and regrouping are done at the I & R Unit level. Thus, data for the entire I & R Unit should be the basis of evaluation of those functions.

Second, because of the expected variability in instructional programming, the sensitivity of instruments to the effects of such variability was a problem. Too many tests of pupil outcomes are very global and reflect general intelligence rather than effects of instruction (Berliner, 1975).

Third, the multivariate/multilevel conception of outcomes meant that several different measures of pupil outcomes would have to be used so that a composite picture could be formed and examined.

Staff outcomes were also important.

If changed pupil outcomes are a result of changed pupil activities, then it follows that changed means are in part a result of changed teacher activities. One established fact in

IGE schools is changed staff roles. The extent to which staff changes are reflected in increased knowledge about individuals and schooling or in changed attitudes and values should also be reflected in the plan. In fact, if IGE is as dynamic as is claimed, then the evolution of a staff to an increasingly professional approach to solving the problems of educating children should be evident.

Both pupil and staff outcomes are illustrated as being multivariate and multilevel. Pupil outcomes included achievement in both reading and mathematics, cognitive skills such as conceptualizing and problem solving, and self-direction. Staff outcomes included knowledge of IGE principles related to individual differences and instruction using the instructional programming model, attitudes about children and schooling, and perceived values of education.

The instructional means or form of formal schooling was to be examined.

It has been fashionable in evaluation circles to concentrate on ends or outcomes and to ignore the means by which they are reached. It has been persuasively argued in traditional circles that means are, by definition, the optional routes to fixed goals. These optional routes are of no significance in and of themselves, but only in terms of the contribution they can make to those ends (Olson, 1976). Yet, in this case, the form of formal schooling is distinctive. Reform movements invariably attack the properties of means. Clearly, IGE is an educational reform aimed at changing the means of instruction. To this extent judging the means was considered as important as assessing outcomes.

Means of instruction were separated into three sets of activities based upon the operating characteristics of IGE schools; namely, the staff activities of the IIC (Instructional Improvement Committee) and the I & R Unit (Instruction and Research Unit), the activities of the staff teacher (both curriculum management and pupil interaction), and activities of pupils.

The degree to which the supportive systems of IGE have been incorporated and developed in a school was to be judged.

The seven components of IGE had evolved as practical features of IGE schools in order to support new instructional methods which in turn produced desired pupil and staff outcomes. It can be argued that the efficiency of an IGE

school is a function of which components have been implemented and how well they are operating. In fact Klausmeier (1977) claimed that

> high quality instruction is realized in IGE schools when conditions such as the following are operative: clearly defined roles and responsibilities, shared decision making, continuous pupil progress, personalized instruction, active learning, evaluation related to instructional objectives, involvement of parents and support from the community, and support by responsible education agencies. (p. 7)

The support systems for an IGE learning environment were separated into four categories. The first, Components 1, 2, and 3 (the multiunit organization, instructional programming, and evaluation), was seen as most directly related to the means of instruction. The second category, Component 4 (curriculum materials compatible with Components 2 and 3), is shown in the figure as the three major curriculum products developed for IGE: namely, *The Wisconsin Design for Reading Skill Development* (WDRSD) (Otto, 1977), *Developing Mathematical Processes* (DMP) (Romberg, 1977), and the *Pre-Reading Skills Program* (PRS) (Venezky & Pittelman, 1977). The third category, Components 5, 6, and 7 (home school relations, facilitative environments, and continued research and development), was seen as supportive and desirable. These later support systems were considered less directly related to instructional means than the other components.

Pupil and staff background variables were included because knowledge of prior pupil achievement, level of motivation, and learning styles were assumed necessary for efficient grouping of students and selection of appropriate activities. Similarly, staff experience with IGE principles, with working in groups, and with pupils was considered to be important.

In summary, as a comprehensive system of education, IGE is directed toward the development of self-direction and motivation for learning in students as well as different levels of achievement. Further, the components are directed toward school staff and community members in addition to changing what students do. Thus, it was essential to gather data beyond pupil outcomes to encompass staff outcomes, the instructional means, and the degree of implementation of IGE.

DETAILS OF THE PLAN

Given that there were limited resources to examine the framework of variables described above, that instruments or techniques were not readily available to scale reasonable proxy variables for each category or subcategory of variables, and that the various relationships depicted in the framework called for different analytic strategies (status surveys, time-series designs, within-school and between-school comparison, and so on), the following guidelines were adopted to insure that a reasonable portrayal of IGE schooling would be obtained.

First, a stratified sample of approximately 150 schools was drawn from a population of some 950 schools. Stratification was done on demographic and IGE support characteristics to insure a wide variability of schools and situations.

Second, we decided to limit the evaluation to teachers and students at the IGE equivalents of second and fifth grades. Second grade is the earliest at which group-administered paper-and-pencil tests can be given to children; fifth grade is the last common grade in elementary schools.

Third, it was decided that resources should not be expended on instrument or test development for use with the total population. Thus, existing self-report surveys and paper-and-pencil tests were selected for use.

Fourth, the analysis of the basic data was to follow a structural equations model which accounts for both within-school and between-school variance.

Fifth, several follow-up studies were to be carried out to gather other data over a long period of time on subsamples of the original population.

Sixth, the Center was to subcontract through competitive bidding one or more follow-up studies.

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[1]Members of the Advisory Panel were: Chester W. Harris, chairman; Arno A. Bellack, David C. Berliner, David Hamilton, and William Wiersma.

Finally, the evaluation was to be conducted by the Center IGE evaluation staff with the assistance of an IGE Evaluation Advisory Panel.[1] The evaluation of IGE included a preliminary examination of the extent of variation of IGE implementation and five operational phases.

Variation in implementation was examined initially as a part of the process of identifying a population of IGE schools to study and a means of selecting a representative sample of schools. The results of this examination are reported in chapter 4.

Phase I was the large sample study to provide basic information about IGE schooling. The specific objectives of Phase I were:

1. to determine the degree to which the components of IGE had been implemented in IGE schools.

2. to describe the implementation of IGE components in terms that can be related to means of instruction, particularly in reading and mathematics, and then to examine the relationship of this implementation to means of instruction.

3. to describe the implementation of IGE components in terms that can be related to staff outcomes, and then to ascertain the relationship between this implementation and staff outcomes.

4. to describe the implementation of IGE components in terms that can be related--presumably by way of instructional means--to pupil outcomes such as reading and mathematics achievement, selected cognitive skills, and aspects of personality development, and then to ascertain the relationship of component implementation to those pupil outcomes.

The means of instruction and the outcome variables of this study were without question influenced by multiple causes that operate simultaneously. This multiplicity of causes resists easy description. Since causal relationships are easier to study when considered in isolation, most studies have examined only one or a few causal relationships. With respect to IGE, simple comparisons between IGE as an undifferentiated package and one or a few other educational alternatives provide us with little information about specific features and processes that

occur in IGE schools. Using structural equations, Phase I simultaneously examined relationships among the network of variables believed to influence means of instruction, staff outcomes, and pupil outcomes.

Data for this phase were gathered from staff and students in over 150 schools in Fall 1977. A summary of the findings from Phase I appears in chapter 5.

Phase II was designed to verify the self-report data gathered in Phase I as well as to extend data collection to include more fully the range of variables that determines the processes of schooling. As a verification activity, this phase was subcontracted to Research Triangle Institute (RTI). Roderick A. Ironside of RTI's Center for Educational Research and Evaluation was principal investigator. Specifically, the objectives of Phase II were:

1. to determine the validity of the self-report data gathered in Phase I.

2. to use interview and observation data to extend the information about each category of variable.

3. to ascertain the role of developmental agencies in the national diffusion process as perceived in IGE schools.

4. to gather cost data so that some indications of cost-effectiveness can be determined.

The areas of cost and of implementation history, including the role of developmental agencies, are the primary additions to Phase I data. The importance of cost analyses has been discussed by Rossmiller and Geske (1977). Adoption and institutionalization of innovative practices are processes which interest not only practitioners and scholars, but also funding agencies (Berman & McLaughlin, 1976).

In Spring 1978 RTI staff contacted and visited 30 schools that had participated in Phase I. A summary of the findings from Phase II appears in chapter 6.

Phase III was a field study conducted in six schools, five of which had also participated in Phase I. Each of the six schools had been reported to be an exemplary IGE school by one or more IGE regional coordinators or researchers. The purposes of this study were:

1. to determine the degree of reform evident in exemplary IGE schools.

2. to determine the degree of renewal evident in exemplary IGE schools.

In particular this phase focused on the social meaning which emerges as IGE is used on a day-to-day basis. Research into the impact of educational reform suggests that changes in school programs frequently do not alter existing patterns, but instead incorporate the reforms into the everyday patterns of school life. Failure of educational planners to consider the institutional patterns of schools has produced unanticipated and unintended results from reform efforts. Early in the development of IGE, the R & D Center explicitly stated that the purpose of IGE schooling was to alter the substantive nature of curriculum and instruction in elementary schools (Klausmeier, Morrow, & Walter, 1968).

Phase III data gathering was carried out during the school year 1977-78. A summary of the findings from this phase is in chapter 7.

Phase IV focused on the use and effectiveness of the three primary curricular projects developed at the Wisconsin Research and Development Center for Cognitive Learning, the *Wisconsin Design for Reading Skills Development* (WDRSD). *Developing Mathematical Processes* (DMP), and the *Pre-Reading Skills Program* (PRS). Each program was developed to be compatible with the IGE system. WDRSD is an objective-based system designed to manage the development of reading skills for children in grades kindergarten through six. DMP is a complete instructional program for elementary mathematics, grades kindergarten through six. PRS is designed to provide instruction in five basic prereading skills at the kindergarten level.

Each program is being used by a number of schools throughout the country in a variety of ways. For example, each program is being used in both IGE and non-IGE schools. Exactly what the capability of each program is to be used effectively in a number of different situations is unknown.

Thus, Phase IV of the IGE evaluation had two major purposes:

1. to describe how WDRSD, DMP, and PRS are being implemented; and

2. to compare the use and nonuse of these programs within IGE and non-IGE settings.

Five studies were conducted as part of Phase IV, three Descriptive Studies and two Comparative Studies. The Descriptive Studies were small sample studies designed to describe how the curriculum programs DMP, WDRSD, and PRS were being used in IGE schools. Each study was conducted during the winter and spring of 1978. The two Comparative Studies were carried out in the 1978-79 school year. Three types of schools were included in each study: IGE schools using DMP or WDRSD, non-IGE schools using DMP or WDRSD, and IGE schools using neither program. A summary of the findings of Phase IV appears in chapter 8.

Phase V was to be a summary report of the first four phases. Phases of the evaluation study were designed to complement and strengthen the validity of the data gathered by the previous phases. For example, data on means of instruction, gathered by the large-sample study of Phase I, are examined in greater depth in fewer schools by Phase II. Phase III's analysis develops a view of instruction from a different perspective. Phase IV explores means of instruction within specific curricular areas. In Phase V we proposed to both summarize the different evaluation phases and to integrate and interpret the data from all the phases into a series of statements about what implications the project has toward contemporary educational issues. This book constitutes the product of this phase.

THE EVALUATION PLAN IN PERSPECTIVE

Ever since Cronbach (1964) and Scriven (1965) made the distinction between "formative" and "summative" evaluations in the literature, authors have vied to identify and clarify types, phases, sequences or standards and to develop checklists on evaluation. One outcome of these deliberations has been the realization that different questions are raised at different times in the development of any program, thus, different informa-

tion is needed which must be gathered in different ways. A total product evaluation encompasses all such questions. The IGE evaluation plan is consistent with the notion that there are different questions which need answers. Thus, the different phases of the plan require different kinds of data, different designs, different methods of analysis, and different reports of results. However, reflective inquiry was at the heart of this plan. We hoped to uncover some of the strengths and weaknesses of IGE in practice and to identify the unintended consequences of IGE schooling. The information generated and relationships studied were to be a rich source of ideas for further investigation. However, it was hoped the findings would help school staffs and funding agents make reasonable decisions in the future, such as how to approach implementation of IGE or at what level to fund further long term r & d efforts.

The literature on planned change is wide in scope and vast in quantity. Havelock (1969) reviewed approximately 4,000 sources in his analysis of the theoretical concepts and the research evidence dealing with change in education, agriculture, medicine, and other fields. Many authors have attempted to provide a model or conceptual framework for planned educational change.

The many models of the change process can be grouped into three main classes. The research → development → diffusion perspective, associated particularly with Guba (1968), is characterized by a rational sequence of coordinated activities, a division of labor, and a rather passive target population. Evaluation in this "center to periphery" notion of development and implementation focused on whether the user at the periphery has adopted and is using correctly the products developed at some central setting.

The social interaction perspective is basically sociological in nature and considers the path taken by an innovation already in existence as it moves through a social system.

The third major type of model for the change process views the user as a problem solver. The points stressed by the problem-solver perspective are (1) starting with the user's need and its diagnosis, (2) providing nondirective help from outside, and (3) encouraging the user to develop his own internal resources and his capacity for self-renewal.

The implementation strategy for IGE attempted to combine aspects of both the research → development → diffusion perspective and the user-as-problem-solver perspective. The IGE support system is seen as providing necessary structural features which make it possible for school staffs to differentiate instruction in an efficient and effective manner. The multiunit school organization and the Instructional Programming Model are not universal prescriptions; instead they are mechanisms to facilitate professional judgments. In fact, teacher and pupil activities should be different for different staffs and pupils. It should be evident that variation is anticipated both in a school and between schools, and thus estimates of both within-school and between-school variances are important. The evaluation plan not only includes estimates of the degree of IGE component implementation and of the level of pupil and staff outcomes, it also provides for estimates of the differential quality of instruction.

In summary the IGE evaluation plan was conceived in light of the variety of educational evaluation activities of the past decade. We tried to incorporate some of the best ideas (like the combination of objective and subjective techniques), the most important variables (such as engaged learning time in the category of pupil activities or degree of structuring in teacher activities) that other researchers have identified in the past few years. We tried to put the evaluation plan in an adequate framework. And, we attempted to use appropriate statistical techniques combined with subjective methods for examination and interpretation of the data. With this preparation, we were confident we could picture IGE in all its complexity.

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Part 2: THE EFFECTS OF PLANNED CHANGE

It is important for educators to consider systematic evaluation procedures for several reasons: The first and most important is practical. The community we serve, legislators, and school boards are all demanding some form of accountability. In the past it may have been enough for a principal when queried about a new program to respond, "In my professional judgement. . . ." Subjective judgments, no matter how valid, are no longer sufficient. "What's your evidence?" is being asked. In part, this is because much recent educational change has been clouded by jargon, unsubstantiated promises and panaceas, ill-defined goals, questionable implementation, and narrow evaluation. In addition, educators' credibility may have been weakened by the fact that some innovations could not be adequately evaluated because they never really happened in the classroom; such "changes" rarely affected the ways teachers actually planned and taught; and because no significant change occurred in what and how teachers taught, many programs produced no significant difference in student learning. A new, but only partially implemented program can rarely match a fully used program!

Educational planners and evaluators are confronted with a public skeptical of both the value and the results of change, skeptical of the institution of public education which pretends to be changing while remaining the same. Even more damaging for future educational improvement is that a segment of the public believes schools produce students who have been changed--changed so that they are less competent than previous generations. Thus, all educators need to be able to present to others reasonable evidence about the effects of their planned changes. In Part 2 of this volume, five chapters summarize the evidence gathered in the IGE evaluation project. In chapter 4 we summarize the data concerning whether IGE "really happened" in schools. Then in chapters 5-8 a summary of the findings from each of the four phases of the project is presented.

CHAPTER 4

TO BE, OR NOT TO BE, IGE

Thomas A. Romberg and Deborah M. Stewart

In 1976, the staff of the evaluation project knew that, although there were estimated to be nearly 3,000 elementary schools in the USA who called themselves IGE schools, there was considerable variation in the degree to which those schools had assimilated into practice the various features which characterize Individually Guided Education. The purpose of this chapter is to describe the extent of variation in IGE implementation at the start of the IGE evaluation study.

DEGREE OF CHANGE IN SCHOOLS

IGE should be viewed as an innovation which, if it were really implemented, would bring about changes in schooling practices. However, there are several difficulties in incorporating any particular innovation into the culture of schools. The difficulty depends on many factors, ranging from the characteristics of the innovation itself to the structure of the culture affected by the change. McClelland (1968) discusses how effective implementation may involve different levels of cultural restructuring. The simplest level is the substitution of one isolated component of the system for another, such as a change in textbook. If the simplest of changes causes further systematic alterations, such as the purchase of manipulative materials for the classroom, that is a higher level of change. The most complex of all changes deals with values, such as asking teachers to value an active classroom over a quiet one. This way of characterizing innovations focuses on the degree of restructuring that will be involved.

Romberg and Price (1981) have labeled the poles of this dimension of change "ameliorative innovation" and "radical innovation." Ameliorative innovations are designed, or perceived as designed, to make some ongoing schooling practice better or more efficient but do not challenge the traditions associated with the school culture. For example, replacing the slide rule in engineering classes with the nonprogrammable calculator did not challenge how the knowledge of engineering is defined or how teachers are to work. Thus, it is an innovation that requires only ameliorative change.

At the other extreme, radical innovations are designed and perceived as challenging the cultural traditions of schools. A modern biology text asks schools to define biological content differently; team teaching requires the development of new staff relationships. Obviously, as argued in chapter 2, IGE was designed with radical change in mind. It challenges basic assumptions of how schools operate, how knowledge is defined in schools, and how teachers and children function in elementary schools.

The Wisconsin Center was well aware that IGE required substantial changes in the behaviors of persons involved in its implementation. So that school staffs would acquire the new behaviors, the changeover was approached in two ways: first, by developing implementation materials and, second, by providing opportunities for the school staff to acquire the understanding, skills, and attitudes expected in their new and expanded roles.

The materials that were developed described prototypes and guidelines for each of the seven components of IGE (Klausmeier, 1975). These materials were designed to assist staff members in understanding the concepts and practices of IGE, acquiring the needed skills, and making adaptations appropriate to local circumstances.

To assist schools in making the changeover from the traditional, age-graded, self-contained elementary school to IGE, three strategies were followed as a part of an overall implementation plan. The first and primary strategy was for the Center to train teams of implementors from other agencies--state education agencies, teacher education institutions, and so forth--who in turn worked with schools through four implementation stages: awareness, first-year changeover, second-year maintenance and refinement, and institutionalization (Klausmeier, 1971).

The second strategy was for a teacher education institution to take the initiative in helping schools implement IGE. This strategy was made possible by the development of the *Leadership Series in IGE* (Klausmeier, 1975). In this approach, a team of teacher educators plans a sequence of activities which includes conferences, courses, and seminars to help school administrators and teachers learn about and subsequently implement IGE. However, these materials were not available before 1976, thus the effects of this strategy could not be examined in this study.

The third strategy was for an intermediate education agency, a teaching center, or a school district to provide IGE implementation assistance as part of an ongoing staff development program. This strategy was often used in school districts where there already were IGE schools and the commitment to IGE was strong. Persons knowledgeable about and experienced in IGE conducted the staff development activities.

In addition, in 1969, an agreement was entered into between the Wisconsin Center and the Institute for Development of Educational Activities (/I/D/E/A/). /I/D/E/A/ then developed a set of IGE Change Program materials and prepared "facilitators" to start IGE schools. Because the /I/D/E/A/ approach to IGE differed somewhat from the Center's approach, mostly in what was emphasized, in 1972 the agreement between the institutions was terminated. /I/D/E/A/ saw IGE as an organization and set of procedures which would facilitate a harmonious learning-teaching environment. Thus, the emphasis was shifted from more effective cognitive instruction to a broader conception of the goals of schooling. By the time the agreement was terminated many schools had become IGE schools through /I/D/E/A/'s efforts.

Since IGE elementary schools started in different ways, with the assistance of different persons and different agencies, and had been involved with IGE for differing number of years, it was reasonable to expect considerable variability in the commitment to the ideas underlying IGE and to its different components. In part, one purpose of the evaluation project was to document this variability and its effects.

DEGREE OF IMPLEMENTATION

The population with which this evaluation is concerned is constrained in several ways. The population is necessarily limited to those schools that define themselves as IGE schools. We believed there were about 3,000 such schools in 1975-76. In the fall of 1977, as data were being gathered for Phase I of the study, we had five sources of data about degree of implementation of IGE, and a sixth source was to come later as part of Phase II of the study. Three sources of data came from a brief IGE Schools Questionnaire filled out by school administrators. This questionnaire was first sent to all IGE schools that had direct contact with the Center in Spring 1976 (1,426 schools). The population studied by this evaluation is constrained to include only those schools that responded fully to that questionnaire in March 1976. The questionnaire was sent again to the schools in Spring 1977 and again to the actual Phase I sample in Fall 1977.

Two sources of data came from a second instrument, the IGE Implementation Survey (Stewart, 1977). This is composed of 77 statements or concepts defining IGE. Respondents were asked to rank their school's implementation of each IGE concept on a 5-point scale. In Spring 1977, we requested that the IGE school's governing body, usually the IIC, provide a concensus response. Then, in Fall 1977, as a part of Phase I, the same survey was answered independently by all school staff; the median response to each statement was used in analysis. Thus, results for both Spring and Fall 1977 were based on one value per school for each statement.

Finally, since both the IGE Schools Questionnaire and the Implementation Survey were self-report instruments, answers to questions from both were validated in Phase II of the evaluation. The Phase II sample was a subset of the Phase I sample and was rated by site visit teams.

IGE SCHOOLS QUESTIONNAIRE

1976 Spring Questionnaire

Of the 1,426 IGE Schools Questionnaires sent out to principals of schools in 27 states, nearly 74% (1,049) were returned before June 30. Zajano and Stewart (1976) described the characteristics of the 946 schools whose principals considered them IGE schools; the first part of this section is based on that description. In developing the sampling plan for Phase I, Price (1977) used the responses of the 768 schools that served both grades 2 and 5, those to be tested in the evaluation; the second part of this section is based on his analysis.

As suggested above, principals were asked whether they considered their school to be an IGE school. Just over 90% of the respondents, 946, said they did. Of the remaining 103 schools, nine reported never having been IGE schools, and 94 reported no longer being IGE schools. Principals who said their schools were no longer IGE were asked to give their reasons for dropping the IGE program. Their responses point out the importance of a common commitment to IGE from all members of the local educational community. Lack of support at the school board/district level was reported to have caused 17% of the schools to leave IGE. Similarly, 16% of the schools abandoned IGE due to lack of faculty support, and another 4% cited the absence of administrative or community backing. Only 5% of these schools dropped IGE because of implementation problems.

For additional background information, the question was asked, "With what agency did your school's involvement in IGE originate?" One-third of the 946 schools said the originating agency was the Wisconsin R & D Center, another 29% said the Institute for Development of Educational Activities (I/D/E/A), while 19% said both of these. The remaining 19% responded by saying it was another agency or they didn't know or left the question unanswered. The next background question concerned the age levels or grade-level equivalents of pupils enrolled in each school. Although the K-6 grade range pattern was the most common (48%), there were 39 patterns represented.

The second set of questions on the IGE Schools Questionnaire dealt with whether or not a school affiliated with any other IGE schools. This affiliation is possible either through an association of IGE schools in the same school system or with schools outside their system. Each principal was asked whether there were any other IGE schools in their school system, and, if so, whether meetings were held with representatives from these schools and central office personnel; that is, did they belong to a Systemwide Program Committee (SPC). The next question asked whether schools affiliated with other IGE schools outside their school system in Networks, Leagues, or other such groups. Of the 685 schools that answered both of these questions and have other schools in their systems, 92% maintained affiliations outside their own building regarding IGE.

The third section of the questionnaire dealt with organization and instruction in IGE schools. Each principal was asked to complete a chart for all Units or learning communities describing the grade-range equivalent(s), numbers of teachers and pupils, inclusion of special education pupils, whether there were weekly planning meetings, and the IGE subjects used. From this information, the answers to several questions about the organization and instruction of pupils could be derived.

The first of these questions concerned the number of IGE schools in which *all* pupils were organized into Units or learning communities. Of the 946 schools, 550 or 58% had unitized their entire pupil population. The percentage of IGE schools with pupils of different ages in each Unit or learning community was also determined. Of the 946 schools, 711 or 75% had all Units multiaged. An additional 133 or 14% had some of their Units multiaged, while 55 or 6% had no multiaged Units.

The combination of these findings was of primary interest; that is, of schools that had all their pupils in Units, how many had all multiaged Units? Of the 550 schools with all pupils in Units, 415 had all Units multiaged. This is 75% of the 550 fully unitized schools and 44% of the total 946 IGE schools.

Since the primary reason for organizing students into multiaged Units is to provide for instruction based on individual needs, schools were asked to list by Unit their IGE subject(s). An IGE subject was defined as "one in which teachers follow the whole sequence of identifying objectives for the students in their Unit, preassessing for those objectives, then grouping students according to which objectives they need to master, instructing on those objectives, then testing again and regrouping," that is, the sequence of the Instructional Programming Model (IPM).

The responses of the 550 fully unitized schools were tabulated to determine which schools use the IPM in the same subject(s) in all Units, thereby providing the fullest opportunity for continuous progress in that subject for their pupils. (For the purposes of discussion, a subject used in this fashion will be termed an IPM subject.) Of the 550 schools, 437 or 80% had at least one IPM subject. Many of these schools were providing for continuous progress in more than one subject area. The most common number of IPM subjects was two, reported in 32% of the schools, but the range extended from zero to six. A disappointing finding was that 96 schools (17%) did not use the IPM in even one subject area that was the same for all their Units.

The subject areas most often selected for IPM implementation in the fully unitized schools were identified. Reading was the most commonly selected subject, chosen by two-thirds of these schools; and math was a very close second. In the fully unitized schools implementing the IPM in only *one* subject area, reading was again the most popular choice (64%) while math was considerably further behind (27%).

It was hoped that the questionnaire would reveal some examples of typical Unit structures; however, so many alternative arrangements of pupils in Units were reported that none was representative. For example, the 159 K-6 schools with all pupils in multiaged Units included from one to seven Units in 52 different arrangements.

Another topic of interest was the operating characteristics of the staffs of IGE schools. Schools were asked whether they had the following features: weekly planning meetings for Unit members, release time, Unit leaders, an Instructional Improvement Committee for schoolwide governance, aides, and interns or student teachers.

Eighty-four percent of the 946 schools responded that all their Units had weekly planning meetings, 6% said some of their Units did, another 6% said none of their Units had these meetings. The results for a related question indicated that in 690 schools, 73%, release time was provided so that Unit staff members could plan together during the school day. Slightly more than two-thirds of the schools that had release time provided two or more hours of it each week.

The question of whether all Units had Unit leaders received a positive response from 92% (869) of the 946 schools. A related question concerned whether it was the school's policy to rotate the Unit leader position. Twenty-six percent replied that it was, while 68% said it was not.

The question of whether each IGE school had an Instructional Improvement Committee (IIC) comprised of the principal and Unit leaders received a positive response from 871 or 92% of the 946 schools. To the question of how frequently this group met, by far the most common reply was "once a week."

A common feature of IGE schools is the use of either paid or volunteer aides or both. Of the 922 schools who responded to both questions concerning the use of aides, 893 or 97% use aides to some extent. Sixty-five percent of the 922 schools had both paid and volunteer aides, while 23% used only paid aides and 9% used only volunteer aides.

Another common feature of IGE schools is their participation in preservice teacher education. A total of 927 schools reported whether they had student teachers or interns during both spring 1976 and fall 1975. At some point during the previous school year, 687 schools, or 74% of 927, had participated in preservice teacher education. This percentage is remarkable when the availability of teacher education institutions is considered. The results suggest that IGE schools were welcoming available student teachers into their building and thereby providing valuable preservice preparation in IGE.

The final section of the questionnaire dealt with the curriculum products component of IGE. The schools were asked to indicate whether they were using any of the

Wisconsin R & D Center's curriculum products. Over 50% of the schools were using one or more elements of the Wisconsin Design for Reading Skill Development (WDRSD). Thirty-three percent were using one or more of the Individually Guided Motivation (IGM) procedures. Eleven percent of the 946 schools used Pre-Reading Skills (PRS); this figure is more meaningfully presented as 14% of the 752 schools who have kindergarten pupils. Finally, Developing Mathematical Processes (DMP) was used by 11% of the 946 IGE schools.

This overall information about IGE schools was what was available to the staff of the evaluation project in Fall 1976. Obviously, there was considerable variability in IGE characteristics among the reporting schools. We considered this good for two reasons--one is statistical, the other social. Statistically, an accurate assessment of relationships among variables requires that the sample not be of restricted range with respect to its parent population; restriction of range on any variable produces a sample estimate of relation that is weaker than the corresponding parameter in the population. Socially, it is important that certain subpopulations be adequately represented--both as parts of the general population and as separately identifiable populations of special interest; for example, schools in low-income neighborhoods, particularly urban neighborhoods, may be more important and deserve greater attention than their proportion of IGE schools would suggest.

From these considerations, a subpopulation of schools that served both second and fifth graders was used as the base population for the evaluation. These 768 schools are about 25% of the estimated total number of IGE schools. We did not assume that these schools were representative of IGE schools. Rather we assumed this population would be positively biased toward IGE and exhibit more of the IGE characteristics on the average than the unidentified IGE schools. Those other schools either were not on current mailing lists, suggesting that they were new to or not active in IGE circles, or failed to respond to the questionnaire, suggesting a lack of interest.

Stratification variables were created from the IGE Schools Questionnaire responses to provide the basis for Phase I sampling. The four variables related directly to IGE characteristics are staff organization, use of the IPM, student organization, and facilitative environments.

Four questionnaire items were used in creating the staff organization variable. Responses to each item were assigned values from 0 to 2, and the four values were summed for a possible maximum value of 8. The following four organizational characteristics are expressed in the 2-point version: first, weekly planning meetings for Unit staff; second, at least two hours release time each week; third, Unit leaders for all Units who were not, by policy, rotated out of position on a regular basis; and fourth, weekly meetings of the principal and Unit leaders. For the fourth item, 1 point was assigned for meetings every other week; there was no intermediate value for the other three items. The distribution of school values for staff organization is shown in Figure 4-1. We considered a composite rating of 6 minimal for IGE staff organization; 480 schools, 63%, had composites of 6 or more.

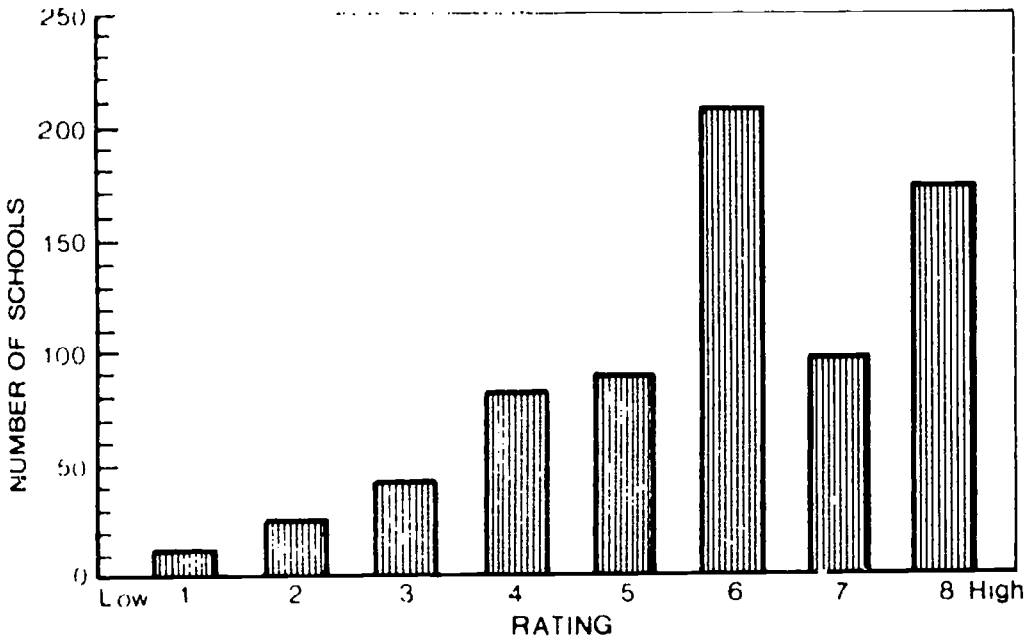

Figure 4-1. Rating of staff organization (Adapted from Price, 1977, p. 16). No rating for 37 schools.

Use of the IPM was a composite variable based on whether each of six curriculum areas--reading, mathematics, science, social studies, music or art or physical education, and language arts--was an IPM subject. Reading and mathematics were weighted more heavily than the other areas. In 144 schools, 19%, there was no IPM subject. In contrast, 139 schools, 18%, had reading, mathematics, and one or more other areas as IPM subjects.

The rating for facilitative environments was based on three pieces of information. First, whether the school was part of a communication network larger than the district to which the school belongs; second, whether there were other IGE schools in the district; and third whether the school reported communication with other IGE schools in the same district. Responses to each of these three questions were classified dichotomously. Although 85 schools, 11%, reported no communication with other IGE schools and an additional 120 schools, 16%, had no communication network outside the district, over half of the schools reported full participation in communication networks, 274 or 36% both within and outside the district and 146 or 19% outside a district with no other IGE schools.

A rating of the organization of students was developed from a composite of three items concerned with how children are organized in a multiunit school. For each item a maximum value of 3 and minimum of 1 was assigned to various responses; points were summed for the composite rating. The first constituent is based on the assumption that an I & R Unit can have too few children or too many; Units of from 100 to 125 children were considered of optimal size and those of 75-99 and 126-150 workable. The second is a rating of the extent to which all children in a school have been included in the I & R Unit arrangement. The third variable reflects whether all, some, or none of the Units are multiaged. Only 10% of the schools reported optimal IGE organization of children. An additional 241 schools, 31%, reported groupings that are workable.

In summary, responses to the 1976 IGE Schools Questionnaire indicated that IGE implementation was incomplete in many schools. The label *IGE* was obviously used to describe many schools that as yet had not implemented key IGE features; these we have called Nominal IGE schools. There were also many schools who had fully implemented only some of the IGE features. And finally, there were some schools that could actually be called IGE in that they reported that they had implemented all major IGE features.

Follow-Up Information

To check both the stability of IGE implementation and the validity of the reported information, there were three additional sources of data. In Spring 1977, when the Phase I sample was being selected, 482 schools filled out the IGE Schools Questionnaire a second time. Then in Fall 1977, as a part of Phase I data gathering procedures, participating schools completed the questionnaire again. In both Spring and Fall 1977, schools were asked to update their previous reports, rather than to fill in a blank questionnaire.

Both 1977 samples were similar to the 1976 sample, and the data reflected near zero change in degree of implementation. The differences reflected changing social and economic conditions nationally. Dramatic size changes were reported by 30% of the schools: 38 schools lost over 100 students from 1976 to 1977, with 13 losing over 300; and 32 gained over 100 students in the same period, with 9 gaining over 300. Both losses and gains were due to overall lower school enrollments which caused some school closings and quite often restructuring of schools and Units within schools. In addition, there were many anecdotal comments about failure to implement other IGE features because of restricted budgets which limited staff development opportunities, purchase of IGE-compatible materials, and so forth.

Finally, in Phase II, the Research Triangle Institute visit teams took the IGE Schools Questionnaire to each of the 30 schools they visited during the spring of 1978. Their task was to validate the information provided in October 1977, the date of Phase I testing. The value of the Phase II validation data is not so much in the actual information reported as in the frequency with which particular items were corrected across schools and the total number of changes in given schools. Both kinds of alterations in IGE status were obtained in face-to-face contact with school personnel, primarily principals, in the total Phase II sample. These alterations intimate the nature and extent of such changes that might be expected in the parent Phase I population, although there is no basis for predicting frequencies that might emerge in the total sample.

Overall the validation task resulted in a great deal more data verification than data alteration or correction. Entries made prior to Phase II work in the field were found to be correct in from 25 to 30 schools for most items in the instrument, including historical data, staffing patterns, and extra-school associations.

Across all schools, no item escaped some sort of change or correction, and certain items required a significant amount of attention. For example, status as an IGE school was changed in one-fifth of the schools; the fact or amount of release time for Unit planning was corrected in almost one-third of the sample; and in two-thirds of the schools, designation of IGE subjects was altered. In all of these cases, the change was essentially negative: the number of IGE schools was reduced to 20 from 26; release time was provided in 22 rather than 25 schools and a number of schools indicated reduced time allotments; and from 1 to 7 IGE subjects were eliminated in each of 18 schools, while IGE subject designations were added in only 4 schools.

In conclusion, the picture of limited IGE implementation derived from the IGE Schools Questionnaire appears to be a rose-tinted picture of the overall impact in the sample of schools claiming to be IGE.

IGE IMPLEMENTATION SURVEY

As this questionnaire was originally conceived, it would provide results to be used within a school to plan for refinement and renewal of the school's program. On two occasions, as described below, the Center distributed the questionnaire to obtain more information about the level of IGE implementation nationally. The questionnaire consists of 77 statements describing IGE outcomes, organizational matters, and processes. The statements were presented in seven groups, one for each of the components of IGE: Multiunit-Organizational Administrative Arrangements (MUS), Instructional Programming for the Individual Student (IPM), Curricular Programs (CURR), Evaluation for Decision Making (EVAL), Home-School-Community Relations (HSC), Facilitative Environments (ENV), and Continuing Research and Development (R & D). The statements to be judged in large part reflect the published list of performance objectives for IGE (IGE Staff Development Project, 1976). The following statements are two of the 18 in the MUS section of the questionnaire:

- the entire organizational staff and the students are organized into I & R Units.

- Each teacher of the I & R Unit participates in the Unit meetings and the related planning and decision making.

For each statement, respondents rate their school using a 5-point scale ranging from no implementation (0), through adequate implementation (2), to ideal implementation (4).

Raw scores were obtained by summing the values assigned to the statements for each subscale and the total. These scores were considered difficult to interpret because subscores were based on differing numbers of statements. The raw scores were divided by maximum possible score to obtain a percentage implementation score for each subscale and the total. To categorize percentage implementation scores, we define those from 75% to 100% as indicating IGE schools, those from 50% up to 75% as indicating schools marginally IGE, and those below 50% as indicating schools IGE in name only.

Spring 1977 Results

In Spring 1977 a single school response was requested of the IIC in each building. Completed forms were returned from 374 schools. The mean percent implementation scores for these schools for all seven IGE components are shown in Table 4-1. On the average, schools were marginally IGE.

Fall 1977 Results

The IGE Implementation Survey was included in the General Staff Questionnaires to be filled out by each professional staff member in the Phase I schools. Thus, instead of a single response from a school, we received several. Average scores were calculated first for each school. To get an average school score for MUS, for example, the ratings of all staff for the 18 questions were added together and then divided by the number of staff responding. Using this average score, the percentage implementation score was then calculated. The average percentage implementation scores for these schools for the seven IGE components, shown in Table 4-2, are from 7 to 10 percentage points lower than scores had been in Spring 1977. The difference was not due to idiosyncratic responses by only a few staff members, since school medians were almost identical to school means. In many schools, there was considerable within school variability. An examination of individual school data revealed that the principal and other IIC members consistently reported higher implementation ratings than other staff. The responses from three schools to items 24 and 32, shown in Table 4-3, illustrate the typical variability in response frequencies. This variability indicates that staff members in many schools have

Table 4.1
Spring 1977 Percentage Implementation Scores
from the IGE Implementation Survey
(N=374 schools, one response per school)

Component	No. Items	Mean	sd
1. MUS	18	62.41	14.40
2. IPM	14	64.71	16.01
3. Curric	8	70.77	16.02
4. Eval	9	61.22	17.60
5. HSC Rel	9	57.76	15.54
6. FacEnv	15	52.58	16.68
7. R&D	4	56.07	18.87
All concepts	77	60.77	12.50

considerably different notions about IGE components and how well their school is implementing them. Some high responses may be due to wishful thinking, believing implementation is better than it really is, and some low responses may be due to unfamiliarity with the IGE terminology, not recognizing the label for a feature that has been implemented.

In summary, in many schools some staff judged that the IGE program was implemented only slightly in their school. In no case did staff judge the IGE program to be fully implemented in their school. Naturally, scores for each school varied among components, reflecting the varying priorities established for implementation of the components and varying strengths of the school.

Follow-up data were also gathered on eleven items from this questionnaire in the Phase II study. This followup was conducted not only to estimate the validity of these implementation data but also to identify reasons for disparate ratings in a school. In each of the 30 schools, observers gave ratings for each of the eleven items, a total of 330 independent ratings (see chapter 6). A comparison of differences in the staff ratings from Phase I and the independent Phase II ratings showed that 39% of the rating differences were essentially zero. However, of the nonzero

Table 4-2
Phase I Percentage Implementation Scores from the
IGE Implementation Survey
(159 schools, multiple responses per school)

Component	No. of Items	Mean	sd	Lowest Score	Highest Score
1. MUS	18	55.8	14.3	14.2	96.3
2. IPM	14	57.8	13.9	10.2	96.8
3. Curric	8	62.8	13.3	27.5	99.0
4. Eval	9	55.3	14.6	18.9	93.7
5. HSC Rel	9	49.7	13.4	17.3	93.2
6. FacEnv	15	45.2	15.9	9.2	93.7
7. R&D	4	47.9	15.8	7.8	94.9
Total	77	53.6	12.8	18.5	92.7

NOTE: The number of schools from which complete responses to the Implementation Survey were received differs from the number with complete responses to the IGE Schools Questionnaire and to each of the other Phase I instruments.

Table 4-3
Frequency of Staff Responses in Three Schools
on Items 24 and 32

Response	School 161	571	624
Item 24: Each I & R Unit functions effectively.			
0	0	0	0
1	1	0	7
2	1	9	10
3	6	14	4
4	5	4	0
Item 32: The IIC functions effectively to coordinate the educational program of the school and its program of staff development, home-school-community relations, research and development, and external relations, taking into account district and state requirements and the needs and objectives of each I & R Unit.			
0	0	0	0
1	4	1	4
2	2	6	13
3	2	13	4
4	5	7	0

differences, two-thirds resulted from higher ratings by school staff, and one-third from higher ratings by the Phase II visit teams. Reasons for lack of staff convergence (Table 4-3) were multiple, even at a single school. School staffs often responded on the basis of something less than the whole school, had some difficulty with various aspects of the items themselves, worked with their own sets rather than as the directions asked, or made guesses and estimates. A large proportion of the obtained reasons reflected some special response bias such as the individual Unit or the previous year's status. In all, these results suggest, as was the case for the IGE Schools Questionnaire, that data about implementation of the seven IGE components are positively biased.

IN CONCLUSION

Let us now return to the question of how many schools who call themselves IGE could reasonably be considered to have implemented its components. We consider the Phase I Implementation Survey data to be the most valid, although clearly positively biased. Rather than working with all seven IGE components separately, we collapsed them into three clusters--the multiunit school (1), the instructional program (2, 3, and 4), and renewal (5, 6, and 7). Average implementation scores for the 159 schools were categorized to indicate actual, marginal, and nominal IGE schools, as described previously, with the marginal category split into high (62.5 - 74.9%) and low (50 - 62.4%). The number of schools that fit in each category is shown in Table 4-4. In terms of total implementation score, there are very few actual IGE schools, only 5, and not many high marginal schools, 32. Many low ratings on total score are due to low implementation of the renewal components--home-school relations, facilitative environments, and research and development. Since these components naturally would come later in an implementation cycle than the other components, we decided to focus on

Table 4-4
Number of Phase I Schools Categorized by Level of Implementation for MUS, Instruction, Renewal and Total
(N=159)

Level of Implementation	MUS (1)	Instruction (2,3,4)	Renewal (5,6,7)	Total
Actual (75% to 100%)	13	13	5	5
High Marginal (62.5% to 74.9%)	37	45	17	32
Low Marginal (50% to 62.4%)	54	67	45	62
Nominal (less than 50%)	55	34	92	60

scores from the first two clusters. A crosstabulation of schools which fit into each cluster for MUS and for Instruction is shown in Table 4-5. From this tabulation, we identified any school which is at least high marginal on both MUS and Instruction as an actual IGE school; there are 38 such schools, 24% of the Phase I population, that fit this description. Next, schools which were at least high marginal on one aspect and low marginal on the other we have decided to call marginal IGE schools; there are 30 such schools, 19% of the Phase I population. The remaining 91 schools, 57% must be called nominal IGE schools.

The number of each category of school participating in each of the four phases of the IGE Evaluation is shown in Table 4-6. Nearly one-quarter of the schools who call themselves IGE were really working at reorganizing their staffs by forming Units, sharing decision making, and attempting to change the pattern of instruction in their schools. Another 20% were heading in the same direction but encountered problems in forming Units, or setting objectives, and so forth; they were not yet IGE but they are no longer a conventional school. Finally, there were the majority, some 60%, who ostensibly liked some of the ideas about IGE and who wanted to be identified with the concepts but who as yet had not made the fundamental organizational and instructional changes which reflect Individually Guided Education.

Table 4-5
Number of Phase I Schools by Level of Implementation for both MUS and Instruction

MUS	Instruction: Actual	High Marginal	Low Marginal	Nominal
Actual	7	5	1	0
High Marginal	5	21	11	0
Low Marginal	1	17	32	4
Nominal	0	2	23	30

– – – – actual IGE schools

——— nominal IGE schools

Table 4-6
IGE Implementation Scores for Schools in Phases I, II, III, and IV

Implementation Category	I N, %	II N, %	III N, %	IND[a] N, %	IVC[a] N, %
Actual IGE	37, *23*	10, *33*	2, *33*	1, *14*	4, *21*
Marginal IGE	28, *18*	5, *17*	3, *50*	1, *14*	-
Nominal IGE	94, *60*	15, *50*	-	3, *43*	2, *11*
Non-IGE	-	-	-	-	7, *37*
Unknown IGE[b]	-	-	1, *17*	2, *29*	6, *32*
Total	159	30	6	7	19

Note: Percentages may not sum to 100 due to rounding.

[a]Phase IV had two parts: a descriptive set of studies (D) and two comparative studies (C).

[b]Because these IGE schools did not participate in Phase I, we do not have results of the Implementation Survey and cannot specify level of IGE implementation with confidence.

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CHAPTER 5

Phase I: THE LARGE SAMPLE CAUSAL STUDY*

Gary G. Price and Thomas A. Romberg

Certain features of IGE schooling were assumed to be keys to the program's success. Phase I of the IGE evaluation project examined variations in the extent to which these presumably essential features had been implemented among IGE school, and assessed how influential such variations in implementation were on the reading and mathematics achievement of second- and fifth-grade students and on teacher job-satisfaction.

Purposes

The overall purpose of Phase I, as with the other IGE evaluation phases, was to gain a more comprehensive view of the operation and effectiveness of IGE. The basic objective was to identify features of IGE schooling that contribute to successful instruction, especially in reading and mathematics. The identification of such features was assumed to be critical to evaluating IGE as an educational system and to understanding schooling in general.

The specific purposes, as described in chapter 3, were:

1. to describe and examine the relationship between the implementation of IGE components and *means of instruction*, particularly in reading and mathematics;

2. to describe and examine the relationship between the implementation of IGE components and *staff outcomes*; and

3. to describe and examine the relationship--presumably by way of the means of instruction--between the implementation of IGE components and *pupil outcomes*, such as reading and mathematics achievement, selected cognitive skills, and aspects of personality development.

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*This chapter is a condensation of the Phase I summary report by Gary G. Price, Thomas A. Romberg, and Terence C. Janicki (1981).

Simple comparisons between IGE as an undifferentiated package and other educational alternatives provide us with little information about specific features and processes that occur in IGE schools. Therefore, Phase I simultaneously examined relationships among the network of variables believed to influence means of instruction, staff outcomes, and pupil outcomes.

The Phase I study was not designed as a direct comparison between IGE schools and other schools. Instead, it was an assessment of certain fundamental and empirically testable premises on which IGE is based. As its developers intended, IGE was not an isolated innovation but a complete system built upon theoretical positions about the goals of education, the effects of certain forms of instruction, the effects of school organization on instruction, and the effects of linkages that go beyond the walls of the school building.

Premises

Some of the premises on which IGE is based are explicit. Others are implicit, but evident. Three general kinds of premises were recognized in the Phase I study.

Premises about instructional programming assert that instructional practices associated with the Instructional Programming Model make high student achievement more likely (Klausmeier, Karges, & Krupa, 1977, pp. 333-334). Two instructional practices and their reputed influence on student achievement are included. The first practice is characterized by a variable named Management of Grouping and Instructional Continuity (IE); the second by a variable named Individualization of Instructional Decisions (IDM). These variables and others were scaled from information drawn from several questionnaires treated as one large pool of potentially relevant items.

The IGE model suggests that the organization of classroom instruction should have an effect on student achievement. The Instructional Programming Model (IPM) is used to group students according to their individual needs, making teacher-student instructional interactions more effective. IE measures several facets of the classroom instructional environment and should, according to the IGE model, be directly related to student learning.

IDM measures the extent to which instructional decisions take into account the individual needs of the student. Taking individual student needs into account is the cornerstone of the IGE model, and it is supposed to be related to student achievement.

The postulated causal links between these variables and measures of student achievement are shown in Figure 5-1. The figure expresses an IGE theory of the causal relationships among the variables.

Student achievement in reading and mathematics is the dependent variable in Figure 5-1. Another dependent variable is Teacher's Job Satisfaction (JOBSAT). It has been left out of Figure 5-1 for visual simplicity.

Premises about information materials, and so on, assert that certain systems of record keeping and information collection make it more likely that the instructional practices of the Instructional Programming Model will occur. Likewise, the use of curriculum materials that lend themselves to record keeping, information collection, and segmentation of curriculum units make those instructional practices more likely to occur. Four variables are concerned with these premises. One of those variables, Individualization of Instructional Decisions (IDM), has already been mentioned. The second is the Use of a Variety of Curriculum Resources (UCR), and the third is the Schoolwide Implementation of the Instructional Programming Model (SIPM). Schoolwide implementation is important because presumably, the instructional practices of the individual I & R Units resonate with the practices elsewhere in the school.

The IGE model suggests that the amount and variety of student information available should directly influence the individualization of instructional decisions. The amount and variety of student information available is reflected by the variable Information Acquisition (IA). The model also suggests that schoolwide implementation of the IPM should promote such individualization. The procedures needed for efficient and useful information acquisition are presumably limited by incomplete schoolwide implementation of the IPM.

Premises about supportive arrangements assert that certain distinctively IGE features of school organization make use of the Instructional Programming Model (IPM) more likely. Those organizational features also make it more likely that the staff will be satisfied with their jobs.

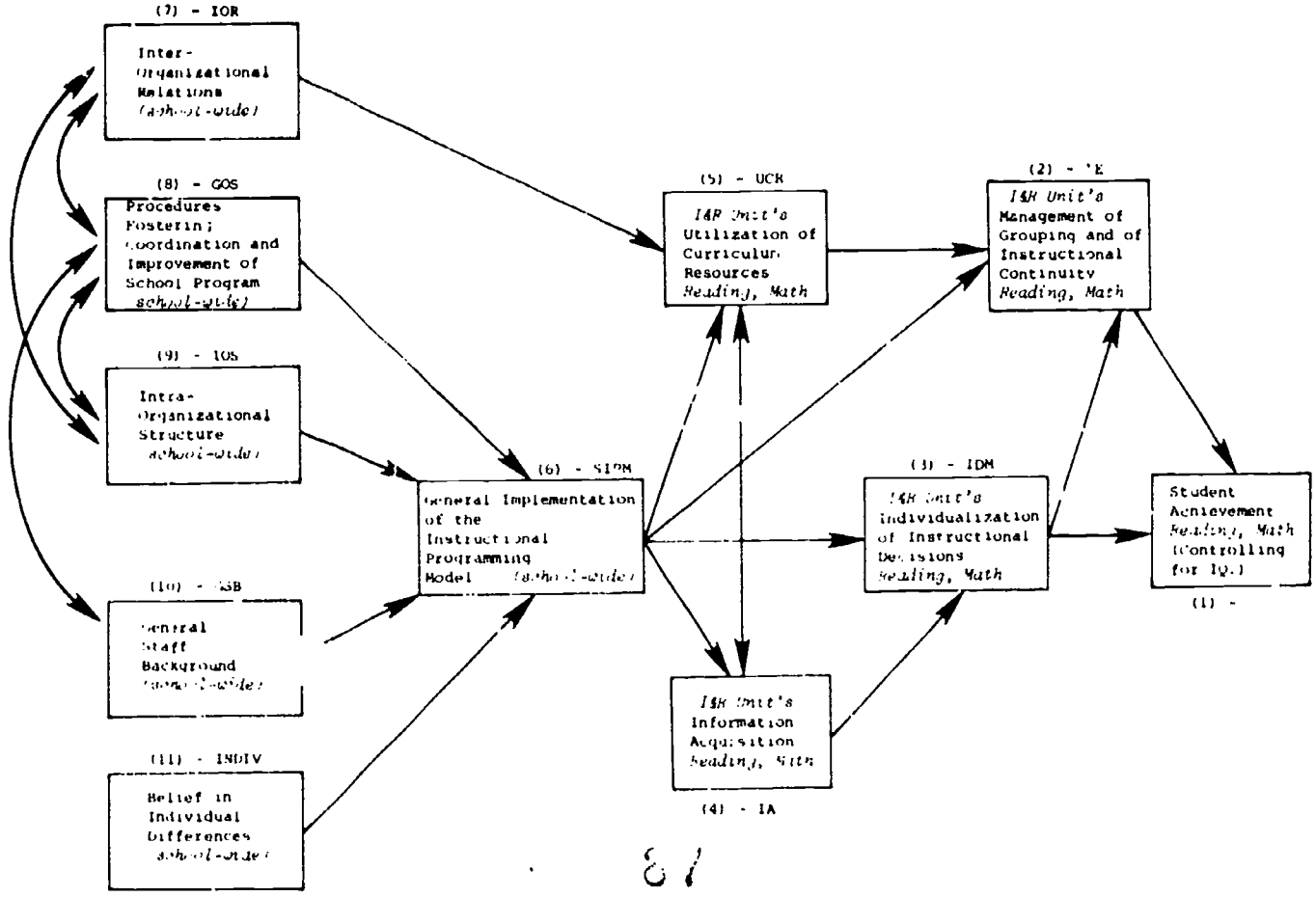

Figure 5-1. Causal model of relationships implied in IGE literature.

Two organizational features in particular have been presented in the IGE literature as ones which create an organizational environment conducive to use of the IPM. The first of these is an assortment of activities collectively labeled and measured as Procedures Fostering Coordination and Improvement of the School Program (COS). The second, reflected by the variable Intraorganizational Structure (IOS), is a collection of structural arrangements distinctive to IGE schools, such as organization into I & R Units, existence of an Instructional Improvement Committee, and so forth.

The effect of organizational features on schoolwide implementation of the IPM would be difficult to assess if teachers' backgrounds and beliefs were not considered, too. Two appropriate staff measures are included. The first, General Staff Background (GSB), is an aggregate measure of how much IGE-related experience teachers have. The second, Belief in Individual Differences (INDIV), is a measure of how strongly and unanimously the teachers of a school endorsed a basic assumption of IGE--the assumption that students differ in ways that instruction ought to take into account.

One distinctive organizational feature of IGE is the system of linkages between IGE schools. One intended consequence of such Interorganizational Relations (IOR) is the exchange of information about IPM-compatible curriculum materials and other curriculum resources. Contact with other schools would presumably help teachers to use a variety of curriculum materials. The variety of curriculum materials used by an I & R Unit would depend partly on other practices of the Unit, too. For instance, I & R Units that gather and organize information about students, through their efforts to individualize instructional decisions, would be more likely to use a variety of curriculum materials.

Summary of the Model

The fundamental premises have been represented as a network of postulated causal links among the variables of the study. Figure 5-1 presents these causal links in diagram form. It shows the paths of influence assumed to underlie the relationships between reading achievement and the other variables studied. The figure expresses an IGE theory of how each variable is causally related to the other variables.

The Phase I study evaluated these premises by empirically assessing the relationships they imply. This approach to evaluation would not be feasible if IGE schools had

uniformly implemented the organizational features, curriculum features, and instructional practices suggested by experts in IGE. Such uniformity, however, did not exist, as described in the previous chapter.

Each arrow shown in Figure 5-1 signifies a causal link assumed in the IGE system. Not every causal link assumed in IGE is indicated, only some of the major causal assertions implicit in IGE. The intent was not to ask whether IGE works. Rather, the intent was to ask whether IGE works in the way its developers thought it would.

The diagram is known as a structural model or causal model and follows certain graphic conventions. According to these conventions, a straight, unidirectional arrow signifies that the variable at its base directly influences the variable at its tip. The omission of an arrow constitutes an explicit theoretical statement that no direct causal relationship exists. A variable is an indirect cause of a dependent variable if a path through two or more arrows can be traced from the dependent variable back to the first variable. Associated with each straight arrow is a nonzero value. The sign of the value denotes whether an increase in the causal variable produces an increase (plus) or a decrease (minus) in the dependent variable. A curved, bidirectional arrow is used at the left of the figure between variables which are known to be correlated, but for reasons not covered in the scope of the model.

A system of structural equations corresponds to the model. These equations were statistically examined for their agreement with the data collected in the Phase I study. Within the limits imposed by measurement error in the group-administered, standardized tests and questionnaires used to collect the data, this approach tests the theoretical model that underlies IGE. If the relationships between variables are not consistent with Figure 5-1, then probable inaccuracies in the underlying IGE model would be revealed. On the positive side, this approach can indicate important features and processes which deserve more attention from schools implementing IGE. In this context, "importance" means that a feature or process influences outcomes that are socially valued.

METHODS

Sampling

The population with which this evaluation was concerned was constrained in several ways. The population was necessarily limited to those schools that identified themselves as IGE schools. The population studied by this evaluation was further constrained to include only those schools that responded fully to the IGE schools questionnaire of March 1976 (see chapter 4 for details). There were 946 such schools, 768 of which had both second- and fifth-grade students. The evaluation was limited to students at the IGE equivalent of second and fifth grades, and their teachers. This population of 768 IGE schools is nationwide; it includes urban areas, rural areas, low-income areas, and high-income areas.

A sample was sought in light of the planned analysis. To select the sample of 300 schools, a plan of *stratified random sampling* was followed. Information from the March 1976 IGE Schools Questionnaire was used to construct seven stratification variables: (1) rating the staff organization, (2) age of the program, (3) utilization of the Instructional Programming Model, (4) rating for facilitative environment, (5) rating of the organization of children in the school, (6) use of Center curriculum products, and (7) demographic information. These seven variables were then used to classify the population into strata, and 302 schools were selected randomly. The sample on which the evaluation was ultimately based, however, was not this initially drawn sample. Only 175 schools agreed to participate in the evaluation. There was consequently a danger that self-selection had created a sample that differed significantly from the population in terms of the IGE characteristics with which the evaluation is concerned. The sampling frame, however, provided a means of assessing whether and how the participant schools differ from the population. Remarkably, the self-selected sample was very similar to the population in terms of the stratification variables. For a more detailed account of the sampling procedure see Working Paper No. 223 (Price, 1977).

Instruments

Instrumentation for Phase I included self-report questionnaires for staff and standardized tests of academic aptitude, standardized achievement tests, and personality development scales for students. In addition, cognitive

ability tests, developed at the Center, were administered to the grade 5 students. More detail about Phase I data gathering has been provided by Klopp, Buchanan, Stewart, and Romberg (1979).

Questionnaires for the staff component of the evaluation were based primarily on several existing instruments which were modified in content or format to meet the requirements of IGE terminology and certain technical constraints, such as machine-readable response forms. A discussion of the content and source of each instrument appears in Stewart (1977). Listed in Table 5-1 are the instruments used in the study and the staff members who responded. The variables actually used in the Phase I analysis typically drew information from several of the instruments. Consequently, scores were not developed for instruments. An overview of the variables from staff questionnaires may be found in Price, Janicki, Howard, Stewart, Buchanan, and Romberg (1978).

Students were tested at grade 2 and grade 5. Listed in Table 5-2 are the tests administered at both grades. Copies of the Short Form Test of Academic Aptitude (SFTAA), California Test of Basic Skills (CTBS), and Self-Observation Scales (SOS) were purchased from commercial publishers. The five Concept Attainment Abilities (CAA) tests are from a battery of tests that was developed as a part of a previously completed Center project (Harris & Harris, 1973). Only students in grade 5 participated in that study. The CAA tests were administered to assess student cognitive skills in three categories--numerical ability, memory, and word fluency.

Scaling of Variables

The structural model was formed before the variables used in the model were created. However, the model was formed with knowledge of the information from which the variables were created. To build scales for each variable in the model several steps were followed. First, all items from all non-student instruments were grouped together. Second, the evaluative staff independently divided the items into sets of items, each representative of a single variable. Having followed this procedure independently, the group met and reached consensus on groups of items that defined a particular variable. After this procedure for selecting item sets, each group of items was given a verbal description that reflected the information contained in its constituents. Next the selected items in each group were combined to form a composite variable.

Table 5-1
Phase I Staff Questionnaires

Instrument Title	School Respondents
Staff Background Information[a]	Each staff member
IGE Implementation Survey[b]	
Job Satisfaction Survey[a]	
Assumptions About Conditions of Effective Schooling[c]	
Assumptions About Learning and Knowledge[d]	
Role of the Staff Teacher[e]	Each staff member in grade 2 and grade 5 unit
Instructional Practices in Reading, Mathematics, and Language Arts[f]	Each staff member in grade 2 and grade 5 unit
Instruction and Research Unit Structure and Function[e]	I & R Unit groups, grade 2 and grade 5
Instructional Improvement Committee Structure and Function[e]	IIC group
IGE Schools Questionnaire, Verification Copy	Principal

[a] From Mendenhall, 1977.

[b] From Klausmeier, 1976.

[c] Derived from Lipham & Fruth, 1976.

[d] From Barth, 1972.

[e] From Ironside, 1972.

[f] Adapted by T. J. Fox from DeVault, 1973.

Table 5-2
Phase I Student Tests

Test	Grade(s)
Short Form Test of Academic Aptitude (SFTAA)[a]	2,5
Comprehensive Tests of Basic Skills (CTBS), Form S[b]	
Reading Vocabulary	2,5
Reading Comprehension: Sentences	2
Reading Comprehension: Passages	2
Reading Comprehension	5
Mathematics Computation	2,5
Mathematics Concepts & Applications	2,5
Spelling[c]	5
Self Observation Scales (SOS),[d] Form C	2,5
Locus of Control (Cromwell, 1964)[e]	2,5
Concept Attainment Abilities (CAA)[f]	
Number Series	5
Number Relations	5
Picture Class Memory	5
Remembering Classes: Members	5
Omelet	5

[a]Grade 2, Level 1: Grade 5, Level 3.

[b]Grade 2, Level C; Grade 5, Level 2

[c]Administered as a CAA word fluency substitute.

[d]Grade 2, Primary Level; Grade 5, Intermediate Level.

[e]Not included in the analysis because of low reliability.

[f]Not included in the analysis.

Had there been resources and time, it clearly would have been preferable to build questionnaire items specifically to measure the constructs for the model. As it was, items from available instruments were used to scale the variables. For most variables, there were many pertinent items available, so, for those variables, little damage was done by relying upon available questionnaires.

Another limitation of the data stems from the remoteness of the data collection procedure and the amount of time it took school staff members to respond to the questionnaires. This questionnaire form of data collection invites hurried responses. Moreover, respondents may have wanted to respond as they thought good ICE citizens should, since they knew that the responses would be sent back to the Center. There is no doubt that the signal one wants to receive comes partly veiled with noise when one uses questionnaires.

The evaluation staff was aware of these limitations from the outset and took steps to minimize their effect. An innovative use of questionnaire responses was developed which deserves mention. Usually questionnaire items, like test items, are combined in a linear manner to form a scale. That was not always done in our study. Rather, Boolean logical expressions were often used to combine the responses on several items into new, composite items to be arranged on a scale. For measurement purposes, these composites were not themselves present in any questionnaire. They were the product of logical operations performed on multiple questionnaire items.

There were two reasons for taking this approach to scaling. One was to "goof-proof" our variables. The detection of contradictions and other convergent uses of questionnaire responses were used to minimize the extent to which our scaled values could be thrown off by erroneous responses. Some forms of distortion were anticipated, and scaling decisions were made to minimize their effect. A second reason for the approach had nothing to do with accuracy of responses. In some cases we decided that, even if we assumed the responses were perfectly accurate, a justifiable ordering would not be obtained by arithmetic combination of item responses.

DESCRIPTION OF VARIABLES

The model presented in Figure 5-1 has 11 variables. The first, (1) in Figure 5-1, is the dependent variable. Five different dependent variables were used, teacher job-

satisfaction (JOBSAT) and four variables associated with student achievement (reading and math at grades 2 and 5). Six of the variables, (6) to (11) in Figure 5-1, measure aspects of the school as a whole, such as organizational features, schoolwide practices, and staff background. Thus a single score was derived for each school. Teacher job-satisfaction was also a schoolwide variable. The other variables, (2) to (5) in Figure 5-1, do not pertain to the school as a whole; they are measures of a specific I & R Unit's practices in reading and in math. Each variable specific to an I & R Unit was actually treated as four separate variables. It was measured in two I & R Units per school--one that included children of grade 2 age and one that included children of grade 5 age. In each I & R Unit, there was a reading version and a math version of the variable.

A more elaborate definition of each variable and how it was scaled has been published in a series of technical reports, listed in Table 5-3. Readers wanting to know more about a specific variable should refer to the report which corresponds to that variable. For reference, the mean and standard deviation of each variable are given in Table 5-4. Additional descriptive statistics are given in each appropriate technical report.

Before proceeding to the results, a description of how student achievement scores were derived for each unit is in order. The student achievement variables used in the analysis were not simply raw scores, but residual scores derived from the differences between raw and predicted scores on achievement tests. Each student's scores on academic ability tests were used to predict his or her scores on the achievement tests. Prior to their use as covariates, the scores from academic ability tests were themselves adjusted to minimize measurement error. Implausible combinations of ability test subscores were adjusted by a procedure known as "winsorization" (see Technical Reports No. 508 and No. 509). The student's actual scores on achievement measures were then compared with predictions based on adjusted ability test scores. The deviations of the actual scores from the predicted scores were the variables of interest.

The residual scores of individual students on CTBS subtests provided the basis for an aggregated measure representing each school. The subtests are listed in Table 5-2. The scores of each group of students in each school were averaged to form a school mean for each subtest. In other

Table 5-3
Reports Describing Variables Used in Phase I and Results of Phase I Study

	Technical Report No.	ERIC No.
Schoolwide Variables		
Interorganizational Relations (IOR)	476	ED 182 332
Procedures Fostering Coordination and Improvement of the School Program (COS)	477	ED 182 335
General Staff Background (GSB)	478	ED 182 329
Intraorganizational Structure (IOS)	479	ED 182 333
Belief in Individual Differences (INDIV)	480	ED 182 327
School's Demographic Setting (DB)	482	ED 182 336
Schoolwide Implementation of the Instructional Programming Model (SIPM)	483	ED 182 328
Teacher Job Satisfaction (JOBSAT)	484 512	ED 182 337 ED 186 426
I & R Unit Specific Variables		
Utilization of Curriculum Resources (UCR)	485	ED 182 338
Information Acquisition (IA)	486	ED 182 331
Individualization of Instructional Decisions	487	ED 182 330
Management of Grouping and of Instructional Continuity (IE)	488	ED 182 334
Student Achievement Variables		
Grade 2 Reading	508 510	ED 183 598 ED 185 538
Grade 2 Mathematics	508 511	ED 183 598 ED 199 084
Grade 5 Reading	509 510	ED 183 597 ED 185 538
Grade 5 Mathematics	509 511	ED 183 597 ED 199 084

*Note: Scaling of a variable is described in the first, or only, report for that variable. Where two reports are listed for a variable, the second reports results of the structural equations analysis.

Table 5-4
Means and Standard Deviations

Variable	Mean	Standard Deviation
Schoolwide Measures		
IOR	20.49	6.81
IOS	20.52	3.80
GOS	58.18	9.91
GSB	3.84	.62
INDIV	3.16	.18
SIPM	62.44	12.26
JOBSAT	40.57	5.08
Second-grade I & R Units: Reading		
UCR	44.85	9.59
IA	7.00	1.00
IDM	8.16	2.38
IE	28.64	6.12
CTBS Reading Achievement, adjusted	-.45	6.69
Second-grade I & R Units: Mathematics		
UCR	39.53	9.61
IA	7.18	1.28
IDM	8.33	2.60
IE	29.58	6.12
CTBS Mathematics Achievement, adjusted	-.26	3.47
Fifth-grade I & R Units: Reading		
UCR	44.77	9.89
IA	6.93	1.02
IDM	7.51	2.18
IE	26.34	5.91
CTBS Reading Achievement, adjusted	-.26	3.47
Fifth-grade I & R Units: Mathematics		
UCR	40.15	9.53
IA	7.39	1.16
IDM	8.09	2.55
IE	28.54	7.80
CTBS Mathematics Achievement, adjusted	-.10	4.60

words, the adjusted scores (regression residuals) of students in an I & R Unit were averaged to provide a representative measure of (ability-adjusted) student achievement in that I & R Unit.

After aggregation, I & R Unit means on residual scores from achievement subtests were combined to form an overall reading achievement score and an overall math achievement score. Overall scores could not have been formed for individual students because, with a few exceptions, a given individual took only some of the subtests.

RESULTS AND DISCUSSION

Reading and Math Achievement

The positive relationships implied in the model between features of IGE schools and measures of students' achievement were not found in either grade. In grade 2 I & R Units, no organizational variable and no measure of instructional practices was correlated beyond a trivial level with either reading achievement or math achievement, although two correlations were statistically significant. Reading achievement had a correlation of .197 ($p < .01$) with General Staff Background (GSB), and math achievement had a correlation of .255 ($p < .01$) with General Implementation of the Instructional Programming Model.

The results in grade 5 I & R Units were similar. Every variable was correlated only trivially with the reading achievement and math achievement variables. Not a single correlation differed from zero with statistical significance. Accordingly, the structural equation analysis lends no empirical support to hypothesized paths of influence.

This negative finding may, in part, indicate faults in our measurement of organizational features and instructional practices. However, not all of the blame can be placed on the attenuating effect of noise in the measures, because ratings of organizational features made by field observers in 30 schools (see Ironside & Conaway, 1979; condensed into chapter 6) showed reasonably high correlation with the questionnaire-based scales (IOR, .66; GOS, .53; IOS, .60; SIPM, .67). There is less assurance that our measures of instructional practices are trustworthy.

The standardized, group-administered measures of reading and mathematics achievement can be criticized as an inadequate indication of what children know about reading or mathematics. The tests may have some sections and items that do not reflect the curriculum of the schools in our study. However, the instruments seem to provide a reasonable assessment. Other information we have indicates that the test scores are reasonably accurate. Different demographic classifications of schools, for instance, show differences on the reading achievement and math achievement measures that closely parallel the findings in the National Assessment of Educational Progress.

Organizational Features and Instructional Practices

The following discussion examines links between organizational features and the instructional practices they were meant to facilitate. Analysis began with an estimation of the a priori model. The initial estimation procedure was a straightforward application of multiple regression. For each path in Figure 5-1, path coefficients (standardized multiple regression coefficients) were estimated for the full a priori models of grade 2 reading, grade 2 math, grade 5 reading, and grade 5 math, respectively. These coefficients were subjected to a statistical test. The a priori model was revised on the basis of those tests. Causal links hypothesized in the a priori model whose path coefficients did not differ statistically from zero were dropped from the models. In effect, such a procedure tests whether a variable used as a predictor accounts for any unique variance in the dependent variable.

Paths theoretically precluded from an a priori model were hypothesized to make no increment to R^2 beyond that obtained by using the path included in the model. The omitted paths of greatest interest lead directly from remote causes to effects--bypassing theorized mediators. When the addition of a direct path from a remote cause--a path theoretically precluded heretofore--was statistically significant, a model was deemed insufficient to explain the observed relationship between the effect and that remote cause. The correlation matrices, path diagrams, and estimates for both the hypothesized models and the fitted models are given in Technical Reports No. 510 and No. 511 (Price, Janicki, VanDeventer, & Romberg, 1980a, 1980b).

When predictors are interrelated--as they are here--interpretation of the tests for particular path coefficients can be easily misleading (see Goldberger, 1964; Gordon, 1968).

The organizational features in this study were interrelated, as were the instructional variables; therefore, the substantive interpretation of individual path coefficients becomes ambiguous.

To get a clearer understanding of the relationships between the organizational and instructional variables, another type of analysis was used. We used *orthogonalized* predictors, which are unrelated to each other and are linear combinations of the initial set of predictors. Interpretation of coefficients of orthogonalized predictors is possible only to the extent that the orthogonalized predictors can be defined in a substantively meaningful way.

Orthogonalization of organizational variables. The six organizational variables in the model were transformed through principal components factor analysis into a set of six uncorrelated (orthogonal) factors. Varimax rotation was used on the full set of principal components. The net effect of performing these transformations was to impose orthogonality on the set of six predictors, while preserving as closely as possible a one-to-one correspondence between variables and principal components. Correlations between the six orthogonal factors and the six untransformed variables are given in Table 5-5; these correlations are a special type of factor loading. As is evident in Table 5-5, each of the six factors is a good proxy for one of the variables and is negligibly related to the other five variables. Thus, the orthogonalized predictors are substantively meaningful, so their coefficients in a regression equation do permit some interpretation.

When predictors are orthogonal like this, standardized regression coefficients are equivalent to correlation coefficients. Therefore, results based on orthogonalized predictors are presented as correlation coefficients.

Orthogonalization of instructional variables. For each of the four models (grade 2 reading, grade 5 reading, grade 2 math, grade 5 math), the four instructional variables in the model were transformed through principal components factor analysis into a set of four uncorrelated (orthogonal) factors.

Correlations between the organizational factors of Table 5-5 and instructional factors were found to be generally nonsignificant; even those five that were statistically significant were nevertheless weak. Our discussion is limited to those correlations that were statistically significant in both

Table 5-5
Correlations Between the Organizational Variables and Their Varimax-Rotated Principal Components

Variables	Factors					
	GOSFAC	IORFAC	IPMFAC	INDIVFAC	IOSFAC	GSBFAC
GOS	.76	.38	.36	.23	.29	.10
IOR	.24	.89	.25	.20	.20	.09
IPM	.25	.26	.87	.22	.23	.12
INDIV	.14	.17	.17	.96	.06	.06
IOS	.06	.18	.19	.06	.94	.13
GSB	.06	.08	.09	.06	.11	.98
Eigenvalue of factor	.72	1.07	1.02	1.07	1.08	1.01

grades 2 and 5 in either reading or math. Three such relationships in reading and mathematics are listed in Table 5-6. Weak but statistically significant correlations occurring in only one grade were regarded as undeserving of serious attention.

The correlations in Table 5-6 are weak, but they are statistically significant. Except for the relationship between GOSFAC and UCRFAC, which was statistically significant at both grades in mathematics only, the other three relationships are statistically significant in both reading and mathematics at both grades 2 and 5. Thus, although those correlations are weak, they do persist at a statistically significant level.

Two of the persistently significant correlations involve the orthogonalized measure (IDMFAC) of the I & R Unit's Individualization of Instructional Decisions (IDM). I & R Units that scored high on IDM tended to be part of a school that scored high on schoolwide aspects of the implementation of the Instructional Programming Model (IPM), as

Table 5-6
Bivariate Relationships That Had Statistically Significant Correlations With Student Achievement in Both Grades

Factors	Correlations	
	Grade 2	Grade 5
Reading		
IOCFAC & IDMFAC	.14	.22
INDIVFAC & IAFAC	.23	.20
SIPMFAC & IDMFAC	.15	.15
Mathematics		
IOSFAC & IDMFAC	.19	.15
INDIVFAC & IAFAC	.24	.18
SIPMFAC & IDMFAC	.13	.17
GOSFAC & UCRFAC	.17	.17

indicated by the persistent correlation between SIPMFAC and IDMFAC. This finding is consistent with the assumption made in IGE that schoolwide implementation of the IPM affects its implementation at the level of individual I & R Units. I & R Units that scored high on IDM also tended to be part of a school that conformed to the intraorganizational structure recommended for IGE schools, as indicated by the persistent correlation between IOSFAC and IDMFAC.

The other relationship marked by persistently significant correlations is that between INDIV (a measure of the extent to which teachers in a school believe that individual differences are important to consider when making instructional decisions) and IA (a measure of the extent to which an I & R Unit collects information about individual differences in reading and mathematics, respectively). The correlations supporting this statement are those between the orthogonalized measures INDIVFAC and IAFAC. Although these correlations are weak, they are persistently significant, and they do suggest that teachers who believe in the instructional importance of individual differences are more likely to collect information of a kind that will support the individualization of instructional decisions.

As mentioned earlier, the correlation between GOSFAC and UCRFAC was significant at both grades 2 and 5 only in mathematics. The a priori model did predict positive correlation between GOS (Procedures Fostering Coordination and Improvement of the School Program) and UCR (Utilization of IPM-compatible Curriculum Resources by I & R Units), but the model predicted the positive correlation in both reading and mathematics, not just in mathematics.

Job Satisfaction

The premise that teacher job satisfaction is affected by particular organizational features of IGE has been represented as a network of postulated causal links among the variables. Figure 5-2 presents the various causal links in diagram form. It shows the paths of influence assumed a priori to underlie the relationships between teacher job satisfaction and the other variables.

Four variables, Interorganizational Relations (IOR), Procedures Fostering Coordination and Improvement of the School Program (GOS), Intraorganizational Structure (IOS), and General Implementation of the Instructional Programming Model (SIPM), are hypothesized to relate to teacher job satisfaction. The model in Figure 5-2 suggests that the amount of communication with other IGE schools (IOR) should help teachers feel better about their skills and be more satisfied with teaching. The structural model also suggests that schools with a well functioning IGE program (schools high on GOS, IOS, and SIPM) would have satisfied teachers. The model indicates that General Staff Background (GSB) and Belief in Individual Differences (INDIV) indirectly affect teacher job satisfaction by way of SIPM. Factors affecting

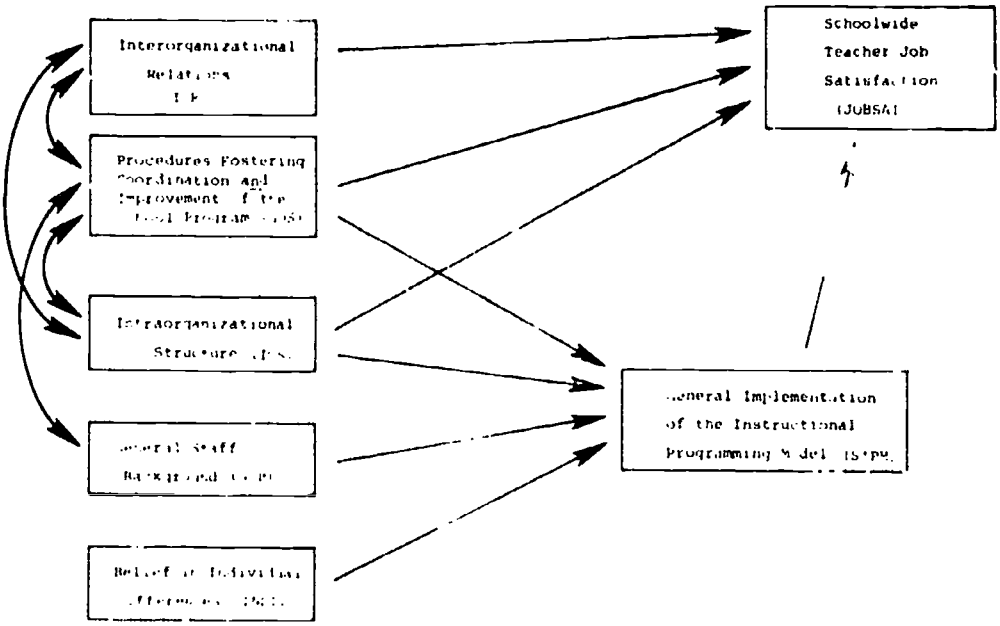

Figure 5-2. A priori model for teacher job satisfaction. (From Price, Romberg, & Janicki, 1981, p. 78.)

SIPM are discussed more completely in Technical Reports No. 510 and No. 511 (Price, Janicki, Van Deventer, & Romberg, 1980a, 1980b).

As with the analyses presented already, the analysis began with an estimation of the a priori model. Each endogeneous variable was regressed on its theorized causes. As a set of predictors, organizational features in the a priori model account for 29.1% of the variance in teacher job satisfaction, which is statistically significant ($p < .001$). For studies of this kind, 29.1% of the variance is good prediction. Whether one should regard good empirical prediction like this as *practically significant* depends on the interpretation given to the empirical relations, however strong they are. By adding exogenous variables that had not been included a priori as predictors of teacher job satisfaction, the multiple R^2 is .301, which is only a 1% increase in variance explained. That small increase is not statistically significant ($p < .25$). Since the a priori model is approximately as predictive as is the fuller model, we are inclined to judge the a priori model to be adequate. However, IOS had a negative regression coefficient, which does give some pause; the a priori model

would have that coefficient be positive. The zero-order correlation of IOS with JOBSAT is, in fact, positive. It is .18 ($p < .05$, one-tailed test). The negative coefficient is inconsistent with the interpretation implicit in the a priori model. The contradictory interpretation is that the features measured by IOS have a weakly negative effect on JOBSAT, which is not apparent by examination of zero-order correlations because of the countervailing influence of IOR, GOS, and SIPM, with which IOS is positively correlated. However, neither the a prior interpretation nor the contradictory interpretation are unequivocally supported by these results.

As noted in earlier analyses, the intercorrelation of predictors makes any interpretation of particular coefficients treacherous. For that reason, the procedure of orthogonalizing predictors was again used. The uncorrelated, substantively interpretable factors defined in Table 5-5 were used as predictors of JOBSAT. By having predictors that are uncorrelated among themselves, path coefficients can be compared and tested without ambiguity--as long as the variables used as predictors are themselves substantively meaningful.

Organizational features as predictors. Factors corresponding to three organizational features had correlations with JOBSAT that were statistically significant and of noteworthy magnitude. The factor corresponding to GOS had a correlation of .32 ($p < .00001$, one-tailed test) with JOBSAT. The factor corresponding to IOR had a correlation of .31 ($p < .0001$, one-tailed test), and the factor corresponding to SIPM had .24 ($p < .01$, one-tailed test). The zero-order correlation coefficients reported here are equivalent to the standardized regression coefficients of JOBSAT regressed on the factors corresponding to GOS, IOR, and SIPM ($R^2 = .261$). That equivalence is inherent to perfectly uncorrelated predictors. The zero-order correlation of the factor corresponding to IOS, another organizational variable, is .02, which is statistically nonsignificant and trivially small.

School staff measures as predictors. Besides the four organizational features discussed in the preceding paragraph, two measures of the school staff, INDIV and GSB, were treated as causally prior to JOBSAT. The correlation of the factor corresponding to INDIV with JOBSAT is .20, which is statistically significant ($p < .01$, one-tailed test). The correlation of the factor corresponding to GSB with JOBSAT, on the other hand, is -.03, which is trivially small and statistically nonsignificant. The addition of the factor

corresponding to INDIV to the predictor set of GOS, IOR, and SIPM improved the prediction of JOBSAT from $\underline{R}^2$ = .261 to $\underline{R}^2$ = .299, a statistically significant increase.

CONCLUSION

The conclusion of this chapter considers the findings of the Phase I study, dividing them for sake of exposition into five parts.

Organizational Features and Instructional Practices

Part of IGE schooling consists of organizational features designed to facilitate the instructional practices that compose the Instructional Programming Model. Because those organizational features have as a primary purpose the facilitation of certain instructional practices, the Phase I study examined empirically the implied relations between organizational features and instructional practices. Some implied correlations between organizational features and instructional practices were borne out in the Phase I data; others were not. The implied relations that were borne out empirically were presented in Table 5-6. The practice of individualizing instructional decisions--an instructional practice pursued to varying degrees by I & R Units in the schools studied--does seem to be facilitated by certain schoolwide organizational features.

Schoolwide implementation of the IPM. The extent to which the Instructional Programming Model (IPM) had been implemented by the school in general (and not simply in the I & R Units studied) was positively correlated with the degree to which the specific I & R Units under study engaged in the individualization of instructional decisions. This finding may surprise no one, but it does attest to the susceptibility of small groups of teachers to the larger (schoolwide) milieu in which they are situated.

Intraorganizational structure. Another aspect of the larger milieu that was consistently associated with I & R Units' individualization of instructional decisions is the intraorganizational structure of the school. (This is a proxy for various structural arrangements distinctive to the IGE schools, such as the organization of staff and students into I & R Units and the existence of a functioning Instructional Improvement Committee.) These correlations with I & R Units'

individualization of instructional decisions offer some vindication of the organizational theory contained in the IGE system. According to that theory, individuals who are part of an organization are affected by controllable features of that organization.

Implied correlations not found. Some implied correlations between organizational features and instructional practices were not borne out by the data in a consistent fashion. An expected connection between the interorganizational relations of a school and the utilization of IPM-compatible curriculum materials by I & R units in that school was not found.

Second, the expected connections between schoolwide implementation of the IPM and utilization of IPM-compatible materials by I & R Units, collection of information about individual differences, and the I & R Unit's management of grouping and instructional continuity also were not found.

In cases such as these, where expected relations were not found, three types of explanations can be offered. The first might be called a "model-blaming" explanation, because it faults the underlying model that has failed under test. The second and third might be called "test-blaming," because they fault the procedures that have been used to perform the test of the model. The second attributes the lack of observed relation to faulty measurement of the predictor variables (in this case, measures of schoolwide organizational features). This explanation seems to have little ground in this case for a couple of reasons. The Phase I measures of schoolwide organizational features agreed reasonably well with counterpart measures obtained in the Phase II field validation study (see chapter 6). Furthermore, other parts of the model were borne out by correlations involving these variables, a circumstance which should not have arisen if these variables were badly measured.

The third type of explanation attributes the lack of observed relation to faulty measurement of the predicted variables (in this case, measures of I & R Units' instructional practices). This type of "test-blaming" explanation cannot be seriously disputed. There was no field validation of these measures, there was abundant opportunity for distorted information to enter the questionnaires, and there are no redeemingly high correlations to suggest that these variables were measured reliably. The measures of I & R Units' instructional practices are the least trustworthy part of the Phase I

study. For this reason, we are disinclined to engage in "model-blaming" when data involving these particular measures of instructional practices are involved.

Staff Beliefs and Instructional Practices

The beliefs that staff members hold about the value of IGE are obviously important. The instructional practice of collecting information about individual differences between students in content areas (reading and mathematics) was, as expected, correlated with a measure of the extent to which teachers in a school believe that individual differences are important to consider when making instructional decisions. In the presence of other factors likely to affect this important element of IGE practice, it is noteworthy that its strongest predictor in Phase I was the extent to which teachers in a school believed in what one could reasonably argue is the most basic tenet of the Instructional Programming Model, namely, that individual differences are pertinent to instructional decisions.

Instructional Practices and Student Achievement

In no instance--not in reading, not in mathematics, not in grade 2, not in grade 5--was there a statistically significant correlation between a measure of instructional practices and a measure of student achievement. Besides the "model-blaming" explanation for this, which would fault the Instructional Programming Model, there are two other types of explanation. One attributes the weak relations to bad measurement of student achievement; the other, to bad measurement of instructional practices. Student achievement, we believe, was measured reliably. Despite the reliability with which student achievement was measured, any standardized, group-administered test can be criticized as an imperfect reflection of what children know about the area assessed by the test. Persons who wish to make that criticism of the student achievement measures--a criticism of construct validity--must concommitantly dismiss any favorable findings based on outcome measures such as these. We have already mentioned the low trust we place in our measures of instructional practices. Consequently, unreliability in those measures may have attenuated correlations between instructional practices and student achievement. For that reason, we are disinclined to use this particular negative finding as a basis for "model-blaming."

Organizational Features and Student Achievement

Expected correlations between organizational features and student achievement were not found, despite reliable measurement of both classes of variables. All measures of organizational features were trivially and nonsignificantly associated with student achievement measures. With regard to this negative finding, a "model-blaming" explanation is the most plausible. Specifically, these findings indicate that implementation of the surface organizational features with which IGE is commonly identified offers no assurance at all that student achievement will be raised. Evidently, the instructional effectiveness of I & R Units included in Phase I did not depend on the degree to which IGE organizational features had been implemented in the school of which they were part. This finding (based on questionnaire data) resonates with the findings of other phases of the IGE evaluation, all of which have converged on the conclusion that surface orthodoxy reveals little if anything about the value of an educational program. Nor does it reveal whether the Instructional Programming Model is practiced in a form that would be recognizable by its developers.

Correlates of Teachers' Job Satisfaction

The foregoing discussion followed a long-standing tradition in educational evaluation by gauging the worth of an educational option on the basis of its effects on the students. There do exist other grounds on which to evaluate educational programs. In an era when "teacher burnout" has become a household word, one evident alternative is to evaluate the effects of programs on staff morale. On those grounds, three organizational features commonly associated with IGE fare well. Three schoolwide organizational features have positive correlations (and positive path coefficients) with the schoolwide measure of teacher job satisfaction. Those three features are: (1) the interorganizational relations of the school, (2) the existence of procedures fostering coordination and improvement of the school program, and (3) general, schoolwide implementation of the Instructional Programming Model. Underlying these positive relations appear to be two factors. One is that teachers like the contact with other adults provided by IGE, especially the contact with a professional network that extends beyond their particular school. The other is that job satisfaction is derived from a belief that their instructional efforts are effective, a belief commonly held by teachers of schools in which the IPM had been implemented on a schoolwide basis.

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CHAPTER 6

Phase II: THE ON-SITE VALIDATION OF IGE IMPLEMENTATION*

Roderick A. Ironside and Larry A. Conaway

As outlined in chapter 3, there were three primary purposes for this phase of the project.

1. To validate and clarify both specific and general Phase I self-report data at school and unit levels. Topics included basic school information, schoolwide objectives, IGE subjects and instructional programming, IIC and unit operations, response sets, disparate staff ratings on IGE status items, apparent inconsistencies in related responses.

2. To gather new and extended information for (a) descriptive purposes, (b) possible use in Phase I analysis, and (c) development of hypotheses. Topics included implementation history, Phase I testing conditions, staff development activities, the Home School-Community Relations component, instructional modes, awareness and utilization of state IGE networks at various levels.

3. To study the dynamics of the IGE implementation and maintenance processes in a range of situations, from an "outside" perspective. This purpose allowed the team visitors to pursue additional topics and to derive somewhat personal perceptions of the nature of IGE beyond the formal requirements related to the two objectives above.

THE VALIDATION PROCESS

The sort of validation carried out in the Phase II study must be understood as nonstatistical. One might look at the Phase II validation effort, in other words, as an attempt to suggest on an essentially impressionistic basis the extent to which Phase I responses may be construed as providing accurate descriptions of the IGE status and activities of the Phase II sample. Three validation approaches were used in the Phase II study: (1) validation through direct confirmation of data, the most commonly employed approach; (2) validation by means of supportive and related information; and (3) validation as the fulfillment of intended procedures.

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*This chapter is condensed from the final report submitted by Ironside and Conaway of Research Triangle Institute. The condensation was done by Deborah M. Stewart, project monitor for the Phase II subcontract.

It was possible to confirm Phase I responses to a series of questionnaire items by means of direct discussion of items in the field (sometimes with reference to the school's Phase I data), interviews, observations, and study of materials. In this sense, corroboration was accomplished by both direct and indirect means, where the purpose was to verify the original known response.

The supportive approach of gathering related information was employed in Phase II in connection with extension material on such topics as instructional practices, objectives, and cooperative planning. Even where such related items were not exactly the same as the original Phase I items, they were used for validation purposes judgmentally so long as the Phase I responses were known. In this sense, too, it was possible to employ the broad judgments that emerged from the site visit to each school and across all thirty schools.

With respect to the third approach to validation, Phase II provided an opportunity to examine the extent to which the Phase I instruments elicited the requisite information, the nature of respondent reactions to the instruments per se, and the relationship between the quality of data obtained and the variables with which those data were associated. They may be viewed as validation in the least rigorous sense, since it is dependent upon the judgments of the participants--Phase I respondents and Phase II site visitors/interviewers. It nonetheless provides one basis for judging the efficacy of various Phase I instruments and the implications for the several variables represented.

PROCEDURE

Sample

Research Triangle Institute (RTI) and Center staff jointly set up criteria to select schools from the Phase I roster.

The Phase II sample of 30 schools was characterized as follows:

1. Located in 16 states from coast to coast, with a purposeful deemphasis on proportional representation from several states with large numbers of IGE schools; no more than 6 schools in any one state; most states had 1 or 2 schools.

2. Initial relationships with one or a combination of three sorts of agencies (R & D Center, /I/D/E/A/, or a state educational agency).

3. IGE initiation spread from 1969 to 1975.

4. School size from fewer than 150 students to more than 1200.

5. Total scores on the IGE Implementation Survey ranging from 24 to 285 of a possible total 308 (in two subgroups: scores 24-132 and 191-285).

With respect to the last characterization, one feature of sample selection was that half of the schools were to represent the bottom of the scale and half the top.

Extensive communication by telephone and mail with school principals, district personnel, and state IGE network contacts occurred as arrangements were made for the Phase II site visits.

Topical Outline

To provide structure for the school visits, a Topical Outline of content was developed. While the Center took on major responsibility for identifying the specific validation topics, RTI undertook the major developmental work in the "new information" topics. The outline was accompanied by a Team Visit Report Form for RTI staff. This form allowed for collection of specific categorical information as well as entry of narrative material.

I. SCHOOLWIDE CONTENT AND TOPICS

A. New Information and Extended Information
   1. School implementation history
   2. Cost factors
   3. Inservice training
   4. Home-School-Community Relations
   5. Unanticipated outcomes

B. Verification-Clarification
   1. IGE School Survey verification, Staff Information Sheet, and local demography
   2. IIC Structure and Function Questionnaire
   3. IGE Implementation Survey
   4. Assumptions about Schooling and about Learning

II. UNIT CONTENT AND TOPICS

A. New Information and Extended Information
   1. CTBS and local curriculum match
   2. Student curriculum activities and progress
   3. Conditions of Phase I testing

B. Verification-Clarification
   1. Unit Questionnaire
   2. Unit Practices

Site Visits

Visits of from 1 1/2 to 2 days each took place in the period from early March to late May 1978. Typically, a team of two professionals made the visit, interviewed and observed both individually and as a team, and conferred on their findings. In all, eleven different individuals participated in the field work, each visiting a total of from two to eight schools. This group of persons comprised nine RTI professional staff and two consultants.

Four major modes of data collection were used: interview, observation, study of relevant materials, and attendance at stated meetings. Data collected during the visits were supplemented in all cases by relevant Phase II information obtained in advance from the principal, and in some cases by follow-up telephone contact to clarify visit findings.

FINDINGS

Early in the contract period the material for validation, extension, and new information needs was subsumed into major questions that would serve as focal points in the inquiry. The findings and interpretations respond to these questions, which are as follows:

1. To what extent do the Phase I survey results reflect reality with respect to the school and IGE? Did staff answer carefully and honestly? Were procedures and directions followed?

2. What are the turning points in implementation, points at which problems to be overcome appear insurmountable and after which there is a period of smooth continuing operation?

3. Are there general indicators or predictors of success/failure as an IGE school?

4. What are the specific features of implementation history of given schools? Are there particular patterns?

5. Is the staff attitude consistent with the concepts underlying IGE? Do individuals vary in their assumptions about education?

6. Is there cooperative planning regarding the instructional program? Does it incorporate various teachers' strengths? Does it provide for continuous progress?

7. How is the IPM implemented and is it based on specific schoolwide instructional objectives? What are the related curriculum practices and how are the IGE subjects handled?

8. Is there a recognition of things well done coupled with a feeling of working toward improvement? Is the current status only temporarily satisfactory and thus plans laid for new growth? Are external sources sought?

9. Is there benefit from the networks (at various levels)? Are the networks a source for refinement and renewal?

10. Does IGE cost too much, in time, money, energy? Is it worth it? In addition to reporting results over the entire Phase II sample of 30 schools, RTI conducted an exploratory inquiry using two subgroups of schools in an effort to ascertain whether high- and low-implementing schools differed systematically. Each subgroup consisted of seven schools, chosen on the basis of original total self-report implementation score and judgments arrived at after the field visits. Both sets of "ratings" reflect overall implementation status as of the 1977-78 school year. Implementation scores of the low subgroup ranged from 24 to 125 and high subgroup, from 122 to 285. The high subgroup score of 122 was judged an underestimate; this group is better described as having scores from 200 to 285. Scores 24 and 285 are the very lowest and very highest scores (of a possible implementation score of 308) of all schools involved in Phases I and II.

Validation of Phase I Results

The staff in almost all schools attempted to follow the survey procedures and answer the questions carefully and honestly, although there were some difficulties reported that also affect the "reflection of reality." For example, personnel in about one-half of the schools indicated that survey instruments included many ambiguous terms--and in a fair number of the schools there was a reaction that the surveys were too long. But local conditions in a few cases exacerbated these difficulties, caused Phase I to represent a special pressure because school had begun late, there had just been a teachers' union strike, enrollment changes had caused alteration of schedules and assignments, or a new principal had been appointed effective September 1977. In addition, in some schools it was mentioned that many survey items dealt with more than one element (as in the Implementation Survey), and that the level of detail asked for in connection with instructional practices in various curricula was somewhat taxing.

With respect to what may be called the "IGE environment," a major concern (apparent in about one-third of the schools) was that the entire school or a significant part of it was not well enough acquainted with IGE concepts and terminology to respond intelligently to a number of specific "IGE items." Many staff reported, nonetheless, that they had proceeded to respond either by guesswork or through consultation with others. Moreover, in several schools there was notable variation in the degree of acquaintance with IGE, making it difficult to obtain centrality in survey results within or across units.

The RTI team at each school arrived at its own ratings of 11 key items from the IGE Implementation Survey that all school staff members had been asked to complete. Both the staff ratings and the RTI ratings were made on a scale from 0, no implementation of the stated IGE concept, to 4, ideal implementation of the IGE concept. While both ratings have some obvious limitations, comparisons were made of the *difference* between ratings, ignoring location on the 0-4 scale.

Table 6-1 shows the frequency of the differences, in .05 increments, across all items and across all schools. There are two distinct tendencies in these data. First, of the total possible 300 comparisons, 129 (or 39%) show virtual compatibility of the two ratings; second, of the remainder, a strong majority, 40%, place the Phase II ratings below those rendered

Table 6-1
Comparison of Phase II and Phase I Ratings for
11 Key Items on IGE Implementation Survey

Phase II/Phase I Rating Comparison	Ratings	
	Number	%
Phase II rating higher		
by 2.1 to 2.5	2	1
by 1.6 to 2.0	11	3
by 1.1 to 1.5	14	4
by .6 to 1.0	36	11
Phase II rating same (±.5)	129	39
Phase II rating lower		
by .6 to 1.0	70	21
by 1.1 to 1.5	27	8
by 1.6 to 2.0	22	6
by 2.1 to 2.5	10	3
by 2.6 to 3.0	7	2
Phase II unable to rate	2	1
TOTAL	330	99

in Phase I, while 19% show Phase II ratings higher than those of the Phase I judgments. It appears that the majority of schools were rated higher for these eleven items by the school staffs in Phase I than by the Phase II visit teams.

Quality of staff responses to the Phase I questionnaires differed in the high- and low-implementing groups of schools. Based on all the sources of information available in Phase II (including the apparent extent to which school staffs in toto were knowledgeable of IGE concepts and terminology), it seems clear that the low group were not only less informed about IGE and Phase I but also less inclined to participate. Many staff in the low group reported as much by acknowledging hurry, resistance, carelessness, pressure, and the like in the way they handled Phase I requirements, with the notable exception of student testing.

This overall attitudinal domain is especially important to consider because, in the present case, it refers to respondents' *general* reactions to and handling of Phase I instruments and requirements, not merely the particular items or subinstruments specifically marked for validation work in Phase II. In addition--and we feel this to be a clue of considerable significance--the more a school or a staff was removed from IGE, the networks, terminology, expectations, implementation criteria, resources, and the like, the greater the tendency to dismiss the importance of Phase I and thus to treat it somewhat casually. From both the total implementation scores and the Phase II field judgments, it is clear that the low group as a whole was quite far removed from the IGE mainstream, at least by the 1977-78 school year.

Unit staffs were asked about the quality of the testing situation and, thus, test results as well as the content match between the local curriculum and *Comprehensive Tests of Basic Skills* (CTBS) reading and mathematics tests.

Unit staffs discussed the CTBS, examined copies, and rendered group judgments about the match between CTBS content and the curriculum in general in 1977-78 in those units (in fall 1977 where that could be specified). The findings presented in Table 6-2 should be interpreted as gross indications of match, since many respondents found it hard to relate the measures to the fall 1977 curriculum, expressed reservations about standardized tests in general, and otherwise found this task somewhat difficult (note the number of unit with unclear responses, for example). Overall, Unit 5 groups judged a considerably higher level of test/curriculum consonance than did Unit 2 groups, for all subtests.

Testing conditions themselves were explored based on recollections of unit staffs, principals, aides, counselors, or others who had administered the measures; some individuals recalled the details vividly, while most had some difficulty recreating the situation. The responses for Unit 2 and Unit 5 groups were remarkably similar; thus what is discussed here is across the 30 schools. In 23 schools (76%) staff reaction was that the tests were appropriate and adequate; staff in 5 schools (16%) reported feeling that the tests were inappropriate. Reactions from staff in the other 2 schools (7%) could not be fit into the appropriate/inappropriate dichotomy.

Table 6-2
Degree of CTBS and Local Curriculum Match
(30 units at each grade)

CTBS Subtest	Local Curriculum Match						
	None	Little	Moderate	Lot	Much	NA	?*
Grade 2 Units							
Reading Vocabulary	1	5	6	5	7	1	5
Reading Comp, Passages	1	3	10	7	6	1	2
Reading Comp, Sentences	1	3	8	8	7	1	2
Math Computation	1	6	9	8	3	1	2
Math Concepts & Applic.		5	11	8	3	1	2
Grade 5 Units							
Reading Vocabulary		1	5	10	10	1	3
Reading Comp (General)		2	3	12	11	1	1
Math Computation		2	6	8	12	1	1
Math Concepts & Applic.		2	7	10	9	1	1

*Unclear response.

Staff in 26 schools (86%) reported that test administration conditions would lead to trustworthy results, while staff in 2 schools (7%) reported the opposite. Again responses from 2 schools could not be categorized.

Turning Points in IGE Implementation

This was an exploratory inquiry in the sense that it represents a byproduct of Phase II rather than a focus. There was, for example, no attempt to pursue the topic in depth or to validate any findings against outside measures in any formal way. The question may well be worth a survey in itself, especially to those interested in expanding and/or refining IGE implementation.

Principals and others were asked to identify turning points in terms of "points at which problems to be overcome seem insurmountable and after which there is a period of

smooth operation." For discussion purposes, the primary response of each school is included in Table 6-3; these break out into three distinct groups: (a) one-half the schools reported points or circumstances that were viewed as positive forces; (b) one-fourth reported negative points; and (c) the remainder gave either an unclear response or reported no particular turning point. In connection ith the latter, staff members were unable to identify turning points. In some cases this was because they felt the program had always run smoothly or that it gradually ran smoother each year as they gained more experience with IGE concepts and implementation strategies; in other cases, this was because the IGE program was still facing problems and had not yet become a smooth-running operation. Certainly the school's perception of past and present status, along with its ability to identify key factors in the implementation process, affect the relevance of the responses provided.

Schools providing any sort of direct response fell into two categories: those who associated the turning point with the advent of a smooth running operation, and those who associated it with stagnation or decline of the IGE program. Within both categories there was a wide range of responses.

One-third of the schools indicated a positive turning point associated with staff acceptance and implementation of the multiunit organization including full operation of the IIC. In five other schools, related turning points were associated with parent approval, successful delineation of curricular objectives, and the IPM. In connection with the latter--perhaps the only surprise in the data obtained--two schools reported that the turning point for successful operation was related to cutting back the initial IGE thrust. These staff members felt that the goals for implementation were set unrealistically high for the first years, and the goals were later set at more attainable levels. Specific examples included dropping science as an IGE subject area, reducing student movement during the school day, and reducing emphasis on the IPM.

Turning points associated with a decline in the IGE program also related to circumstances either at the outset of implementation or considerably later on. Several schools referred to influences outside the school, usually at the district level, as noted in Table 6-3. Staff at a few schools indicated that the program was hurt by more internal problems, such as a unilateral decision to implement IGE without

Table 6-3
Reported Turning Points in Implementation Sequence

Turning Points	Number of Schools
POSITIVE	
Joint staff decision to go IGE	2
Recruitment of good staff, removal of weak staff or UL	3
Staff acceptance and implementation of multiunit organization	4
Full operation of the IIC (its several roles)	1
Parent approval and involvement	1
Successful delineation of objectives in subject areas	2
Reduced emphasis on IPM and multiaging	2
NEGATIVE	
P made unilateral decision to go IGE	1
Recordkeeping requirement	2
Minimal training/assistance for staff at outset	1
Mass reassignment of staff to subjects and grades (by district decree)	2
Concurrent district dicta: narrow curriculum defined, no funds for inservice, reduced number of aides, no more student teachers	1
Concurrent interactive factors: loss of aides, loss of planning time, reduced Board support, reduced staff commitment, greater costs	1
Unclear	2
None reported	5

staff support or the demands of the recordkeeping system. The impact of negative factors was sometimes in terms of multiple circumstances rather than single turning points.

In the comparative analysis of high and low schools, the identification of turning points in implementation showed a clear difference between the two groups. The high group reported no turning points or only positive ones; the low group reported only negative turning points.

Predictors of Success in IGE

This question is highly related to the one just discussed. Again, Phase II reports represent a byproduct, since Phase II did not specify criteria in advance or focus special attention on this inquiry. Whereas turning points reflect school staff assessments of their history, the findings discussed here are restricted to RTI team judgments and general observations. In view of the literature and common knowledge about IGE, nothing reported here appears to be at all unusual or unexpected, but rather a reinforcement of the general wisdom about what is required in order for any dramatic change in school practice to flourish and prosper.

Phase II visit teams were unable to identify general indicators of success or failure as an IGE school in one-sixth of the schools.

In terms of success, the general indicators reported most frequently have to do with the school staff, for nearly half the schools including at least one of the following: a majority of the staff made a joint decision to initiate IGE in the school, or many of the school staff members displayed a willingness to work extra hours and work cooperatively in initiating and implementing the IGE program. Success is also attributed to individual student achievement and growth, substantial parental support, and continued inservice activities of a practical sort for learning and rejuvenation.

In terms of failure, the general indicators again have to do with the school staff, including one of the following in about one-third of the schools: a unilateral decision by the superintendent or principal to initiate IGE against resistance from, or without the participation of, a majority of the staff who were unwilling to devote time and energy in moving away from traditional practices; or as time passed, decreasing attention to student re-evaluation and regrouping, causing a return to practices characteristic of the self-contained class-

room. Other indicators of failure appear to be lack of leadership by the principal; changes in enrollment bringing about unfortunate teacher assignment changes; inadequate building and facilities; unionization; lack of cross fertilization with other IGE schools; and lack of actual individualization and application of the IPM.

The comparison of high- and low-implementing schools was intended in part to determine whether special indicators exist in school IGE history that might differentiate the two groups. The two groups were virtually identical in the frequency and range of reasons for going IGE given by school principals and others. The same is true for the initial implementation step, the kinds of assistance provided by the key originating agency identified by the school, and the range of personnel trained in the first two "major training events."

Features of Implementation History

Initial training from external agencies. Most schools noted the importance of initial training for any chance of success as an IGE school, and all but one reported some sort of formal initial training event for all or part of the school staff. There were many different resources for the initial training, such as states (SEA and SICC), teacher education institutions, various network agencies in the broad sense (HUB, intermediate agencies, district or diocese facilitators), workshops conducted at or by the R & D Center, and workshops conducted by district and/or school personnel themselves. Staff members in many schools mentioned that the experiences associated with early awareness and training were vital to IGE implementation; when they were successful, there was good impetus for the program, and when they were ineffective, it was difficult for them to start the program.

A major problem which was mentioned in many schools was that few staff members had received training directly from experienced personnel *fully acquainted with IGE concepts, potential obstacles, and effective implementation strategies.* Many of those interviewed felt that this had been a major drawback of the existing "networks" in the initial years of IGE (i.e., roughly 1970-1974). This observation may be interpreted as a school-level reaction to the training chain concepts implemented in the early years.

Initiation of IGE at the local school. Schools reported a wide variety of "reasons for going IGE" (1-5 reasons per school), with the large majority related to IGE concepts such

as differentiated staffing, improved educational opportunity, predisposition of staff or building to the IGE patterns. Only a very few reasons (or schools) involved an irrelevant matter such as a district requirement. Appropriate motivations to join IGE were usually followed by obtaining a commitment through participation of the total school staff and district personnel, and sometimes such others as parents, the school board, a TEI, the Center, or a league.

About two-thirds of the schools reported the early planning of the implementation of the seven components in a sequenced organized way, suggesting awareness of all seven and some realization of their interrelatedness. (Most of the remainder had no set plan for component sequence or could not report on this because of the time lapse involved.) Some, however, apparently expected to initiate the full IGE pattern all at once and very soon (within the first two months), while half the schools expected initiation of their plans to require twelve months or longer.

The majority of schools reported a formal staff training event (2-5 days) before school opening for the year, with the remainder having one at or after that point. And while half the sample reported a second such formal training early in the installation period, it was not the rule for the total staff to be involved or trained even across both such sessions. The basic content of these formal events concentrated on concepts and philosophy, management and planning, and the multiunit structure (all important and necessary) at the expense of the IPM, instructional objectives, and curricula for implementation. Frequently these gaps were filled by subsequent staff development activities at the school or extra-school levels, but not all schools had (or recalled) such training.

As schools looked back at their history, they noted that it took 1-4 years to initiate the IGE components (compared with less than one year to 2 1/2 years in the initial plans). In about two-thirds of the schools, 6 or 7 of the 7 components were reportedly initiated in that period. In this group of schools, component 7, Research and Development, was consistently either the last to be implemented or not yet implemented as of spring 1978. The other somewhat consistent patterns were for the Multiunit Organization to be initiated first and for the IPM to be initiated fifth or sixth in the sequence.

Current IGE staff development. Two-thirds of the schools make some provision for new staff to become acquainted with IGE, depending as a rule more on informal than formal approaches and most often scheduled before school opening or within the first month. The informality of this training, plus the fact that just over one-third of the schools had a 1977-78 preschool workshop (or equivalent), suggest the somewhat minimal extent of "annual IGE renewal" in the Phase II sample.

While the schoolwide inservice training is frequently well organized, related to IGE components, based on staff needs, and scheduled on a regular basis, the Phase II teams nonetheless took away the impression that such training was often not adequate to staff needs (in terms of time or content) or was approached more as general than as IGE inservice.

Patterns in implementation history. As the specific data and the discussion above are studied, several patterns in implementation history--at least so far as the Phase II sample is concerned--can be discerned. These are outlined below, some in relation to school practice and some in terms of the larger IGE context.

1. From the schools' viewpoint and in connection with specific evidence available, considerably more technical assistance, basic information, and training were available in the early years of IGE installation than in recent years or at the present (1978).

2. Similarly, recourse to the networks (at all levels, but principally the state level), and network-initiated assistance in installing new IGE schools as well as in helping established schools to refine IGE, has diminished.

3. While virtually all schools reported one initial formal training event (and half reported a second) plus various amounts of IGE-related inservice training during the first installation year, the amount of such inservice had reduced markedly by 1978. This appears to hold true for "inservice in general" as well as for strictly IGE-related staff development activity.

4. Similarly, the level of self-direction appears to have diminished over time. This relates to commitment, use of implementation criteria, self-assessment, planning, adherence to the basic concepts, seeking outside resources, and so on. The actual level of commitment and IGE activity reported in Phase II suggest a reduced level of implementation in many schools and a certain stagnation in a few others.

5. The Home-School-Community activity, perhaps given heightened importance in the first year or two, does not appear to enjoy recognition as an IGE component or to be given special attention beyond the sorts of communication that most schools engage in.

6. Similarly, while a good deal of attention was given at the outset to the IPM and a good deal of activity has revolved around it, this component has not emerged as either a special input or notable output of IGE in practice. It seems not too well understood by many staff members, and where it is understood and accepted there are often obstacles such as lack of aides, loss of unit planning time, reduced willingness to engage in detailed recordkeeping.

7. The range and frequency of reported impacts/consequences are about the same for the initial period as for the current period, in terms of both positive and negative impacts. Both negative and positive outcomes continue to be reported up to the present (1978), including strong positive outcomes in a number of schools in this sample.

8. In practice, among Phase II schools, "IGE" appears to have changed somewhat from a comprehensive attempt to achieve an integrated instructional and organizational milieu to a way of denoting either the use of certain types of curricular materials or a coordinated attempt to accomplish some level of individualization. In the process of change, the IPM and its technical schema--the very heart of IGE conceptually--appear to have been replaced by the multiunit organization as the most identifiable aspect of IGE at the same time that some individually guided education continues to be implemented.

It seems reasonable to infer that these patterns are interrelated. The existence and availability of outside resources, for example, will affect their value and utilization, and in turn this will influence the school's perception of its goals, its status, and its potential level of success--as well as its actual efforts in effecting change or accomplishing individually guided instruction.

Staff Agreement with IGE Concepts

In view of much that has already been reported about staff awareness and commitment, it is reasonable to theorize that considerable variation in staff attitude would obtain along with meaningful differences in their assumptions about educational practice.

The Phase II visit teams reported that the consistency of staff attitudes with respect to the concepts underlying IGE falls into three categories: (1) a great majority of the staff members in about one-third of the schools had attitudes very consistent with the concepts underlying IGE; (2) in about one-half of the schools, there was a good deal of consonance, but either a significant number of the staff did not have attitudes consistent with IGE concepts or the school did not implement certain components of IGE; and (3) in the remainder of the schools, there was overall a lack of consistency with regard to IGE concepts. When these judgments were reduced to a simple Yes-No rating for the overall staff attitude and acceptance of underlying IGE concepts, the result was Yes, 23 schools, and No, 7 schools. It seems clear, however, that some of the Yes judgments are moderated by the recognition that the majority of school staff accept IGE-like concepts but do not (or have not yet) put all of them (or even the most important of them) into practice.

In the schools exhibiting the most consistency, it was sometimes noted that there was a great deal of staff unity or that the staff was young and vigorous. It was also frequently true that new teachers were required to undergo preservice orientation or that many of the teachers had served as student teachers or interns in IGE schools before teaching in their present school.

Of those schools showing a lack of consistency with regard to IGE concepts, most included some staff members who have attitudes consistent with IGE concepts but these people were definitely in the minority. There was also generally a great deal of variation in attitudes and practices across Units, with IGE practices also in the minority.

Cooperative Instructional Plannning

In more than half the schools, the teams concluded that there was strong evidence of cooperative planning regarding the instructional program at the Unit level. In most of these schools, cooperative planning was evidenced in instructional management, staff differentiation, and providing for continuous student progress. In the remainder, staff differentiation appeared more firmly entrenched than did continuous progress.

In about one-third of the schools, there was some evidence of cooperative planning at the Unit level, with little or no leadership and coordination across the Units. In some of these schools, a moderate level of cooperative planning

took place in all Units, while in others it appeared in only some Units.

In the remaining one-sixth of the schools, there was almost no evidence of cooperative Unit planning regarding the instructional program. In these schools there was no functioning IIC to exert leadership or to provide coordination. Although there was some evidence of either staff differentiation or continuous student progress in individual Units, the efforts were weak, and they failed to have a significant positive effect on the overall school instructional program.

Implementation of the IPM

Two general approaches were taken in exploring IPM implementation. One was to observe, interview, and study materials in Units 2 and 5 in an attempt to synthesize IPM elements and determine whether or not they comprised the classic IPM or possibly some variant of it. This "new information" task proved difficult to accomplish because of the variable Unit structures, and the many staff members who were not conversant with IPM operations or concepts. The second approach was to attempt to verify the accuracy of reported IGE subjects through discussion of schoolwide objectives and recordkeeping activities. This validation task also proved difficult because various subjects could not be followed up in all Units and because what looked like schoolwide practices in fact were often limited to certain Units (or even parts of Units). In addition, designation of IGE subjects by principals was influenced by variable local definitions of certain curricula, resulting in confusion over just what was and was not a discrete IGE subject.

The IPM component--with its instructional objectives, status measurement, recordkeeping, continuous progress, grouping, instruction, and staff planning--was discussed throughout the complete Phase II report in different contexts. Unit definitions of specific instructional objectives were noted along with the finding that, in half the sample, schoolwide objectives apparently do not exist for certain subjects as originally reported, resulting in variation in IPM implementation at the Unit level. Similarly, staff reactions to assessment, grouping, and recordkeeping were reported, revealing somewhat limited practices and somewhat restrictive attitudes. The fact, too, that many Unit 2 and Unit 5 teachers described their typical instructional modes as classroom groups within the Unit--combined with the finding that many "Units" exist more as convenient administrative

entities than as instructional groupings--suggest a milieu in which it would be difficult for a strong implementation of the IPM to occur. It would be difficult to describe what is typical, because overall the IPM appears to be either poorly understood or partially implemented, and in a significant number of schools the IPM takes second place to the priority placed on the multiunit organization. The IPM itself has several interrelated elements, and it is not always easy to see all of them operating conjointly at the school or Unit level especially where the model does not appear to be perceived as a unified whole.

It is clear, however, that the IPM can function in small groups (such as multiaged or single-aged self-contained classrooms) and Phase II gives ample evidence of this. A number of committed teachers operate in the IPM mold in one or two subjects--in their own contained classrooms, in their personally developed subunits with some cooperation from one another teacher or in other situations. And while a few schools follow the IPM in a highly professional way in multi-aged Units and in three or even four subjects, this is not typical for Phase II schools. Inasmuch as the classic IPM is expected to work best where it is adopted schoolwide and where the total staff teaching multiaged groups of children is both cognizant and committed, these isolated cases of positive Unit autonomy may not be as effective as desired.

Refinement and Renewal Attitudes

The Phase II visit teams found many positive indications of pride in the school program and a general recognition of things well done in about two-thirds of the schools, irrespective of IGE status. They also found active seeking of improvement in about one-third of the schools, including general efforts across the school program and specific efforts such as staff cooperation on curriculum development and revised student reporting systems. These feelings of pride and accomplishment as well as efforts toward improvement were not limited to IGE elements, however. They included overall school programs with their unique adaptations of IGE components, and applied in one or two cases where IGE is no longer recognized. It would likely require a case-study approach to these schools, with all that implies, to examine this whole question definitively in terms of IGE status, renewal, and refinement.

Of the remaining one-third of the schools, some generally accepted the status quo while a few others almost totally

lacked pride in the educational program and were making little effort to improve. Again, this applied to the overall school program as well as to IGE operations.

State Network Benefits

For purposes of this question, *network* is defined broadly to include state networks, leagues, PACTs, HUBs, and any other such organizations outside the individual school--with emphasis on the state-level organization but also conceived as the total matrix of such resources.

About one-third of the schools reported that they currently receive some positive benefits from the network in general or view the network as an important source both of materials and enrichment. Among the specifics mentioned were: statewide IGE conferences; newsletters; regional, league, or other inservice or "sharing" meetings from time to time; joint activity (within a league) at self-evaluation; AIGE* as a "supernetwork" in relation to annual conferences; trading ideas on curricula; general and specific courses at TEIs. Overall, however, when specific benefits were mentioned, they more often related to networks at regional or local levels than at state levels.

There was some indication that networks had been very important in initiating IGE a few years ago, but that they are much less active in recruiting new schools or in providing enrichment and rejuvenation to "old" IGE schools at the present time (1978). In addition, there was some concern that networks have been losing their funding resources in the recent past, causing personnel to be switched from facilitator roles at the SEA level. A few respondents felt that these trends will hurt IGE severely, since IGE extension to new schools will be limited, and present IGE schools may abandon the movement because of the lack of technical assistance and refinement activities. In one state where two schools were visited, both principals mentioned the efforts, in spring 1978, to recreate a regional league network, since they felt it was indispensable to continuation of any level of IGE implementation.

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*Association for Individually Guided Education.

Cost of IGE

This topic was discussed directly and indirectly in interviews at all the schools, with emphasis on "Does IGE cost too much?" as well as "Is IGE worth it?" to evoke both positive and negative reactions.

When staff responded in terms of budget, about two-thirds of the schools stated that IGE involved either no additional monetary costs or minimal additional costs, at least at the present (1977-78). In terms of time and energy, staff in these schools indicated that IGE requires greater amounts than traditional programs but is worth it. Many of these schools gave specific examples of the benefits gained from the extra time and energy devoted to IGE: increased student achievement; teacher cooperation and sharing; better student climate in terms of responsibility, growth and discipline; and personal and professional growth of teachers.

Staff in about one-third of the schools stated that IGE does require too much commitment, in terms of money, time, and/or energy. In most cases they continued by stating that IGE was really not being implemented in the schools, in spite of its potential.

In addition to the general observations above, visit reports were analyzed for school perceptions of costs and savings involved in IGE implementation, across the total period to the present. Table 6-4 outlines the specific findings across all schools. In the upper block, the overall perception of minimal cost or minimal saving is reported for each school. In the lower block, specific costs or savings are listed; this block is set up so that roughly equivalent categories may be contrasted as perceived costs or savings. While monetary matters were mentioned, they were less frequent overall than other types of entries, and notably less frequent in the minimal savings column. Conversely, 14 schools mentioned minimal costs in terms of actual dollar output and use of community personnel resources. Overall, there are 21 reasons for minimal savings among the 13 schools responding with specifics, and 26 reasons for minimal costs from the 17 schools providing specific responses.

On balance, this sample of schools--irrespective of current IGE implementation status--judged that IGE is more worthwhile than not in terms of the costs of time, money, and energy and perceived more specific savings than costs associated with IGE.

Table 6-4
School Perceptions of IGE Cost and Savings

Cost	Number of Schools	Savings	Number of Schools
Overall perception: One response per school			
None, minimal	10	None, minimal	6
Reasonable, a little (general)	2		
Unclear response	3	Unclear response	5
No response	2	No response	2
Reasons for minimal cost/savings: Multiple responses allowed			
Share materials; less to buy	8	Costs for instructional materials	3
Less cost for substitutes	1	Salaries for aides	5
More community resources used (parents, retired teachers, other volunteers)	5		
More efficient use of teacher time (teacher planning)	2	Workload on staff (sometimes means reduced morale)	6
		Maintaining staff commitment	2
Better staff morale	2	Rivalry between IGE and non-IGE staff in the school	1
		Resentment in non-IGE schools	1
Student responsibility, less vandalism, better discipline	3	Attribution of discipline problems to IGE	1
Better community attitudes re education	1	Time to persuade community of IGE value	1
More efficient use of principal's time (more on instruction)	2	Time for league activities	1
Better education for the same money	2		

CONCLUSIONS AND IMPLICATIONS

While some of the implications and strictly judgmental observations below may properly be applied broadly to IGE, the conclusions themselves relate to the particular sample of schools studied in Phase II. It is emphasized that among the criteria employed in sample selection was inclusion of schools with higher and lower implementation status according to self-report data supplied in Phase I. As a result, the findings and the conclusions derived from them reveal a significant "spread" in IGE perceptions and practices rather than a common set of findings that might describe what is typical.

1. Phase II validation findings may be applied to Phase I more as aids to interpretation than as recommendations specific to Phase I variables or analysis.

This conclusion is related not only to the nature of somewhat equivocal findings but also to the nature of the inquiry. Where direct confirmation of Phase I data is concerned, the overall findings show a greater amount of verified data than of data not verified, but they also reveal some serious concern with particular Phase I items as well as with respondent attitudes in some cases. The inquiry itself must also be considered in that it involved a select sample of schools and included an array of validation items related to a select group of Phase I variables.

One might note that a number of "new information" topics expand on what was obtained in Phase I (re history, inservice, originating agencies, networks), irrespective of the validation task. These data cannot be applied directly to Phase I variables or analyses (having been obtained for a select sample), but they can "advise" interpretation of the strength of the variables in effecting Phase I outcomes. In that sense, there is a clear conceptual relationship between the validation and "new information" tasks as they relate to Phase I.

2. A variety of factors affected the utility of data gathered by the Phase I instruments.

In the majority of schools, Phase I data reflected an adequate to strong sense of reality with respect to IGE implementation and the particular organizational and instructional practices engaged in. In the majority of schools, too, it appeared that staff members answered carefully and honestly and attempted to follow the Phase I directions and proce-

dures. Across the Phase II sample of schools, however, staffs indicated a number of factors that made completion of the Phase I self-report questionnaires somewhat difficult and resulted in some responses they did not feel entirely comfortable with. These factors included such matters as confusion over directions, staff resistance, differential appropriateness of items to the local IGE situation, fatigue, inconsistent within-school responses, nonparticipation by some staff, differential bases for rating implementation status, length and complexity of items or instruments, and ambiguity within items. While the intent in most all schools was to cooperate, to assist the evaluation, general and local circumstances tended to reduce the expected meaningfulness of the questionnaire data. There was also apparently some special difficulty with the Implementation Survey as a whole. In addition, the final status of the verified IGE School Survey suggests some confusion over IGE terminology as well as incomplete or inaccurate responses to basic descriptive items at the school level.

A related factor is that a significant number of schools no longer appear to be IGE schools or are IGE only partially--and a general sense that IGE is not the paramount motivator or touchstone of the educational program in many of the sample schools.

Student achievement and affective testing appears on the whole to have been conducted appropriately, and the great majority of respondents indicated that they would trust and use these outcomes. The usual careful approach to testing was likely enhanced by the aura of formality and importance typically attached to standardized measures by both students and school personnel.

3. The several IGE components are differentially understood, valued, and implemented in the Phase II sample.

It is not the rule for school people (including principals and unit leaders) to think of IGE in terms of components or of seven given components. And, among the seven stated elements, there is a rough hierarchy of awareness closely related to extent of implementation. Although about equal emphasis on the Multiunit Organization and the Model for Instructional Programming for the Individual Student (IPM) was reported across schools, the Multiunit Organization appears much better understood and implemented than the IPM. Indeed, most principals and many teachers seem to feel

now that the heart of IGE is the Multiunit Organization (with shared decision-making and more open communication) irrespective of the level of IPM implementation.

Aside from the Multiunit Organization two other components are tied quite firmly to the schools' overall concept of IGE, Curricular Programs and Facilitative Environments (more as a set of helpful circumstances than as integrated components of a larger system). Home-School-Community activities are also widely engaged in and valued--and received emphasis in the installation period--but in many schools these are not viewed as aspects of a component per se. Of all the components, Research & Development seems to be understood and implemented at the lowest level across schools.

A good deal of effort--more in the past than at present--has been expended in connection with the IPM component, but with only moderate success overall. There was considerable evidence in Phase II of "partial IPM-ing," of variations within and across units, of employment of the full IPM for some students but not others, and of emphasis on some steps in one curriculum but not another. Frequently this somewhat inconsistent approach resulted in an emphasis on and a valuing of some form of individualization but not necessarily the whole IPM sequence.

4. *The historical patterns that emerge in the Phase II sample suggest a decline in implementation energy, availability and use of outside resources, and adherence to basic IGE concepts.*

There are data of record as well as the perceptions of school people which indicate that the several originating agencies and the networks at various levels provided a good deal of impetus for IGE implementation several years ago, developed training chains, organized resources for technical assistance and mutual support, and in other ways aided the implementation/maintenance processes. At the same time these resources have apparently declined either in actual existence or in importance, there has been some evidence of a decline in IGE bootstrap attitudes, in acceptance of the more demanding IGE concepts and components, in staff development related to IGE, and in affiliation with active networks--at least so far as this sample is concerned. If there is a demonstrable relationship here, it is not a surprising one since most IGE schools report a need for contact with and support from a larger IGE context of some sort.

This conclusion is drawn from the total sample and the apparent overall patterns. But within the sample, there are strong IGE schools with a high degree of independence and self-sufficiency; schools which continue to attempt improvement with whatever resources are available; and schools which value IGE for what it has accomplished and saved and generated. There are also schools where adherence to the IPM is clearly evident and where cooperative planning at IIC and Unit levels is effective.

5. Certain predictable factors appear related to overall IGE status and success.

Direct and indirect findings in Phase II reinforce "common knowledge" about the sorts of historical factors which relate to later healthy or declining IGE status. Particular facets of a well planned installation period (such as staff commitment, curricular objectives, parent approval) appear to augur well for later strong IGE status or at least a smooth operation. On the other end, schools recognized that unilateral decisions to go IGE or insufficient training at the outset appears to relate to later decline or stagnation of the IGE effort. Thus, a number of specific turning points were stated by school personnel themselves and seem closely related to present (1977-78) judged status of IGE implementation at least in the broad sense.

6. Useful data on "new information" topics can be obtained via refinement of data-collection methods.

Regardless of the specificity of the topical outline and Team Visit Report Form, the conditions of a brief field visit did not always permit obtaining the full extent of data that might be needed for some research purposes. Exploration of these areas would be enhanced--depending on research needs--by surveys specific to certain topics and/or by clearcut case studies of a longitudinal nature.

7. Some form of annual assessment of IGE status, operations, and commitment is important not only for research and accounting purposes but also as a means of enhancing new and refined implementations.

In view of a number of observations based on Phase II as well as general awareness of IGE, an annual monitoring or accounting activity is seen as a near necessity in order to keep the movement alive and healthy. Such an activity

should be national in scope and should be approached cross-sectionally as well as longitudinally in order to accomplish several related purposes and to make use of a broad spectrum of resources.

8. The multiunit organization of IGE schools is fluid and affects operations as well as the description and evaluation of those operations.

Historically, it appears that IGE concepts, implementation plans, descriptions, and evaluation efforts have defined or assumed the school as the locus of operation and the focus of study. The model's paradigm supports this interpretation with its reference to the IIC and several Units equal in their makeup and their relation to the IIC. And while departures from this model are no doubt expected, perhaps encouraged, Phase II findings suggest that implementation is so varied as to affect the kinds of data obtained in Phases I and II and the interpretation of some of those data. The variations occur with regard to subjects, schedules, multiaging, grouping strategies, planning, grades, use of the IPM in part or full, or any combination of these.

9. Implementation variables lead to a question of what IGE is and means.

Among many school people as well as Phase II visitors, a question often arose--What *is* IGE?--and this appears to be a legitimate question. In a sense, IGE is whatever occurs under its name, but this is often quite different from the models disseminated by the originating agencies. So far as the Phase II sample is concerned, IGE is more recognizable as a form of the multiunit organization along with facilitative environments than as an implementation of the instructional programming model.

However, what may be described as IGE (or partial IGE) schools do appear to have something in common. This is an effort to accommodate individual students, to engage in some form of individualized instruction. In pursuit of individualization or personalization, these schools as a group have broken the lockstep of strictly graded self-contained classrooms and single-teacher instruction, although this is sometimes evident in only a portion of the school or in the work of a few dedicated teachers or for one hour a day four days a week. In the Phase II sample, a certain movement can be seen from the old to the new, and frequently IGE has been adopted or adapted or borrowed from in an effort to find operational ways of implementing "new" ideas related to the individualization of instruction.

10. The full IGE model may never be attained and may not be attainable. But some moderate level of implementation may be sufficient to describe IGE and to accomplish its objectives.

It is quite apparent that all the IGE components and outcomes can be and have been implemented--but not necessarily in the coherent integrated fashion that was intended. At the same time, many schools have moved beyond the traditional mode, adopting certain important IGE practices and effecting a degree of individualized or individually guided instruction. At this juncture, it may be useful to consider what IGE is and does in a normative way and to redefine IGE in terms of what is most attainable and still comes closest to the "ideal."

It is conventional wisdom that a certain amount of "overreach" is either necessary or desirable when institutions attempt to make broad meaningful changes. Many IGE schools appear to have aimed high and fallen somewhat short, settling into a locally feasible adaptation of IGE that may be less than the ideal but at the same time is more than the traditional. Other schools have edged slowly up to that same level. In either case, the basic IGE concepts are not necessarily lost or devalued. They are redefined. And the difficulties involved in either sort of attempt can be--and often are--viewed as valuable as well as necessary. They help schools to decide on the minimal elements that represent their goals; to alter the model's goals and components to fit with reality; to choose their priorities within their resources; to accomplish some level of individualization.

CHAPTER 7

Phase III: THE FIELD STUDY OF SIX IGE SCHOOLS

*Thomas S. Popkewitz, B. Robert Tabachnick and Gary G. Wehlage**

What values and meanings are transmitted by reform programs in schools? This report, drawn from a more detailed discussion of the use of Individually Guided Education (IGE) in six schools reported to be exemplary IGE schools (Popkewitz, Tabachnick, & Wehlage, 1982), addresses this question in a manner which reveals more than the conclusions of a single research effort. This summary chapter considers the development and implementation of IGE in a network of social and political relationships involving students, teachers and their aides, parents and other community members, school and district administrators, and the IGE designers. Its conclusions, rather than simply evaluating the match between intention and outcome, create a less conventional focus for the study of what is intended and unintended, for what was expected to change and what was changed.

As a systems approach to the reform of schooling, IGE was intended as a comprehensive program coordinating research and development, teacher training, curriculum materials, school administration and district practices, and home-school relationships, as well as student and teacher behaviors. IGE's designers believe that by applying the principles of educational psychology through a systems approach the objectives, variables, and interrelationships of an educational environment can be known and can be structured to yield efficient learning. The procedures of IGE are assumed to be universally applicable to any and all school settings and are believed to be a neutral, nonideological technology capable of reforming all elementary schooling.

The IGE program embodies at least two attitudes found in the currents of American educational thinking. One of these is the belief that individualism is important and that the development of individual talents and interests is a significant goal of education. The individualization of instruction can be seen as a contemporary response to the perception that

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*The authors appreciate the editorial work of Paula M. Bozoian which made this chapter possible.

schools have failed in their responsibilities to the individual. The second attitude involves the assumption that important social problems, such as the education of youth, are most effectively attacked through the power of scientific expertise.

IGE is unusually attractive to many school people because it links the appeal of individualism with the harmony and efficiency of scientific management. Systems management, behavioral objectives, and criterion-referenced measures are backed up by research on individual cognitive differences and needs. The unitized school and the Instructional Programming Model combine systematically to provide for students who learn at different rates and in different ways; by offering varied groups and materials as different routes to specified objectives, this system appears to be responsive to different learning styles. Giving teachers the decision over which individual objectives children should achieve is intended as a response to the cultural, social, and personal differences that children bring to school, as well as to the different interests and expertise among teachers. Individualism and scientific management blend to bring coherence to the social purposes of schooling.

As instituted in the elementary school, however, Individually Guided Education's reforms extend beyond the systems analyses and management procedures of its program. Implicit in Individually Guided Education are values and assumptions about social change and control which remain tacit, even as concrete proposals to intervene in the social world are developed. To understand Individually Guided Education, these tacit assumptions and values, which define the reform and make it feasible, must be systematically investigated, and the relationship of the reform technologies to the ongoing norms, beliefs, and values of schooling must be made explicit.

Our intent in this study, then, was to make problematic the assumptions and procedures of Individually Guided Education: to describe the implicit as well as the explicit learning which occurs when students, administrators, and teachers respond to an educational reform, and to examine how the technologies of IGE are incorporated into the continuing social and political context of schooling, and thereby receive meaning. Our investigation provides a framework in which more general theoretical questions about the assumptions, implications, and consequences of institutional life and change can be raised. We will discuss school interactions, work patterns, and the relationships between schools and their communities to illuminate the rules, social values, and interests that influence different school practices.

Our intent is not only to describe the perceptions and actions of people in schools, however; we are also concerned with the underlying assumptions and social values implicit in school practices, and how they affect the realization of reform technologies. The everyday activities of schooling and its reform are placed within contexts of larger social, intellectual, and ideological concerns.

This summary proceeds in the following manner: after a brief consideration of methodology, discussion turns to the problems of reform in an institutional context and to consideration of Individually Guided Education as social invention; next, the three conditions of schooling--technical, constructive, and illusory--are introduced and described; finally, these three institutional configurations are related to the ways educational reform is conceptualized, researched, and implemented and the assumptions about the nature of school change as a neutral and technical endeavor are examined.

This investigation of Individually Guided Education, reform, and institutional life was designed to complement the more conventional evaluation of the other phases of the evaluation effort. The approach taken was to study six elementary schools that had been nominated as exemplary IGE schools. Nominations were solicited from people reputed to be knowledgeable about IGE including Center staff who had worked with various schools to implement the program, individuals in state education agencies who had first-hand knowledge of IGE in their states, and individuals who had worked at implementing IGE at a variety of sites. Seventeen schools were visited for two days each by two people. Four of these schools were selected for the study. Two additional sites, not among the original 17, were added later.

This research effort was a four-year project. Our first concern was to place the IGE program in a general context of school reform and institutional life--to establish the program as a particular case of educational change and reform from which theoretical insights could be derived. We then sought to understand what the planners of IGE had written about the program; our intent was not to use the definitions and categories of the planners in our field research, but to understand how the program had emerged historically, and what assumptions and implications about educational practice underlay the thinking of its designers. To gain firsthand knowledge of how practitioners around the nation talked about and implemented Individually Guided Education, we initially

paid two-day visits to each of 17 schools which had been reported to be exemplary IGE schools. From these schools we selected five in which, in the second year, intensive case studies were carried out; a sixth school was added to the investigation in the course of the field work. Each school was visited for data collection on at least three separate occasions.

The last two years of the project involved analysis and writing. As our research progressed, we had encountered fundamental variations in the conditions and social implications in the six schools studied, as well as different institutional responses to the technologies of IGE; to describe these variations and their significance, we created three categories: technical, constructive, and illusory schooling. The categories are related to Wittgenstein's concept of family resemblances; the schools in each category have overall similarities and overlapping characteristics, but the categories should not be considered as qualitatively identified or determined.

Before discussing schools as institutions into which reform programs are introduced and the elements of institutional life, a comment on methodology is appropriate. Analyses of research often separate discussions of reform and institutional life from discussions of methodology, making the choice of investigative procedures seem a purely technical act. We believe, in contrast, that problems of methodology cannot be considered adequately without referring to the questions, theories, and intellectual traditions that make particular investigative strategies plausible. Data and descriptions of social conditions are not presented in a vacuum, but are inevitably tied to theory. A study of educational reform, therefore, involves the complex and profound relationships of reform, institutional life, and methodology.

INSTITUTIONAL LIFE AND THE FOCUS OF REFORM: A Theoretical Perspective to the Problem

Social institutions perform certain agreed-upon functions to achieve social goals. The mandate or function of schooling is to provide a formal social structure within which children are to prepare for adulthood. Schools define and legitimize categories of competence in society, provide publicly acceptable classifications of people and knowledge, and give access to valued positions in society. While it is important to

recognize that schooling is given legitimacy because it has a social mandate, that charter cannot be taken for granted. Most Americans accept the mandate on the grounds that schools should "prepare children for a democratic society," or that people should "be taught to think for themselves," but these slogans have many possible interpretations. Some may view the school mandate as a call for providing individuals with opportunities to develop their own intellectual capabilities, expressing a classic liberal faith in the individual's ability to contribute creatively and imaginatively to public life. Others may see schooling as preparation for entering a social world already classified and organized according to certain occupational and status lines (Popkewitz, 1981). Inherent in each interpretation are different social values and implications for school practices that are obscured by slogans about the social mandate.

The conflict between definitions of social purpose directs our attention to a second aspect of schooling--the actual values and beliefs sustained in day-to-day school life. Like all institutions, schools function according to rules and procedures which give coherence and meaning to everyday activities and interactions. Such rules and procedures are embodied in regularized patterns of behavior, specific vocabularies (a child in school is a "learner," his or her learning is "achievement," and so on), and particular roles (teacher, pupil, or administrator). So potent are institutional patterns that the social structure experienced in schools channels the thought and the action of participants, giving definition and meaning to both school reform and pedagogical practice (Popkewitz, 1979).

While making this argument, we do not wish to present an overly socialized, deterministic view of the individual. Institutional life can respond to and be shaped by the people who participate in it. However, we cannot pretend that contemporary forms of social life are not potentially coercive. Our definitions of social conditions and our expectations are created by past and present patterns of action and belief which limit the possibilities for change, or at least restrict the options for making modifications.

In considering the effects of IGE as a reform program, it is important to look beyond its language of individualized instruction, team teaching, and nongraded teaching units. The IGE model carries with it certain assumptions about the nature of knowledge, the most effective ways children can work to gain that knowledge, and the role of the professional staff in implementing the reform. IGE was conceived as a

systematic attempt to reform schools; it was also designed as a comprehensive program affecting both agencies external to the school and structures within the school. There is a pattern, therefore, of interrelated assumptions that give IGE form and content. Our understanding of institutional life, and of the effects of reform, may be clarified by considering these important dimensions of schooling--knowledge, work, and professionalism--and the relations among them.

Conceptions of Knowledge

Schools are places where conceptions of knowledge are distributed and maintained; implicit in this discourse are ways of reasoning and communicating about social relations, social conditions, and social authority. The authority of an institution to channel thought and to define human conditions has subtle implications for the way knowledge is conceptualized and hints at the underlying patterns of thought found in schooling. Carl Becker (1932) suggested that rooted in the everyday life of each age are certain preconceptions, beliefs, and/or value structures that give direction to social thought. The medieval assumption, for example, was that of existence as a cosmic drama, written by God, and embodying a central theme and rational plan.

Today, however, a number of assumptions compete for dominance. The laws of God, and of nature, have been challenged by existentialists, liberals, and Marxists. From such a plurality of ideas, problems of choice arise that are compounded by the institutionalization of education. Schools selectively impart cultural traditions and concepts of knowledge; and curriculum, instruction, and evaluation direct students toward specific uses of intelligence and a particular kind of reasoning about ideas and action. The concepts of knowledge that are distributed in schools, then, become problematic when we view curriculum, instruction, and evaluation as having social as well as intellectual content.

Schools as Places of Work

Schools are also places of work where students and teachers interact to alter and improve their world, establish social relations, and realize human purpose. The activities of students and teachers in schools collectively form a pattern of work (Popkewitz & Wehlage, 1977). However, school work should be considered in relation to human work in general. Work is fundamental human activity by which people establish, modify, and carry out their social purposes. An important

aspect of work is the relation of thought and imagination to the products of human labors (Braverman, 1974): work not only affects the form of the material on which a person works, but expresses, in the shape given to the material, the realization of purpose and will. While we can view work as expressing human intent, we must also recognize that the structure of human activity delimits the adaptability of the world we live in and the possibilities for altering cultural and social conditions.

Work involves a developing interplay of activities, beliefs, norms, and social relations that is particularly important in institutionally defined situations. From an institution's structures emerge historically conditioned ways of expressing intent, establishing social relations, and giving form to the social world and one's own humanity.

Because school work not only defines the possibilities of human creative activity but also provides opportunities for cultural development and social mobility, the institution's definitions of work are exceedingly important. The patterns of activities, social relations, and sentiments produced in schools must be clarified, so when the effects of reform are investigated we can question how reform technologies sustain, modify, or otherwise relate to these institutional patterns. The relationships between technologies of reform and other elements of institutional work should make the significance of intervention programs apparent.

Professionalism as a Social Category

Schools are staffed by an occupational group whose activities give legitimacy to patterns of work and conceptions of knowledge. Often that group uses the slogan "professional" to establish its status, privilege, and control. Certain occupational groups--professions--at work in schools have the authority and power to define pedagogical practices. The label "professional" is used by occupational groups to signify a highly trained, competent, specialized, and dedicated group that is effectively and efficiently serving the public trust. But the label "professional" is more than a declaration of public trust: it is a social category that imputes status and privilege to an occupational group. In teaching, the label signifies not only technical knowledge and service, but the power of a particular group to bestow social identity ("students") upon its clients.

Some have argued that the culture of professionalism may have consequences for the capacity of individuals to provide for themselves (Lasch, 1977). Individual ability and personal competence have been progressively diminished through schemes controlled, disseminated, and evaluated by particular occupational groups. To "educate" students for American life, school professionals have acquired mandates to teach children problem-solving, values clarification, sex education, health education, safety education, and much more. These subjects reflect a professional definition of what kind of "help" should be given to people growing up and entering society. Such education often poses a contradiction: while the purpose of schooling is the introduction of certain forms of social and personal autonomy, it also introduces a form of dependency; people learn to rely upon professionals to define and solve social problems. Psychologists give diagnoses and prescriptions for marital or family problems; urban sociologists issue guidelines for living together in cities; and educators define what knowledge, reasoning, and thought is taught to children in our society.

THE RESILIENCE OF INSTITUTIONAL ARRANGEMENTS

The complex social and political arrangements of work, knowledge, and professionalism are not easily altered, and when we examine the context into which educational reform is introduced the assumption that reforms will be faithfully implemented can be questioned. Faced with reform, institutions exhibit remarkable resilience; innovations are first incorporated into existing patterns of behavior and belief, then used to legitimize ongoing patterns of educational conduct, while being identified in slogans to suggest reform. In this study three patterns of schooling were found which we have labeled *technical, constructive*, and *illusory*.

Making Schools Efficient: Technical Schooling

Among the schools reported to have exemplary IGE programs, three--Maplewood, Belair, and Clayburn--share common institutional characteristics. Although the communities they serve display considerable socioeconomic diversity, the schools are quite similar in the configurations of work, knowledge, and professionalism they offer in their implementation of Individually Guided Education.

Geographically, these schools are widely separated: Clayburn is in the southeast, Maplewood is in the midwest, and Belair in the west. Clayburn is essentially rural, Maplewood is suburban, and Belair is in an urban area. One-third of Clayburn's student population is black, but minorities have only miniscule representation in the other schools. Clayburn is also the only school that serves more than a local neighborhood; some of its black students are bused across the county to achieve racial balance.

There are other differences among the three schools. Maplewood is solidly middle class, with few students from wealthy or poor families. On the other hand, nearly one-half of Clayburn's students qualify for federal educational assistance. Belair's students represent a range of family incomes, but of the schools we studied its neighborhood is the only one in which millionaires are reported to live. Information obtained from school personnel places Clayburn at the low end of the income scale and Belair at the top end, with Maplewood in the middle. It should be kept in mind, however, that Belair pulls students from the widest economic range, from welfare recipients to reported millionaires.

While there are demographic, as well as physical, differences among Belair, Clayburn, and Maplewood schools, we found them to be alike in their understanding and implementation of Individually Guided Education. In a survey designed to measure the extent to which IGE technology and principles are perceived as operational by a school staff (IGE Implementation Survey), teachers of all three schools saw themselves as implementors of a school "Unit" organization characterized by a flexible separation of children into multiaged groups, team planning of the curriculum, and teaching activities appropriate to a range of student interests and abilities. Teachers in these schools identified the Instructional Programming Model as a second key feature of IGE: they perceived themselves as formulating objectives for students, establishing record-keeping procedures to monitor achievement, and providing a set of instructional activities to guide students of differing abilities toward the achievement of individual objectives.

An important part of teaching in these IGE schools is to sequence the work students do so that teachers can manage pupil activities and monitor their achievements. These management procedures are often justified in reference to broader, more abstract educational purposes, such as enhancing achievement, learning better, or developing conceptual thought. At

Maplewood, Clayburn, and Belair, however, management techniques have become the *ends* of school activity rather than a *means* of instruction, and technology provides an independent value system that gives definition to curriculum, classroom activity, and professional responsibility. While these three "technical" schools differ in some of the formal ways through which they organize instruction and in their physical arrangements, all three incorporate IGE technologies into everyday activities and make technique into a value.

The effect of viewing technologies as the ends of schooling was to alter the social relations by defining the content and the nature of the school work in such a way that individual control over ideas or work was denied. As IGE was originally designed, the language of technology was planned as a tool, an aid to the teacher's and student's assessment of progress. The designers viewed the language of systems as coexisting with a language of ideas. In practice at the technical schools, this coexistence has never developed, and the language of procedures has become legitimized as the substance of the curriculum itself.

Professionals searched for the most efficient ways to process people. For example, a teacher at Belair spent a major part of his time planning improvements in record-keeping procedures for children's mathematics levels. The emphasis on processing people resulted in an unusual definition of responsibility. For teachers, responsibility did not mean considering what was appropriate to teach and how to best teach it; rather, responsibility meant structuring objectives, keeping proper records, and insuring an orderly movement of children. In these schools, the unit planning time and decision-making process of Individually Guided Education came to be used in a way that denigrated the knowledge and work associated with teaching. For children, responsibility meant learning and obeying the rules of the classroom, listening to authority, and striving to master predetermined objectives. Responsibility was operationally defined as accepting dependence upon others for ordering activities and thinking about intellectual problems, rather than taking charge of these issues in any manner. The criteria of teachers' and principals' success in all three schools seemed to be related to the degree of planned control that could be exercised over children's progress.

"Excellence" was generally achieved by looking busy (process), or by producing in quantity (outcomes). These criteria often applied to both teachers and students. The definition of a better teacher in one school, for example, was

one who spent more time before and after class preparing lessons and keeping good records, and who kept children looking busy. For children the ability to look industrious was important, and achievement was often judged on the basis of hard and continuous work rather than on the quality of the results.

In the technical schools, knowledge was standardized. All ideas and skills to be learned were presented in a discrete and sequenced form. Ordering knowledge in this way enabled teachers to devote full attention to the procedures of implementation. The standardization of ideas was demanded by the process of social control. This standardization of knowledge reduced the curriculum to learning that could be measured. The teachers at the technical schools have interpreted individualized education as a systematic way of responding to children's lack of specific information or skill. No curriculum or instruction is considered appropriate unless precise, measurable objectives are stated. Instruction can then follow the test-teach-test routine.

The emphasis on preplanning and measurement eliminated from consideration the serendipitous, accidental, or problematic process of instruction. Many valuable learning experiences arise from children's interactions with materials, people, and events. If a child enjoys the alliteration in a poem, a teacher can capitalize on that interest when planning future activities. Similarly, a lesson on figuring change may raise questions about currencies in other countries and how they differ from ours. Such opportunities for learning were observed in the technical schools' classrooms, but the emphasis on technical mastery limited classroom exchanges to short, utilitarian interactions serving immediate goals. Serendipitous learning was improbable in the technical schools.

Breaking learning down into a sequence of objectives to be mastered created a division between the conception and execution of work. Each element was defined for the learner in isolation, distinct from the logic which might guide or tie activities together. The consequence of this separation was that teachers and students lost control over their work.

Nevertheless, data gathered at Maplewood, Belair, and Clayburn indicate that the daily routines and instructional practices of these schools *do* have a coherence, a coherence provided by five educational slogans which teachers identify with their support of Individually Guided Education. The slogans are *individualization, continuous progress, meeting children's needs, positive self-image*, and *accountability*.

These words provide the public language through which teachers and administrators discuss school conduct, justify program planning, and give coherence to the reform program itself. The words in effect hold the promise that the quality of schooling will improve. They establish a mood with which both parents and professionals can feel comfortable and with which they can affiliate particular pedagogical practices. Teachers perceive that the social and cultural life of the community gives them a mandate to focus on basic skills and social discipline. Professional ideologies supply a technical definition of educational problems. Together, these influences give credibility and legitimacy to the programs in the technical schools.

Professional ideologies in school district administrations and in other educational agencies defined the task of schooling in terms of management and efficiency and provided still another source of credibility and support for the technical schools. In school district administrations, the internal management procedures and emphasis on efficiency in these schools were seen as an extension of district programs to develop consistency and standardization. Districtwide objectives, criterion-referenced measures, a single reading textbook series, and curriculum management systems had all been introduced in at least one of the districts. The superintendent in another district viewed the development of a standardized and consistent program in all district schools as essential to good school administration. At the district office of the county in which Clayburn is located, school management appeared to be important as well. The curriculum coordinator said that the district was beginning to develop a comprehensive management scheme which would include many of the instructional procedures at Clayburn, and that management systems of instruction were being introduced districtwide through an adaptation of the reading textbook.

Professional agencies outside the Clayburn school district also gave credibility to the school's program. The state department of instruction regularly used criterion-referenced tests to determine the level of achievement in schools throughout the state. In practice, this state policy gave legitimacy to instructional practices which aimed to improve test scores--like those found at Clayburn. At Maplewood and Belair, standardizing curriculum and rationalizing instruction were also given credence by agencies outside of the schools. The superintendent in Maplewood's district considered the school as a model for other schools to emulate, and Maplewood's principal and staff gave workshops and talks to other district personnel. The state education agency supported the school's

computerized record-keeping program. At Belair the principal received strong support from the superintendent's office, and also had backing--including a grant--from state officials.

It must be pointed out, however, that the technical emphasis given to conceptions of knowledge and to work at Clayburn, Maplewood, and Belair obscured underlying social and political issues embedded in the process of schooling. By focusing attention on problems of management and of efficiency, the existing priorities, values, and patterns of social control remained unscrutinized. While the three schools responded to and were sustained by institutional, demographic, and cultural facets of their communities, the emphasis on technology appeared to separate education from other community affairs. School staffs operated as though there was a broad consensus about the goals of instruction, and teachers appeared to believe that the school mandate was unambiguous. Far from being a technical matter, however, the choices that have to be made in education involve substantive issues about social life and its interpretation, and they require debate.

The combination of social factors that makes technical school practices legitimate is a historical question which cannot be addressed here. It is crucial, though, to consider our contention that the technical definition of the school mandate actually serves the interests of neither the community nor the teachers. The dissociation and fragmentation of knowledge and work in these schools produce a definition of professionalism that limits the creative and purposeful quality of teaching. Students are offered a mode of thought that cannot penetrate the complex patterns of communication dominant in contemporary society. Schooling is thus robbed of its imaginative and liberating potential. The emphasis on only the most limited skill acquisition legitimates a style of work which is fragmented, isolated, and unrelated to truly purposeful activity. This style of school work and reasoning, if internalized, imposes occupational limitations upon the students: rather than offering options for adult life, this schooling legitimates the specific demands and expectations of the social and cultural majority of the community. It provides no means for considering new possibilities beyond those suggested by circumstances of birth and community location. It also helps to perpetuate a belief that success in late life is directly proportional to success in basic skills.

Exploring Ways of Knowing: Constructive Schooling

Kennedy School is located in a university town on the edge of the foothills of a major mountain range. For years the community remained modest in size, and the university and agriculture were the mainstays of the town. Recently, however, corporate industry has discovered the area and the population has expanded dramatically. Much of the new industry uses advanced technology. In addition to the lure of jobs, a pleasant climate and recreational opportunities make the setting attractive. On several occasions people in the school system commented to us that new families were moving into the community because of its attractiveness even though the parents had not yet found employment. The conventional wisdom is that population and business growth will continue unabated in the foreseeable future. One new school opened in 1979, and the school district has been hiring a substantial number of new teachers.

When we first visited Kennedy Elementary School we had already spent considerable time in those schools we have characterized as technical, and our experience had led us not to expect any major variations in the way IGE was interpreted and implemented. It was with some surprise that we confronted a totally different set of institutional assumptions and behaviors at Kennedy. The term *constructive* eventually emerged to summarize the patterns of work, conceptions of knowledge, and professional definitions that gave meaning and interpretation to this school situation.

Constructive schooling, rather than emphasizing state of knowledge, pays attention to the ways knowledge is created. In the curriculum, relational ideas and the exploration of general principles and concepts are stressed, and skills are developed within that context. For analytical purposes we can separate the kind of work and knowledge that occupied students from that which occupied teachers, but in actuality they are inseparable.

The commitment at Kennedy was to make the school "a kid's place," and this commitment rested in part on the belief that different kinds of activities and experiences contribute to children's intellectual and social development. The resulting curriculum design provided a broad range of ways of knowing and learning. Kennedy students were continually offered experiences that included art, music, poetry, drama, logic, literature, science, history, and even controversial issues.

The variety of classroom work and knowledge at Kennedy shared three characteristics. First, the problematic aspects of knowledge were emphasized. Second, aesthetic forms of knowledge, in which poetry, drama, music, and art are used to produce and express understanding, were incorporated into school work. Third, frequent efforts were made to integrate different kinds of knowledge and skills. While from time to time we found examples of problematic, aesthetic, and integrative work at the other schools we studied, the persistence and pervasiveness of these characteristics was definitive of the curriculum at Kennedy.

Within the set of beliefs, priorities, and patterns of conduct established at Kennedy, Individually Guided Education was given a special meaning. While teachers appeared to have adopted the main elements of the reform program, the technologies were used in ways that responded to the definitions and special requirements of the school. The organizational structures of IGE, such as the Units, provided forums in which teachers could carry out their programs. Some form of the Instructional Programming Model was used in a few subject areas, but not to guide instruction. IGE's record-keeping procedures provided evidence that the school district's minimum objectives were being respected by the staff.

The interest at Kennedy in promoting student initiative and autonomy has its corollary in the work of teaching itself: teachers viewed themselves as having the responsibility to decide what knowledge was to be introduced into classrooms, how it was to be introduced, and when. The value placed on autonomy did, however, involve the constructive school teachers in a professional conflict with the district administration and its policy of "consistency" in the curriculum. This policy entailed the specification of common behavioral objectives that all teachers were to follow in developing the basic curriculum for the several grade levels and the requirement that all schools use the same reading program to ensure that students who transferred from one school to another experienced little discontinuity in reading. The idea of a highly specified curriculum was offensive to the staff because they believed it was their right as professionals to make expert decisions about what educational experiences were appropriate for their students.

Also important in understanding constructive schooling is the relationship of Kennedy school to its community. It is clear that the style of life and orientation of the community influenced specific patterns of instruction: parents supported

the instructional emphasis on multiple forms of knowledge and their children's active participation in learning; teachers often took the backgrounds of their students into account when planning programs; children related their own experiences to the programs and, in some instances, took the initiative in determining programs.

The intellectual and social points of view found in the school are those of that substratum of the middle class represented in the professional occupations. The emphasis on interpersonal control characteristic of this substratum encourages facility with language and responsiveness to the subtle nuances of interpersonal situations. These abilities, necessary to enter the professions, are reflected in the flexible roles and ideas found in Kennedy school: knowledge and work are the property of the individual and enable him or her to establish control in interpersonal relations and to maintain skepticism toward ideas.

With knowledge and work defined as the property of the individual, the pedagogic emphasis is upon children's exhibiting the attitudes and emotions appropriate to learning. Participation and involvement are the criteria of performance and achievement, and children's activities are monitored to assess the underlying attitudes and emotions that give purpose to their intellectual and social activities. At Kennedy, all aspects of intellectual and social life were treated as part of the public concern of teaching. Reducing the private space in institutional settings like schools can make it harder for an individual to withdraw, even momentarily, and can make norms and expectations more coercive. In addition, the language of constructivism--abstract, complex in construction, and self-reflective--while it legitimates the skills and sensibilities of intellectuals, denigrates the creativity, imagination, and craftsmanship entailed in some physical work.

The relationship of Individually Guided Education to the conditions of constructive schooling can be described as follows. The aspects of the IGE program used at Kennedy were those which sustained the knowledge, work, and professionalism of constructive schooling. The Unit and team-teaching technologies were employed as devices through which teachers could express school and classroom priorities, and as a response to outside pressure for consistency. The Instructional Programming Model was an integral part of the program, but it existed as a symbol of change and effectiveness in the school. Its systems of record-keeping and testing were not

basic to teachers' thinking and planning. Records were used to prove to others that skill development was given explicit attention. The priorities, beliefs, and norms of Kennedy demanded a flexibility and ambiguity of ideas and work that made those aspects of the Instructional Programming Model appear subsidiary and of minor importance.

The concrete ways in which the interests and orientations of the community and school district were mediated in Kennedy School is one of the major concerns that emerges in our analysis. While in the technical schools it was evident that the relationship of pedagogy to external factors was significant, the relationship was suppressed, to some extent, by the emphasis on the procedural aspects of school life. The language and procedures of technical schooling made pedagogical activities seem efficient, objective, and neutral in application. In Kennedy what we see is the confluence of contradictory forces which attempt to define and shape the school. The definition of schooling advocated by the central administration and the technologies of IGE were adapted in relation to the expectations and demands posited by the specific community in which Kennedy is located.

Form as Substance: Illusory Schooling

In analyzing the institutional meanings of Charles Evans and Pierce elementary schools, we discovered a series of anomalies, discontinuities, and contradictions. Much of the action of these schools created an image of rational, controlled, and productive enterprise, and their practices appeared to be governed by a wish to create a positive image: what professionals and parents want and hope for is actually happening. While in a few instances the image represented reality and could be substantiated by observation, in many other instances the image was void.

Work and social interaction at Charles Evans and Pierce presented fundamental contradictions. There were facts and subjects to be taught, but the rituals and ceremonies of the formal curriculum were unrelated to this content and therefore could not produce success for most pupils. The social processes of the daily activities, however, did have substantive meaning. Teachers perceived the failure to learn as a result of conditions in the children's lives (broken homes, indifference to academic values, lack of educational readiness) which were believed to make achievement impossible for all but a lucky few. The shortcomings of the schools were attributed to the inadequacies of the poor and minority communities in which the schools were situated.

The label *illusory* applies to both the images and the details of life in these schools--the false impressions created by the everyday patterns of activity, and the substantive values represented by these patterns of schooling. The emphasis on community pathology, pedagogy as therapy, and ritual gives these schools meaning different from those of the technical and constructive schools.

How then, did teachers in the Pierce and Charles Evans schools see the problem of teaching? What conceptions of knowledge and of learners did they bring to the practices of schooling? How did they define the mandate of schooling? In the technical schools the prevailing belief seemed to be that teaching involves uncovering student deficiencies in skills and implementing an instructional system to correct those deficiencies; the language of individualization, children's needs, and continuous progress expressed these beliefs. In the illusory schools, teachers were pessimistic, not sure they could overcome children's learning deficiencies; no technical or professional skill could make up for such "social defects" as uncaring homes and cultural indifference to academic values. The ideology of professional practice that emerges in the illusory schools is one of social pathology--a belief in the cultural inadequacy of the children who attend these schools. The knowledge and work transmitted in these schools is related to this view of social pathology.

Professionals in both Pierce and Charles Evans schools made frequent references to the unstable and unsupportive home lives of their pupils. Both schools are situated in communities regarded as "difficult" by their staffs: Pierce enrolls mainly pupils from white, low-income families, a number of whom receive welfare assistance; Charles Evans enrolls children of low-income black families whose economic position is even less secure. With a few exceptions, teachers in the two schools generally believed that achievement at a "normal" rate was possible for only a few of their students. To teachers and principals alike, these communities were characterized by poverty, broken homes, and an underclass culture that is indifferent or hostile to academic values and that creates social conditions that prevent pupils from learning. Whether or not these perceived conditions are realities, the professionals in the schools believe they are.

By accepting the idea that community conditions can influence schooling, teachers also affirm the view that those outside conditions can hinder children's work in school. As a result, there is an emphasis on professional competence in the

face of what seem to be overwhelming odds. The possibility of success exists only if children in school can overcome the debilitating elements of their home lives. On the other hand, when students fail to achieve, their failure can be attributed to community pathology or a lack of individual motivation. Student failure is not seen as the result of the structural qualities and norms of schooling itself.

A glance at the daily activities of Charles Evans and Pierce schools reveals what on would expect to find in any American school: there are established times for teaching language arts, social studies, reading, and mathematics, and children go to the gymnasium for physical education and have art and music classes. The curriculum at the two schools is given a particular nonconventional form through the technologies of Individually Guided Education. Units, small groups of children, and talk of instructional planning pervade the patterns of school conduct.

Looking more closely at the actions and behaviors in the schools, discrepancies and discontinuities emerge. Rather than engaging in any elaborate grouping or testing practices to determine instructional needs, instruction follows the sequences outlined in whatever teachers' manuals or textbooks are being used. As one probes further, this textbook instruction takes on a ceremonious quality.

The discrepancies and discontinuities between the form and the substance of schooling in Charles Evans and Pierce schools appear in the response of these schools to the IGE reform program. In both schools, reform is symbolized in a language that refers to "flexibility," "individualization," "grouping and regrouping," and "testing," and bulletin boards at their entrances announce that these are IGE schools. Yet when we tried to observe the regrouping of children, the implementation of a "systems" approach to curriculum, or the use of evaluation procedures, we were unable to find clear evidence that these schools were doing what they said they were doing.

Although optimism about the school mandate pervaded technical and constructive schooling, the staffs at the illusory schools were pessimistic about conventional goals of instruction. The day-to-day activities in the illusory schools gave priority to teaching what was considered the necessary behaviors, self-control, and attitudes, rather than formal schoolwork. It was the social messages in the instructional processes that gave definition to the concept of work and knowledge.

The emphasis in the illusory schools on rules to be obeyed should be considered more closely. To establish a rule is also to express a tacit message about what values should underlie the structure of control. The rules of illusory schooling are not what we might associate with the conventional "management skills" or discipline children should learn in order to master formal schoolwork. In the technical and constructive schools, teachers expected everyone to know how to act to accomplish their work, even though they might need reminders. In the illusory schools, teachers believed that children did not know how to act and that the first task of schooling was to establish the behavior necessary for schooling. The social process of instruction in the illusory schools emphasized values related to the children's character formation, such as cooperation, hard work, respect for property, and the delay of gratification. Teachers perceive these behavioral and attitudinal characteristics as lacking in the children's home environment. At Pierce school, teachers and a guidance counselor developed a motivation program to help children learn to get along with each other.

A distinction, then, exists between curriculum as the formal subject matter of schooling and the "curriculum" of social processes at Pierce and Charles Evans schools. The formal curriculum at these schools is a ritual involving little follow-through or substantive work. The social processes of instruction, however, do yield values and meaning: the acquiescence to external authority, respect for property, delayed gratification, and hard work required of a moral person are emphasized. Often the image of the school as an institution conveying moral values is juxtaposed to the community and the children's homes to indicate the benevolence of institutional arrangements and the inadequacies of the home environment.

Like the actions and behaviors within these schools, their relations to parents and school districts were also subtle and contradictory. While our data collection procedures focused upon the schools and limited our researchers' involvement with external agencies, certain district and state policies and practices emerged and were identified as factors that influenced and legitimated the illusory quality of schooling. Many activities undertaken by the school staffs were viewed as public relations efforts in response to pressures for change and increased efficiency; their purpose was to convince parents that the schooling was efficient and benevolent.

The home-school-community relations component of the IGE model is intended to increase parent participation in and understanding of the school's program. In the illusory schools, however, home-school-community activities had a more specific meaning: parents' interactions with professionals functioned both to legitimate school practices and to separate professionals in the school from parents in the community.

In brief, the policies and practices of the schools, school districts, and states appear to accept criteria of program development and evaluation that legitimate the conditions of schooling found in Pierce and Charles Evans. Procedural questions and surface characteristics are used to project institutional competence and benevolence. Public relations efforts serve to establish the superiority of school morality and behavior. While the evidence suggests that practices and policies external to the schools act to legitimate illusory schooling, we realize that these relationships need to be treated more systematically than our data permit.

The role of public relations in school legitimacy was illustrated by the ceremonial uses of IGE at Pierce and Charles Evans. Professionals viewed the technologies of IGE as part of the way the schools expressed their relations to their communities. District administrators and school principals talked about the pressures placed on the school by the public--pressure to improve reading and mathematics achievement scores and to create rational, efficient organizations. In response to these demands, IGE technologies provided parents with information such as objectives and test scores that enabled them to feel that they knew what was going on in the schools.

The illusory schools are confronted with a social predicament which the staffs do not perceive to be of their own making. The conventional mental learning of skills and knowledge is thought to be unattainable for most students. Children are seen as deficient because of the debilitating effects of home life and community. Teachers view the children who come to the schools as poorly equipped with the sensibilities, manners, and awarenesses appropriate for learning. Patterns of school work are concerned with learning how to act; the operative conceptions of school work and knowledge emphasize the development of obedience and acquiescence to institutionalized social authority, and acceptance of certain aspects of middle class culture.

The nature of illusory schooling is illuminated through its discrepancies and contradictions. The organization of instruction and the routines of school work and teaching are often without content. The language of "meeting children's needs," of individualization, and of grouping is circular, and it becomes questionable when referred to concrete actions. The routines and language forms at Pierce and Charles Evans schools, however, help to project an image of schooling as rational, productive, and competent.

In all the schools there are discrepancies between what the schools hope to do, what they think they are doing, and what they actually do. The type and extent of these discrepancies at Pierce and Charles Evans lead us to distinguish between technical and constructive schooling, on the one hand, and illusory schooling on the other. In technical and constructive schooling, the formal categories of the subject matter play a significant role in the organization of school work and knowledge. The integration of content and personalization of knowledge give a particular meaning to constructive schooling. The fragmentary and hierarchical organization of knowledge, together with precisely specified forms and types of work, provide meaning for technical schooling. In illusory schooling, in contrast, the subject-matter objectives that children recite, the emphasis in teachers' conversations, and the norms of classroom discourse create a definition of knowledge and work only tangentially related to any formal curriculum. The messages of the instructional processes in illusory schooling contain different meanings. They give reference to community pathology and docile student behavior. The formal curriculum content in these schools seemed secondary to the institutional purpose of developing a controlled and morally correct student population. Yet, one must view the ritual of participating in school work as having possible substantive values. The rituals define the formal categories of school knowledge as important in society and for individual success and achievement. The lack of follow-through in teaching the content and skills of the subject matter produces failure which is to be viewed as personal. It is defined as personal by the ceremonies which make it seem that all are being taught in a competent institutional setting.

CONCLUSION

The aim of Individually Guided Education is to provide a set of organizational and curricular procedures that if followed could be used in any community or social context. IGE assumes psychological differences among students; the central

technologies of the reform program circumscribe the variety of responses that these psychological differences require of teachers. Underlying the reform technologies and the emphasis on individual variation are the assumptions that the reform will make schooling meritocratic, and that each student will progress according to his or her ability regardless of the social conditions from which the child comes. The belief that schooling can be a rational, efficient, and objective response to individual differences is not unique to IGE; it is drawn from broader educational thought about school accountability, curriculum as management, and systems perspectives on school organization (Kliebard, 1979). The unique quality of the IGE reform program is that it offers a comprehensive organizational, political, and curricular system that appears to respond to demands for a true meritocracy.

We find, however, that Individually Guided Education neither creates a universal condition of schooling nor frees schooling from the constraints of different social conditions. Our data uncover configurations of schooling that respond as much to community and professional interests as they do to students' differing capabilities. In each of the three kinds of schooling we have identified, the use of IGE technologies is shaped by distinct assumptions about teaching, learning, and schooling. The ways in which a school reform effort is shaped by different social contexts and predicaments is the focus of this final section.

The influence of professional ideology on the meaning of the daily activities of schooling is apparent when we compare technical, constructive, and illusory schooling. Despite the fact that IGE implementation literature includes extensive descriptions of the program's goals and technologies, teachers and pupils in the six schools translated the slogan "Individualization" in a way that responded to certain beliefs they already held about children and learning. In the technical schools, children were considered deficient with respect to a body of predefined knowledge and skills. The underlying psychology of learning was behavioristic, and knowledge was held to exist outside the minds of individuals. Individualization, in technical schooling, was a matter of pacing children through specific levels of information and skills. In the constructive school, knowledge was considered to be personal; individualization involved the child in a communicative process that would enable him or her to exercise control in interpersonal situations. In the illusory schools, since the children's backgrounds were seen as pathological, the individualized instruction was therapeutic: appropriate social values and behaviors could be sought and acquired, together with

those minimal academic skills that students were able to acquire, given the social constraints under which they were thought to live.

Those different professional ideologies defined the appropriate means by which children were to engage in social relations, comprehend the world, and improve their social and cultural conditions. The technical schools' emphasis on procedures and efficiency, for example, standardized knowledge and separated the conception of work from its execution; this in turn produced fragmented and oversimplified tasks that removed from the activities of schooling the possibility of creating a self-organized, self-motivated, and self-renewing community. In contrast, the emphasis in the constructive school on developing facility with language and responsiveness to the subtle variations of social situations offered practice in controlling interpersonal relations. This emphasis in communication skills, however, devalued knowledge related to certain kinds of physical labor. And finally, the ideology of pathology which permeated illusory schooling promoted the establishment of a moral basis for the socialization of children, in which schooling assumed a missionary quality.

As significant as the differences between professional ideologies might be, a second important factor in definition of schooling was the relationship between ideology and the professionals' perception of the immediate community served by the school. In each of the schools studied, professional ideology was related, in part, to a definition of the kind of student being taught, and each of the three forms of schooling offered different perceptions of students. The sense of what professionals could (and should) accomplish was shaped both by abstract beliefs about children and schooling and by a set of obligations and limitations arising from the professionals' perceptions of their clientele. Professional definitions and descriptions of student populations entailed claims about the children's "needs," and meeting these "needs" was said to be the overall obligation of the school. However, the social characteristics of the children's community were treated by teachers as psychological traits inherent in the individuals that constrained the possibilities of schooling.

That professionals perceive students as carrying different social characteristics is probably inevitable and not necessarily undesirable. Differences do exist among students, and certainly some differences are a result of the fact that children spend a substantial part of their time among people and in settings outside the school. Relations with

families and friends and activities in the neighborhood can be thought of as sources of educational experiences; however, these experiences may or may not enhance the characteristics of the "good pupil" envisioned by the professionals. The problem with the vision, however, is that a school staff defines its mandate in relation to that ideal, often ignoring the actual linguistic competencies, cognition, and reasoning patterns of the children who come to the school.

Those who would introduce educational reform measures, then, must recognize that their intentions, goals, and technologies are profoundly subject to the specific dynamics affecting a particular institution. Reformers should expect that their programs will be interpreted, modified, and used in accordance with the professional ideologies which are asserted through institutions, as well as in response to conditions outside of institutions. The relationships among professional ideologies, communities, and classrooms are neither simple nor direct. They are mediated by signals and pressures exerted by parents, communities, and occupational groups outside the school, as well as by the interactions within the school.

In considering the different pressures that interact to produce particular kinds of schooling, we must also recognize that schooling gives form to certain social and community interests, and that it is not at all a neutral endeavor. The six schools in this study are distinguished by different styles of thought and action that are passed on to the children as ways of maintaining relationship with the world; each of the institutional conditions identified offered different visions of society, rules for individuals establishing relationships with the social world, and principles of legitimacy by which to judge the adequacy of these social relations.

The relationships that we have found among social, cultural, occupational, and pedagogical practices suggest that the problem of reform in institutional life needs to be recast. The R → D → D model of change has a center-to-periphery orientation; centralized groups were to develop the knowledge and programs necessary for school reform, and to disseminate nate the programs to the nation's schools. The flaw in this model of change becomes apparent when the logic of individual differences and individualization is examined. Individual variation is a psychological abstraction which isolates human traits, aptitudes, and attitudes from the school setting, cultural environment, and social circumstances in which children function. It assumes, incorrectly, that individual

differences exist apart from the social setting of schooling and that they can be "treated" in a logical and administrative fashion.

What must be accomplished is the extension of the concept of schooling as an institution to articulate more clearly the social and cultural meanings that impinge on school life. These relationships are best formulated as questions: What conceptions of knowledge and work exist in pedagogical contexts? How do occupational ideologies and practice influence the pedagogical context? What are the relationships among teaching/learning, occupational structures, and the social/cultural orientations of the communities in which the schools are located?

The IGE study has pointed to the importance of understanding how these sets of relationships affect institutional life and what meaning they give to reform. Their specific content and dynamics contain unresolved questions and issues. For example, how do specific social/cultural characteristics filter into the school to influence instructional practices, and what are the implications of teachers' different and potentially conflicting perceptions of their occupational role? Professionals do have relative autonomy in establishing pedagogical practices, but how is this autonomy exercised to create, sustain, and renew occupational ideologies? What are the roles played by state and local education agencies, teachers' associations and unions, and teacher-preparation institutions in establishing and legitimating school practices?

The interplay of these sets of relationships requires methods of inquiry that respond to the complexities of the problem. The issue, however, is not one of qualitative versus quantitative measures, or process versus output measures. Questionnaire and field study techniques need to be incorporated into research designs to provide descriptions of ongoing activities, the meaning that such actions have for those involved, the interpretations people give to their own actions and the actions of others, and the regularities and correlations exhibited in school practice.

The history of social and political reform efforts suggests that their effects cannot be uncritically accepted and that--no matter how benevolent the intent of the reformers--unforeseen, unplanned, and unwilled consequences must be considered in ways that permit the researcher to go beyond the assumptions and priorities of those who administratively define the "system." Our research suggests that the distinc-

tion between intent and effect is important in studying schooling and reform efforts. While the intent of reform may be noble and sincere, planned social intervention is fraught with unanticipated and sometimes undesired consequences. The curriculum reform movement upon which IGE is based was built upon certain assumptions about educational change and reform, and our research has raised questions about both the reform and its underlying assumptions. The study of six elementary schools reported to be exemplary of IGE illustrates the complexity of making schools better. Schools are social and political enterprises characterized by interests that cannot be taken for granted.

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CHAPTER 8

Phase IV: THE FIVE CURRICULUM STUDIES

Thomas A. Romberg, Deborah M. Stewart, Norman L. Webb and Anne G. Nerenz

The intent of Phase IV was to describe in detail the actual operations of a sample of schools using three curriculum programs designed to be compatible with IGE: Pre-Reading Skills program (PRS) (Venezky & Pittelman, 1977), Wisconsin Design for Reading Skill Development (WDRSD) (Otto, 1977), and Developing Mathematical Processes (DMP) (Romberg, 1977). First, three small sample descriptive studies were conducted in IGE schools in Spring 1978, one for each program. And then, data were gathered for two comparative studies during the 1978-1979 school year. In the later studies three groups of variables--pupil outcomes, instructional time, and means of instruction--were investigated in IGE and non-IGE settings in which WDRSD or DMP as well as alternative curriculum materials were being used.

In all studies, pupil attainment of program objectives was the dependent variable. The other two variables, instructional time and means of instruction, are essential in explaining and understanding how the programs work and how objectives are obtained. The structural relationships among these variables are illustrated in Figure 8-1. The primary purposes of Phase IV were:

1. to determine the degree to which PRS, WDRSD, and DMP meet their goal of having students master specified objectives and skills.

2. to determine how time is allocated for instruction in implementing PRS, WDRSD, and DMP.

3. to relate instructional time to the means of instruction and mastery of content for PRS, WDRSD, and DMP.

4. for WDRSD and DMP, to contrast IGE schools using the program with two situations--non-IGE schools using the program and IGE schools using alternative programs--on the variables of pupil outcomes, instructional time, and means of instruction.

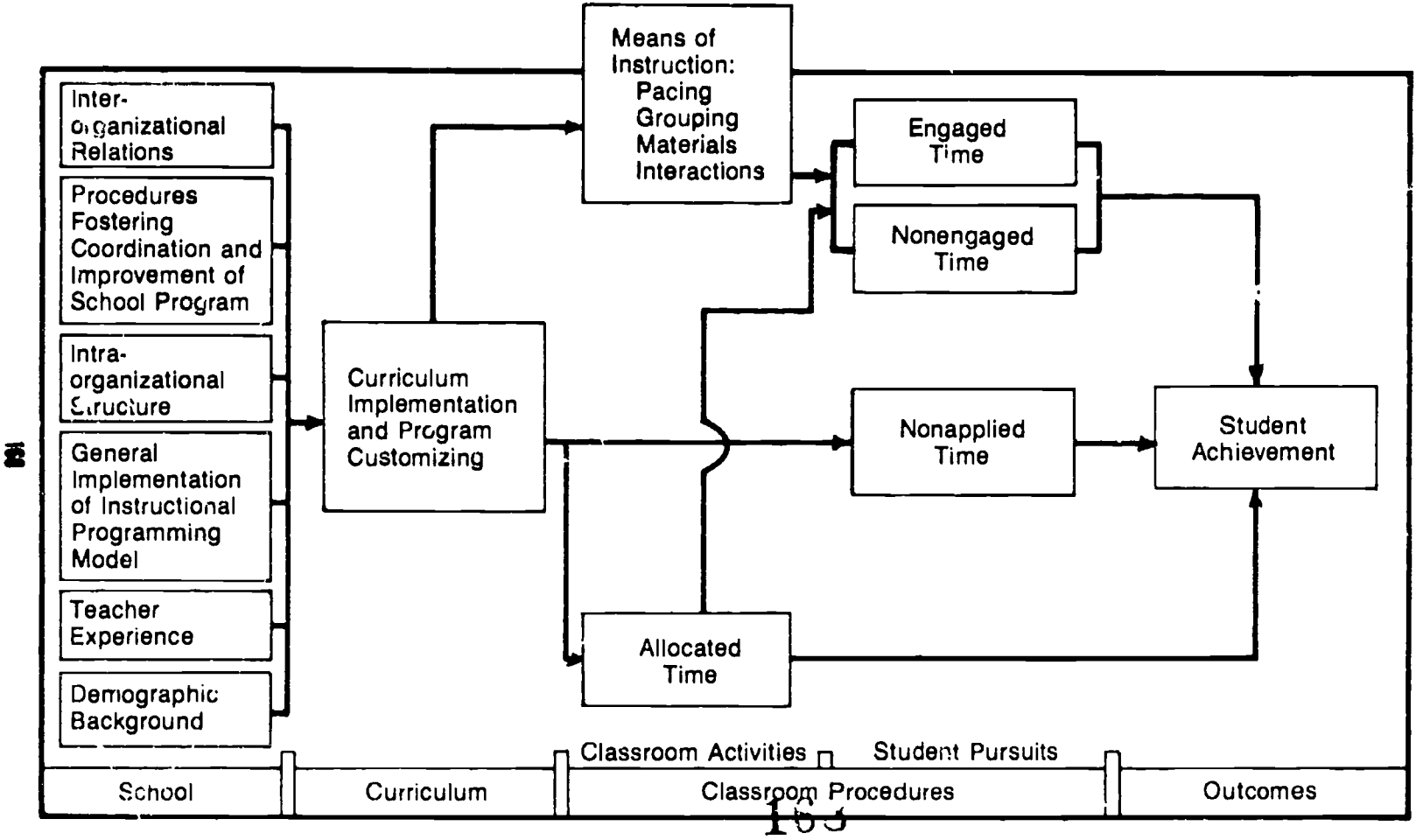

Figure 8-1. Phase IV model of anticipated relationships between variables.

CURRICULUM DESCRIPTION

Pre-Reading Skills

PRS was developed for use in kindergartens "to prevent reading failure by teaching children skills that are necessary for success in beginning reading" (Venezky, Pittelman, Kamm, & Leslie, 1974, Teacher's Guide Folder 1). Five skills, three visual and two sound, comprise the program. Letter order (distinguishing *no* from *on*), letter orientation (distinguishing *b* from *d*), and word detail (distinguishing *take* from *tale*) are the three visual skills. Sound matching (recognizing the same sound at the beginning of *cow* and *kite*) and sound blending (making *pat* from the sounds /p/, /a/, and /t/) are the two sound skills.

The PRS program includes a variety of large group activities, small group games, and individual projects and practice sheets. This variety may be used to provide children with a range of learning experiences for each skill.

In the preferred schedule, PRS instruction is provided every day, alternating between sound and visual skills. The recommended alternative is PRS instruction 3 days a week with a sound and visual lesson each day. After the visual schedule has been completed, it is recommended that instruction in sound skills be provided 5 days a week. Checkpoints are provided in both the visual and sound schedules. These points indicate when to give the individually administered skills tests and provide directions for teachers who decide to form more than one skill group.

Wisconsin Design for Reading Skill Development

WDRSD is an objective-based management system designed to provide both struction and substance for an elementary school reading program. The focus is on developing the essential subskills of reading which, once acquired and applied, enable students to read successfully. The WDRSD has four fundamental purposes:

1. to identify and describe instructional objectives for the skills which appear essential for competence in reading.
2. to assess individual pupils' skill development status.

3. to manage instruction of children with different skill development needs.

4. to monitor each pupil's progress. (Otto & Askov, 1973)

The WDRSD provides a framework for teaching reading skills as the basis of a curriculum in which individual differences in students' rate and type of learning are emphasized.

Six areas of reading skills have been identified: Word Attack, Study Skills, Comprehension, Self-Directed Reading, Interpretive Reading, and Creative Reading. Behavioral objectives were written for each skill in the first three of these six areas. The skills in the other three areas are not behaviorally described and assessment exercises are not included. Skills in each of the six elements are clustered at levels that correspond to traditional grade levels, as shown in Table 8-1, in order to facilitate initial implementation and to help in general skills assessment and regrouping.

Formal tests of demonstrated reliability which are suitable for individual or group administration and which aid in the preparation of skill development profiles have been developed for most of the skills in Word Attack, Comprehension, and Study Skills. The *Teacher's Resource File* includes a folder for each skill with a list of published instructional activities and at least a few new activities; teachers are encouraged to add to the folder other activities they have found particularly successful.

Table 8-1
WDRSD Skills by Element and by Traditional Grade Level

	Grade						
Skill area	K	1	2	3	4	5	6
Word attack	A	B	C	D	–	–	–
Comprehension	A	B	C	D	E	F	G
Study skills	A	B	C	D	E	F	G
Self-directed reading		A-C		D-E		F-G	
Interpretive reading		A-C		D-E		F-G	
Creative reading		A-C		D-E		F-G	

Developing Mathematical Processes

DMP (Romberg, Harvey, Moser, & Montgomery, 1974, 1975, 1976) is a total program of elementary mathematics for grades K-6. It is composed of 90 topics which correspond approximately to grade levels as follows:

Topics	1-14	Grade K
	15-27	Grade 1
	28-40	Grade 2
	41-53	Grade 3
	54-65	Grade 4
	66-77	Grade 5
	78-90	Grade 6

The components of DMP are resource manuals, teacher's guides for each topic, student booklets and guides, printed and physical materials kits, a preassessment package, topic inventories, and pupil performance records.

DMP approaches mathematics through the measurement of attributes. The major content areas are problem solving, place value, attributes, measurement, addition and subtraction, multiplication and division, fractions, geometry, and statistics. An emphasis is placed on exploring relationships between objects using processes such as describing, classifying, ordering, equalizing, joining, separating, grouping, and partitioning.

For each topic a sequence of activities is specified. Alternate activities are included for students who need more work on an objective or variation in instruction. The activities are keyed to objectives. The topic inventories are used to assess mastery of the objectives for each topic. Instructional activities include experiments, use of manipulatives, learning stations, games, stories, discussions, worksheets, and contests.

DATA COLLECTION PROCEDURES

Classroom Observations

The data gathered from observations of teachers and pupils was based on a system modeled after the one used in the Beginning Teacher Evaluation Study (Marliave, Fisher, Filby, & Dishaw, 1977). The observation system (Webb, 1979) used time as a metric to describe how the curriculum

program operates to facilitate students' achievement of program objectives. The behaviors of target students were recorded using time sampling procedures throughout the period allocated for reading or mathematics instruction.

The categories used in the observation system were:

Available Time:	allocated time devoted to the observed curriculum
Nonapplied Time:	allocated time devoted to other than the curricular program being observed
Specific Content:	reading or mathematics skill (specific curriculum objectives)
Pace:	whether the student is working at his or her own pace or is paced by the group
Grouping:	size of group which the student is a member
Materials:	the materials being used by the student
Learner Moves:	student engagement or nonengagement
Interaction:	persons with whom the student is interacting and the direction and focus of that interaction

Teacher Logs

Teachers maintained logs for a sample of target students in order to obtain a measure of the total time allocated to instruction on specific skills or objectives during the investigative period. On the logs, teachers recorded the amount of time allocated to instruction on each skill, the size of the group with which the target student was working during instruction, and the type of materials being used. Logs were kept daily for six to eight students by the teacher who was directly responsible for the instruction of the students in the target population.

Interviews

In each school interviews were conducted by the observer for that school with members of the participating instructional staff and with the principal. Background information about the school, the staff, and use of the curriculum products was obtained from these interviews. Instructional staff provided information about their own teaching experience, how the curriculum product was used, and how the overall instructional program was planned and carried out. Each principal described the school's organization, its relationship to other educational agencies, and some procedural aspects of the school's ongoing operation. From the interview responses the school variables identified in Figure 8-1 were scaled.

Achievement Measures

In the PRS study, group-administered tests developed by the PRS staff for each of the five PRS skill areas were used to measure achievement. The tests are criterion-referenced, and results provide teachers with diagnostic information.

For the WDRSD and DMP studies, four forms of achievement monitoring tests were developed for each grade. During each testing, one-fourth of the pupils were given each form so that each pupil was tested on only a portion of the entire set of skills at a time. The forms were systematically rotated among the groups of students for each test time. A group score, percent correct, was computed for each objective using the corresponding items from all forms. In this manner, data were obtained for the group on a large number of skills with minimal disruption of normal classroom activities. The WDRSD achievement monitoring tests used items from the published WDRSD skills tests. For the DMP achievement monitoring tests, four items for each objective were written to correspond to the items included in the topic inventories for each objective.

THE THREE DESCRIPTIVE STUDIES

These small sample studies were designed to describe how each curriculum program was being used in different IGE schools and, for WDRSD and DMP, to provide a testing ground for instruments and procedures for the comparative studies which were to follow. A comprehensive summary for the PRS study can be found in Stewart, Nerenz, Webb, and Romberg

(1980); for WDRSD in Nerenz, Webb, Romberg, and Stewart (1980); and for DMP in Webb, Nerenz, Romberg, and Stewart (1980). All three studies were conducted during the spring semester 1978. Three schools participated in the PRS study and two in each of the WDRSD and DMP descriptive studies. In the later two, data were gathered at both grades 2 and 5.

Results—PRS

Meeting program objectives. By the beginning of the study in February, the average scores on visual skills at all three schools were above the PRS program's recommended mastery level. This high level of student achievement indicates that the children were indeed acquiring the skills. Both kindergarten and first-grade teachers mentioned that children's visual scores had gone up, that the time needed for reading readiness had decreased, and that children were more comfortable with reading skills. First-grade teachers reported that many reading skills could be reviewed rather than taught and emphasis could be put on blending rather than on the more elementary material.

Time allocation. The developers of PRS recommend that instruction alternate between visual and sound skills until visual skills have been completed, that separate skill groups be formed if possible, and that review activities be provided only for students who have not demonstrated mastery of a skill on an individually administered test.

At the beginning of the study, teachers reported having passed Checkpoint 4 in the visual schedule, after which time instruction in visual skills should have been provided only to nonmasters of the skill. Variation in visual skills instruction across schools was evident.

None of the teachers in this study reported forming separate skill groups. In each of the interviews, all students were said to be on the same page in the schedule.

Relating instructional time and achievement. An increase in the number of students mastering sound blending occurred in two schools where engaged time for that skill was much higher than at the other school.

Where time was allocated to all skills for four or more children, test results generally indicated that the instruction led to increased average scores, or raised the minimum score, or both.

Staff responses to the program. Teachers at the three schools in this study were very enthusiastic about the program, enjoyed teaching PRS, and believed that the children, parents, and first-grade teachers had all responded favorably to the implementation of the program. The daily activities, the accessibility and attractiveness of materials, the thorough coverage of skills, and the quality of the materials for parents were listed as the major attractions of the program. Drawbacks were listed as not using letter names, not introducing more letters, lack of supplementary visual materials, and amount of time needed for individual assessment.

Overall, the data indicated that the objective of PRS of having children master specific skills was met. Pupils learned and teachers were enthusiastic about the program. There was variability among classes in how the program was used.

Results—WDRSD

Data were grouped for analysis at three progressively more general content levels. The most inclusive is the content area, followed by the general objective, and then specific objective. In this chapter only results at the general objective level of aggregation are discussed. There are 12 such general objectives at each grade level. Means of instruction, use of time, and achievement profiles are described separately by grade level.

Grade 2. Even though the time allocated to reading skills was about the same at the two schools, students at one school received somewhat more skill instruction each day because the amount of available time was greater at the school. At both schools large group, other-paced settings were the predominant mode of instruction. Instruction at both schools was characterized by the use of paper and pencil materials about half of the time; at neither school was a variety of materials represented either on an individual day or across observation days. Interactions were observed about one-thrid of the time at both schools, usually teacher-initiated speech. Thus, the percentage of allocated and available time and the average number of minutes for four means of instruction variables were almost identical.

The use of time during reading skills instruction appears to be very similar at the two schools. Each school provided instruction on about 80% of the possible instructional days. Over all of the observation days, 62% of the time was actually available for instruction. Of this, engagement average 68% at

one school, and 70% at the other. Most of the observed and allocated time was devoted to Word Attack skills.

At grade 2 the achievement monitoring tests covered 10 of the 12 general objectives. Students at both schools had mastered phonic analysis-consonants at test time 1, and at school 4 initial achievement in passage meaning was also high. By test time 3, students had mastered one additional skill, although this differed by school. At neither school, then, was a mastery level of 80% or more correct achieved for a majority of the general objectives for which data were obtained.

Variations in initial achievement and type of progress were also clear. At one school, there was very little difference in initial achievement for many of the skills, and substantial gains were made for only two objectives, with the percent correct for one objective declining by test time 3. At the other school there was considerable difference in initial scores. Steady gains across test times occurred for four objectives, with small gains in two additional areas and achievement declining in one area over time.

Grade 5. The pattern of reading instruction was quite different at the two schools. While students were self-paced 43% of the time at one school, self-paced settings were observed 88% of the time at the other. Large group instruction was observed 46% of the total period at the first school, but at the second school it accounted for only 7% of the available time, with nearly three-fourths of the instructional period spent in individual work and 20% in small groups. Although both schools relied heavily on paper and pencil materials, at the first school these were used almost exclusively on a day-to-day basis. At the other, paper and pencil materials were always used in conjunction with printed material.

There are also similarities between the two schools at grade 5. Available time averaged about 75%, and students were engaged 76% of the available time at each school or about 57% of the allocated time. Little Word Attack time was scheduled at either school. Skills instruction at the first school focused almost equally on Study Skills and Comprehension, while at the other Comprehension was allocated over four times as much.

At grade 5 students evidenced only small changes in achievement for all but a small number of the 12 general objectives at each school. The number of skills for which students reached a mastery level of 80% on the achievement

monitoring tests was not significantly larger at test time 3 than at test time 1 at either school. A pattern of steady achievement across test administrations occurred for only two skills at each school. In none of these instances of growth did students reach a level of 80% correct, and in three of the cases the overall gains were not large.

Allocated time. Time allocations were adjusted to reflect the average number of minutes allocated to the children who received instruction rather than the average number of minutes per child. Overall, relatively large differences existed between the amount of time which was allocated and the amount of time the developers considered necessary for continuous skill development and mastery. In that less than the minimum recommended amount of time was allocated, especially to Word Attack at grade 2 and to Study Skills and Comprehension at grade 5, it is not surprising that there are very few large gains in achievement over the investigation period. Thus, the nonsignificant correlations between time and achievement probably occurred because an insufficient amount of time was allocated to instruction, resulting in small and relatively unstable changes in students' performance.

Results—DMP

Grade 2. The length of the class period was nearly the same at both schools, ranging between 35 and 40 minutes. Three-quarters of this time was spent in activities related to specific mathematics objectives. At both schools paper and pencil materials were used approximately 60% of the allocated time. Manipulatives were used for nearly one-third of the time. This relatively high use of manipulative materials is most likely associated with DMP, reflecting the program's emphasis on their use. Games were seldom used at either school. The main type of interaction was teacher to group, occurring from 11% to 14% of the time at both schools. The patterns of the other interaction types were very similar at both schools.

The main variations in instruction between the two schools were in pacing and grouping. These two means of instruction appear to be more associated with the teacher, than with either school or program variables. Variations in grouping and pacing also occurred from day to day, more at one school than the other, indicating flexibility in their use. Also, within the instructional group of one teacher, some variation in pacing and grouping existed between individual students, which suggests some individualization of instruction.

At grade 2 the total allocated time for the two primary objectives--addition and subtraction computation and counting--was very similar in the two schools, with computation allocated more time. One school spent a significant time on measurement/attributes and some time on geometry, whereas at the other only 31 minutes was spent on measurement with no time being spent on geometry. On the other hand, that school spent more time on writing sentences and fractions. Even though DMP is used at both schools there are differences in which objectives are accorded instructional time and in the sequence of instruction.

The students at one school began the period of investigation at a higher level of achievement on five of the seven tested objectives than did the students at the other school; in problem solving the schools were comparable and in fractions students at the first school were lower.

The patterns of achievement are similar between the two schools on writing sentences, computes (+/-), counting, inequalities, and measurement/attributes which can be partially explained by both schools using DMP. The schools differed in the increase of achievement on fractions and problem solving. Overall, the differences in achievement between the two schools appear to be related to the differences in content covered rather than to differences in the means of instruction.

Grade 5. Very few common features were observed in the means of instruction at the two schools. Paper and pencil materials were the main materials used, although to a much larger extent at one school than the other school. Very little use was made of small groups, manipulatives, or games at either school. The dissimilarities between the grade 5 classes at the two schools are numerous. Self-paced individual activities were used extensively at one school, but only about one-fourth of the time at the other. The teacher at the first school spent a large proportion of the allocated time talking to the whole group of students, whereas only one of the teachers at the other school used any teacher-to-group interactions and usually for only 5 minutes at the beginning of the class period.

Because of the large variance between the schools, there appear to be no common means of instruction that can be related to the common curriculum program, DMP. The means appear to be more a function of the teacher.

The two schools differed noticeably in the content covered during the investigation. At one school instruction was confined to two general objectives--fractions and decimals. The teacher commented that he prefers to teach the topics related to one strand, such as fractions, rather than take the topics in numerical sequence. In contrast, at the other school where two classes participated in the study, instructional time was spent on a range of general objectives. However, one general area received the major part of classroom time early in the study, multiplication and division computations, and emphasis later shifted to a second area, fractions.

Non-DMP materials, primarily worksheets taken from other commercial sources or made by the teacher, were used at both schools. As the school year progressed the trend was to use these materials to provide the students more practice on skills.

The percentage of engagement at both schools was similar and averaged approximately 70% of the available time. Thus, the variance in content covered was due more to what time was allocated to particular general objectives than to variance in the engagement of students during classes.

Thus, even though both schools were using DMP as the main mathematics program at grade 5, the use of the program varied greatly. This indicates flexibility in the use of DMP. At neither school was DMP used exclusively.

Achievement differences between the two schools reflect differences in when instructional time was spent on objectives. At one school students began with some competency in multiplication and division and made large increases in achievement first on fractions concepts and computation and then on decimals-computation. The relatively low scores on most objectives for test time 1 provide evidence that the students were grouped closely in their achievement. In contrast, the initial scores on objectives for the other school were moderately high, .50 or above, and there was large variability among students, which suggests that more emphasis was placed on individualization at that school. Also, moderate increases in achievement over the periods provide additional evidence that perhaps not all of the students were given instruction on the same objectives at the same time at that school.

The final levels of achievement are similar for both schools on fractions-computation, decimals-concepts, computes (x/÷), and problem solving despite the differences at the beginning of the investigation and the varying instructional approaches. The similarities between the two schools in student outcomes appear to be, at least in part, associated with both schools using DMP. Some of the same topics were used at both schools.

The differences in student outcomes between the two schools appear related to how the materials were used and the sequence in which topics were given. Selected topics were used at one school allowing more advanced topics to be presented. At the other school a larger number and a wider range of topics were used. However, students did not advance as far on particular topics such as decimals. This difference in the topics covered resulted in the largest difference in achievement between the two schools, which occurred on decimals-computation at test time 3.

Summary of the Descriptive Studies

From these studies we believed adequate evidence was available that each of the programs can be effective in getting students to master specific objectives and skills. The evidence is more convincing for PRS and DMP than for WDRSD, but steady improvement on some leading objectives was apparent.

However, what was more obvious was that how time was allocated and instruction carried out varied considerably between teachers. In particular the time allocated to different content objectives, the sequence of instruction, and the grouping of students differed dramatically from class to class.

THE IGE/WDRSD COMPARATIVE STUDY

Procedure

The purpose of this study was to examine three questions:

1. What are the effects on reading skill instruction of using the WDRSD in an IGE and a non-IGE school environment?

2. What are the effects on reading instruction of using the WDRSD and using other reading programs in the IGE school environment?

3. What are the relationships among the variables presented in Figure 8-1?

To answer these questions, data were gathered from a sample of IGE schools using the WDRSD, a sample of non-IGE schools using the WDRSD, and a sample of IGE schools using other reading programs. A full report of the study was provided by Romberg, Stewart, Webb, Nerenz, Pulliam, and Srivastava (1982b).

Data were gathered for this comparative study from October 1978 until May 1979 from students in grades 2 and 5 and their teachers. As in the descriptive studies, data were collected by four means: tests on general objectives of WDRSD, observations of specific students during the reading instruction period, teacher logs for reading instruction of specific students, and questionnaires which served as the basis for structured interviews with school staff.

For each of the three school types--IGE/WDRSD, IGE/non-WDRSD, and non-IGE/WDRSD--schools were matched according to community size, socioeconomic level, composition of student body, size, and for IGE schools "IGEness." Communities represented were extreme rural, small place, medium city, and urban fringe. One urban fringe IGE school not using WDRSD withdrew from the study just prior to the beginning of data collection, bringing the number of schools in this study to 11. Differences in operating characteristics, or background variables, among the three types of schools were anticipated to predict differences in the way instructional time was used; time use, in turn, was anticipated to predict student performance on objective-based assessments. However when schools were compared on the four background variables which represent IGE characteristics (the first four school variables in Figure 8-1), the non-IGE schools proved to have the highest average on two variables and were between the two groups of IGE schools on one variable. Thus, in this sample, schools using the IGE label were not operationally different from schools not using the label.

Data were grouped for analysis at three progressively more specific levels, the most inclusive being the content area followed by the general objective and the specific objective. In the WDRSD, reading skills with specific behavioral ob jec-

tives are organized into three content areas: Word Attack, Comprehension, and Study Skills. Within each of these content areas, from two to five general objectives were developed for the present study, based on the specific objectives of WDRSD. The general objectives used in the study for grades 2 and 5 are shown in Table 8-2. The content aggregation for reading skills instruction was used with the teacher logs, classroom observations, and achievement monitoring tests.

The actual dependent variables used in this study were the residualized mean gain scores (final scores adjusted for differences on initial scores) calculated for 13 variables at grade 2 and 11 variables at grade 5 (see Table 8-2).

The results of the IGE/WDRSD comparative study are summarized in terms of six categories of information: time use, achievement results, and relationships between time use and achievement for grades 2 and 5 separately. Because of their size, tables reporting results are in the appendix to this chapter, numbered 8A-1 through 8A-4.

Grade 2 Results

Time allocated to reading instruction, the amount of time a teacher intended to spend in various reading instruction activities, is a gross measure of opportunity to learn. The number of hours allocated overall indicates the relative importance of reading in the elementary curriculum at various schools. Broken down by objective, allocated time informs us about the focus of instruction at various schools. In Table 8A-1 a summary of the time allocated to content areas is presented; these data come from teacher logs.

Word Attack skills received the primary instructional emphasis in reading at grade 2 with most schools allocating from one-half to two-thirds of the skill time to that area. Study Skills were taught very little at the non-WDRSD schools, and not at all at three of the eight WDRSD schools. At three of the non-IGE/WDRSD schools, over one-third of the skills instruction time was allocated to Study Skills. There seem to be two distinct ideas about the teaching of Comprehension skills in grade 2: Three schools, all WDRSD schools, allocated no time to instruction in Comprehension skills; at the other eight schools about one-third of the skills instruction time was allocated to Comprehension.

Table 8-2
Student Achievement Variables for the WDRSD Comparative Study

	Variable	Grade 2	Grade 5
01	Phonic Analysis--Consonants	✓	
02	Phonic Analyses--Vowels	✓	
03	Phonic Analysis--Silent Letters	✓	✓
04	Structural Analysis	✓	✓
05	Vocabulary Meaning	✓	
13	Word Attack	01+02+03+04+05	03+04
06	Map Skills	✓	✓
07	Graph and Table Skills	✓	✓
08	Reference Skills	✓	✓
14	Study Skills	06+07+08	06+07+08
09	Word Meaning Skills		✓
10	Sentence Meaning Skills	✓	✓
11	Passage Meaning Skills	✓	✓
15	Comprehension	10+11	09+10+11
12	General Reading		

Note: Variables 01-11 are general objectives; variables 13-15 are content areas. Variable 12 is for basal reading groups which were logged and observed in 4 of the 12 schools.

Obviously there are no consistencies apparent among the eight IGE schools or the seven WDRSD-users in terms of time allocated to the content areas of reading. There was considerable variation among the schools on each of the time use variables, and no similarities were found related to either IGE or WDRSD. The only conclusion that is warranted is that what operationally constitutes a reading program at grade 2 is distinct in each classroom.

Use of different group sizes, different types of materials, and incidence of teacher- and student-initiated interactions were examined in terms of percent of available times. At all IGE/WDRSD schools large groups were used extensively, but the schools differed in their use of individual and small groups. Similarly, at all IGE/non-WDRSD schools, individual work was predominant, but small and large groups were used for different percentages of time at the three schools. In use of materials no totally consistent patterns were found.

Achievement data were gathered eight times in each school on all specific objectives. The data were then aggregated for general objectives and content areas. To simplify this discussion only the aggregate data for the three content areas from the first and last administrations are reported here. Both actual change and relative change from time 1 to time 8 are presented.

The actual change, of course, is an increase during the school year from time 1 to time 8, an actual gain in achievement. Since scores differed at time 1 and at time 8 and since the proportion of change was different among schools, the relative change in achievement differs among schools. Relative change is expressed as residualized mean gain scores, or residuals; these scores are both positive and negative even when actual achievement increased for all schools. The summary data for grade 2 reading achievement are shown in Table 8A-2.

For Word Attack and Comprehension, scores at time 1 were moderately high, thus leaving little opportunity for substantial gains on those tests. Yet, positive actual gains were exhibited in each school in each area. There was very little difference among the three groups of schools and much overlap in the scores of schools.

The emphasis in this study was on identifying instructional patterns that are particularly effective in raising children's achievement. There were no distinct instructional patterns in the schools that had high achievement gains. We

feel that instruction in the relatively less effective programs was not well targeted; that is, instruction seems to have been provided less on the basis of individual instructional needs than on the basis of skills customarily taught at grade level.

The contrast between school 476 and school 493 for second grade instruction in Word Attack provides a striking example of the effect of targeted instruction. School 476 had the highest score at time 1; all of the reading skill instructional time was allocated to Word Attack; the score at time 8 was above average but the score gain was less than average. School 493 had a nearly average score at time 1; about two-thirds of the reading skill time was allocated to Word Attack; the score at time 8 was the same as that at school 476; the score gain at school 493 was half again as high as the average.

For Comprehension skills, achievement at time 8 was quite high at all schools and outstanding at school 451. Again, at this school, the emphasis on comprehension skill instruction was no greater than at most other schools and the instructional pattern did not differ from other less effective patterns. We conclude that instruction was well targeted.

Grade 5 Results

In Table 8A-3 a summary of the allocated time to content area is presented; these data came from teacher logs.

Word Attack skills were taught at grade 5 in only two WDRSD schools and in all three non-WDRSD schools. These results are consistent with the developers' expectations; the Word Attack element of the WDRSD was designed to end formal skill instruction between third and fifth grade, with reinforcement and application continuing during basal reading groups.

The five schools that provided Word Attack skill instruction allocated a relatively smaller proportion of their reading time to Study Skills than did other schools. At school 903 no time was allocated to Study Skills during the skill period. In contrast, at school 900 virtually all skill instruction time was allocated to Study Skills.

In 9 of the 11 schools, about half of the grade 5 skill instruction time was allocated to Comprehension skills. The two exceptions differed not only from the other schools but also from one another. At school 903, nearly all of the skill instruction focused on Comprehension; at school 900, no skill

time was allocated to Comprehension. The importance of Comprehension skills at 10 schools is the most consistent time use finding.

Observational data on time use are reported in detail in the complete report. The percentage of nonapplied time varied among schools, averaging 19% of the allocated time. Extreme deviations occurred at schools 446 and 902, where nearly one-third of the allocated time was nonapplied time, and at school 410, where only 3% of the allocated time was nonapplied.

Students were engaged in instructional activities nearly two-thirds of the time, on the average. School 466, where students were engaged only 50% of the time, and school 410, where students were engaged 89% of the time, were again exceptional. At school 900, where the percentage of nonapplied time had been average, engaged time was only 55% of the allocated time.

Finally, for the means of instruction variables--group sizes, primary types of materials, and incidence of teacher and student interactions--no consistent patterns were apparent.

At grade 5 the same strategy of reporting proportion correct at times 1 and 8 with actual and residual mean gain scores was followed (see Table 8A-4). As at grade 2, for most objectives average scores were at a moderately high level at time 1. Most scores for all objectives increased from time 1 to time 8.

The group of non-IGE/WDRSD schools showed more positive average change on all three aggregate objectives than either of the groups of IGE schools. IGE/WDRSD schools had higher positive gains than IGE/non-WDRSD schools on both Word Attack and Study Skills. The average differences are slight; score ranges for all three groups overlap considerably on both Word Attack and Comprehension.

Large achievement gains in Word Attack skills occurred at two of the schools that allocated no time to formal skill instruction in Word Attack, schools 451 and 902. Only skill instruction and not the total reading program was studied in these schools so knowledge of the reasons for the improvement is not available.

In Study Skills, above average achievement gains were made at schools 900, 902, and 901. These gains were not extremely large and did not lead to impressive high achievement at time 8. No distinct instructional pattern was observed at these three schools.

In Comprehension, the achievement gain was dramatic at school 410 and large at schools 507, 902, and 901. At school 410, the total reading period was logged and observed; perhaps the small groups were a particularly effective mechanism for improving Comprehension skills at that school. Because only skills instruction was observed at other schools, where no instructional pattern emerged, we cannot draw any conclusions about the effectiveness of the basal reading groups in increasing achievement on specific Comprehension skills.

THE IGE/DMP COMPARATIVE STUDY

Procedure

As in the WDRSD study, the purpose was to examine three questions:

1 What are the effects on mathematics instruction of using the DMP mathematics program in an IGE and a non-IGE school environment?

2. What are the effects on mathematics instruction of using DMP and using other mathematics programs in the IGE school environment.

3. What are the relationships among the variables presented in Figure 8-1?

To answer these questions, data were gathered from three samples of schools: IGE schools using DMP, non-IGE schools using DMP, and IGE schools using other mathematics programs.

Data were gathered during the 1978-79 school year from students in grades 2 and 5 and their teachers. As in the other studies data were collected by four means: tests on general objectives of DMP, observations, teacher logs, and structured interviews based on questionnaires. More detail is available in Romberg, Stewart, Webb, Nerenz, Pulliam, and Srivastava (1982a).

Table 8-3
Student Achievement Variables for the IGE/DMP Comparative Study

	General Objective	Grade 2	Grade 5
01	Writing Numbers	✓	
02	Inequalities	✓	
03	Other Place Value or Numeration	✓	
Place Value and Numeration (16)		01+02+03	
04	Addition/Subtraction	✓	✓
05	Multiplication	✓	✓
06	Division		✓
Operations (Whole Numbers) (17)		04+05	04+05+06
07	Concept	✓	✓
08	Fractions Compuces		✓
Fractions (18)		07	07+08
09	Decimal Concept		✓
10	Decimal Computes		✓
Decimal Fractions (19)			09+10
11	Measurement	✓	✓
12	Word Problems	✓	✓
13	Applications	✓	✓
Problem Solving (20)		12+13	12+13
14	Geometry	✓	✓
15	Miscellaneous	✓	✓

For each of the three types--IGE/DMP, IGE/non-DMP, and non-IGE/DMP--schools were matched as in the WDRSD study. Communities represented were extreme rural and small place, medium city, and urban fringe. One medium city IGE school using DMP withdrew from the study just prior to the beginning of the data collection, bringing the number of schools in this study to eight.

As before, differences in operating characteristics among the three types of schools, background variables, were anticipated to predict differences in the way in which instructional time was used; time use, in turn, was anticipated to predict student performance on objective-based assessments. As in the IGE/WDRSD comparative study, when schools were compared on the four background variables which represent IGE operating characteristics, the distinctions between groups were not apparent. For two of the variables, the non-IGE schools averaged slightly above one of the groups of IGE schools and had ranges that overlapped those of both groups of IGE schools. The overlap also occurred with one group of IGE schools on a third variable. Thus for these IGE-related scores, the label *IGE school* was not useful in grouping schools.

To aggregate the data the basic strategy used in the IGE/WDRSD comparative study was followed. Pupil performance data on specified program objectives were gathered and aggregated into 23 general content objectives. These general objectives were organized into eight content areas: place value and numeration, operations (whole numbers), fractions, decimal fractions, measurement, problem solving, geometry, and miscellaneous. While the same content areas are used for both grades the general and specific objectives differ as shown in Table 8-3. Results are tabulated in the appendix to this chapter in Tables 8A-5 through 8A-8.

Grade 2 Results

The total hours of mathematics instruction per child and the assignment of those hours to the 11 general objectives for grade 2 are given in Table 8A-5. Overall, hours allocated during the 25-week study ranged from just over 40 at school 33 to over 90 at schools 593 and 906. Clearly, addition and subtraction of whole numbers is the heart of the second-grade mathematics program, regardless of curriculum program used. At the DMP schools, writing numbers and word problems both had a substantial proportion of time allocated. At the non-IGE/DMP schools, over 10% of the time was allocated to fractions. At the various schools, different general objectives

had been identified for additional emphasis: geometry at schools 440 and 762; miscellaneous topics at schools 593, 428, 421, and 333; and other place value also at school 421. At school 906, time was allocated to only 7 of the 11 general objectives; at other schools, time was allocated to 9 or more of the objectives.

Each of the IGE/DMP schools allocated over three-quarters of the mathematics instruction time to three basic objectives: writing numbers, addition and subtraction of whole numbers, and word problems.

Also, at two of the three non-IGE/DMP schools, about three-quarters of the time was allocated to the three basic objectives; at the third, nearly two-thirds. At least 11% of the time at each of these three schools was allocated to measurement of length and capabity, much more time than at other schools.

At the three IGE/non-DMP schools, addition and subtraction was the only basic objective to be scheduled for a large proportion of time and the proportion was larger than in the other two types of schools. The miscellaneous topics such as time, money, and graphs were allocated a fair proportion of time at two schools, one of which also allocated considerable time to place value and numeration. At the third school in this group, the relatively little time not allocated to addition and subtraction was spread among four other objectives including the miscellaneous topics.

Thus overall there was a distinct difference in what constituted the mathematics program at grade 2 depending upon whether DMP was the program or not.

In contrast, the aggregated observational data on time use show that there is no consistent pattern of how instruction proceeds in the groups of schools at second grade. Observations were made during the time period in which mathematics instruction was scheduled in each school. Although there was variation among the schools on nonapplied time, available time, and engaged time, it is not consistent for groups. For two of the means of instruction variables there was a hint of a pattern. At four of the five DMP-user schools there was a more balanced use of grouping patterns than at the non-DMP schools where instruction was predominantly individualized with paper and pencil materials. Similarly, manipulatives were used only in DMP schools. What is surprising is that at two DMP schools (one IGE and one not) there was little use of manipulatives.

As in the IGE/WDRSD comparative study, achievement data were gathered eight times for the specific objectives. To simplify comparisons only the data from time 1 and time 8 are presented with both actual and relative change. The summary data for grade 2 mathematics achievement are shown in Table 8A-6.

In general, there was little variance in proportion correct at test time 1 and greater variance at test time 8. The three non-IGE schools usually scored lowest of the school groups while the two groups of IGE schools alternately had the highest average. Gains were generally very high positive. In spite of the instructional emphasis on addition and subtraction at all schools, average gains were greater than .20 for four additional objectives.

In the following paragraphs, results for each of the four aggregate objectives in mathematics are discussed in relation to time and means of instruction. The emphasis is on identifying instructional patterns that are particularly effective in raising children's achievement.

For place value and numeration, students in schools 440, 593, and 906 made above average achievement gains. Students were observed to be engaged more hours at these three schools than at the other five.

For operations, although addition, subtraction, and multiplication were included in objectives for instruction, only addition and subtraction were tested and very little time was allocated to multiplication at any of the schools. Initial scores were above average at schools 593, 421, 333, and 906. At schools 593 and 906 achievement gains were above average; at schools 421 and 333, below. At schools 421 and 333, students worked individually over 80% of the time. Individual work occurred a smaller proportion of the observed time at schools 593 and 906 where large groups were more frequently observed. At school 906, extensive use of small groups was also observed. Paper and pencil materials, or worksheets, were in use about half the time at schools 593 and 421 and nearly 90% of the time at school 333 and 906; both schools 593 and 906 used additional materials--primarily printed materials at school 593 and entirely manipulatives at school 906--for nearly the same amount of time worksheets were in use. In addition, there were more interactions at schools 593 and 906.

For fractions, the two schools in which students made substantial gains, schools 440 and 904, were the two in which manipulatives were in use for a large proportion of the available time.

For problem solving, only in the five DMP schools was a substantial proportion of time formally allocated and observed. The achievement gains at schools 428, 421, and 333 suggest that problem solving is an integral part of instruction on other mathematics objectives. Achievement gains were low for all three non-IGE/DMP schools, particularly so in school 906 where over 40% of the mathematics instruction time was allocated to problem solving. The instructional pattern in this school was not different from the effective patterns at schools 440 and 593. It seems possible that both allocations and observations did not include a clear distinction between the operations of addition and subtraction and the application of those skills in problem solving.

Grade 5 Results

In Table 8A-7 a summary of the time allocated to the general objectives is presented. Overall hours allocated during the 25-week study ranged from nearly 70 at school 593 to over 90 at school 440. There was no general pattern of instruction differentiating the groups of schools, although the non-IGE/DMP schools were more similar than the other two groups. Division was the only general objective to which all schools allocated a substantial proportion of time. All schools except school 593 also allocated at least 10% of the time to computing with fractions. At school 593, a third of the time was allocated to computing with decimals, much more than at the other schools.

The very small proportion of time allocated to word problems and applications is disappointing. These objectives comprise the aggregate objective problem solving which, for most adults, is the primary application for mathematics.

The observational data present somewhat the same picture; the percentage of nonapplied time, and of course available time, did not vary greatly among schools. The largest percentage of nonapplied time was observed at the two IGE/DMP schools which were similar to each other. The non-IGE/DMP schools also were similar.

Variability among schools increased for engaged time. IGE/non-DMP schools were similar to one another and had a higher average engagement rate than the other groups of schools.

For the means of instruction variables, four interesting differences were noted. First, in use of the three group sizes the two non-IGE/DMP schools were similar to each other

and different from the other two groups of schools; only in use of small groups, however, is there no overlap in the range of individual school scores. Second, the IGE/DMP schools had a much higher rate of teacher-initiated interactions than the other two groups. Third, in spite of DMP, manipulatives were rarely used in any school. And finally, school 333, an IGE/non-DMP school, is unique: All instruction is directed to individuals; absolutely no large group instruction is provided; paper and pencil materials predominate; and there were virtually no observed teacher-pupil interactions.

Achievement results are shown in Table 8A-8 which includes, for each objective, proportion correct at times 1 and 8, actual gain, and residual gain score.

The most striking finding is the slight but consistent decline on addition/subtraction; only school 428 had a higher average at time 8 than at time 1. At both times 1 and 8, scores were highest for this objective. Scores were high at both times 1 and 8 for multiplication.

The IGE/DMP schools had the highest average on six of the nine general objectives and three of the four aggregate objectives. However, differences among the three groups of schools were small except for decimal computing and its aggregate.

At grade 5, the identification of particularly effective instructional patterns is very difficult. For example, at school 905 instruction in operations was very successful; the achievement gain was more than double the average gain and was sufficient to bring the time 8 score very close to the average. At school 906 the instructional pattern observed was nearly identical to that observed at school 905; however, at school 906 the achievement gain was slightly less than average. For operations at schools 440 and 333, where achievement changed very little from time 1 to time 8, the overall rate of materials use was much lower than at other schools.

For fractions, the use of manipulatives seems to enhance achievement. The only other apparent effect is of relative emphasis on fractions in the overall mathematics curriculum as indicated by proportion of allocated time.

Only at school 593 was instruction on decimal fractions a major portion of the fifth-grade mathematics curriculum. Achievement gains were very large at this school and at school 906, although achievement levels at the two schools were very different.

And finally, at no school was instruction in problem solving a significant portion of the mathematics instructional program, as shown by percentage of allocated time. At all schools, achievement gains were small from an initial level that was uniformly low. Instructional patterns were very similar at the three schools where problem solving instruction was observed. The small gains are consistent with the disappointingly low percentage of time allocated to problem solving.

CONCLUSIONS

The information presented in this chapter is from five studies conducted as Phase IV of the IGE Evaluation Study. The four primary purposes of the Phase IV Evaluation Project reflect on our attempt to describe in considerable detail the actual operating characteristics of a sample of schools that were using the curriculum materials designed to be compatible with IGE. Based on these studies three primary conclusions are warranted.

1. There is no obvious pattern by which the different learning environments at each grade level can be appropriately grouped; one cannot confidently argue that any two classrooms (or units) operated in the same way. It appears that each learning environment is unique. The demography of the school, the way in which it is organized, the degree of implementation of various components of IGE, whether or not IGE-compatible materials are used, the way in which time is used in classrooms, the way in which instruction is actually carried out, and the level of achievement on different objectives present an interesting descriptive picture about each learning environment. However, there is little common from situation to situation.

2. Whether a school calls itself IGE or not is not important. The label difference is not a good indicator of operating differences in the schools.

IGE was not developed or disseminated as a simple new idea. Rather IGE is a synthesis of many existing ideas which, implemented together, represent a comprehensive alternative to traditional schooling. It is not surprising,

then, that schools not using the IGE label have characteristics that one would expect in an IGE school. Similarly, it is not surprising that there are "nominal" IGE schools, as described in chapter 4, which differ little from traditional schools.

3. Whether schools use IGE-compatible materials (PRS, WDRSD, or DMP) is important if the content of those materials differs from traditional materials. The key here is allocated time. If other content of programs differs, then time is spent differently and achievement differs. This appears to be the case for both PRS and DMP. However, for WDRSD, which is basically a skills management system, the differences between WDRSD users and WDRSD nonusers were not generally apparent.

In addition to these general conclusions the following seven findings need to be noted.

1. If time is reasonably allocated to objectives, then students' performance does improve. Also, if little time is allocated to instruction (such as fractions at second grade), then little change in achievement is shown. However, even though a lower bound of allocated time is needed to increase achievement in any area, the relationship of allocated time to performance is not linear. For example, at second-grade reading, the variability in time allocated to Word Attack skills is not related to achievement, since all schools spend a lot of time on these skills. In fact, some schools are probably spending too much time for the relative payoff.

2. Particularly in reading instruction, while much time is allocated to reading, what is actually taught--relative emphasis on specific objectives--differs greatly across classes. This variation might be appropriate if the differing emphasis reflected the needs of the students and was in turn reflected in improved performance. However, a great deal of time was allocated to specific skills with little apparent gain in performance. Part of the lack of gain occurred because achievement at time 1 on most objectives was fairly high. Part is due to the fact that items for a general objective were not necessarily related to all the subskills, and time may have been spent on untested subskills. However, the most likely explanation is that teachers seem to have chosen to base reading instruction in their classes on what they customarily cover at each grade level rather than on individual needs, and what they customarily cover is idiosyncratic.

3. At grade 2, the non-DMP users did not allocate time to solving word problems. This objective is emphasized in DMP. The differences in problem-solving performance between DMP and non-DMP groups clearly favors the use of DMP. Similar differences at grade 5 were not found since little time was allocated to problem solving in any class.

4. An unanticipated finding in grade 2 mathematics was that there was no pattern of differences favoring the non-DMP users on the operations of addition and subtraction until the beginning of third grade, the activities at grade 2 are designed to develop the concepts underlying those skills. Thus, the amount of time allocated for addition and subtraction should have been less at DMP schools, and performance, in turn, should have been lower. Neither was the case. DMP users seem to have modified the program so that the time allocated to computation was similar to that allocated by non-DMP users. For all schools, we believe an inordinate amount of time is spent on addition and subtraction skills at grade 2, with not enough time allocated to other important parts of mathematics.

5. Totally individualized instruction with children working independently on worksheets is detrimental. For example, in school 333 at grade 5 in mathematics, where this is the only way in which instruction is carried out, the approach produced low achievement.

6. For some of the mathematics objectives (fractions, place value and numeration, for example) the use of manipulative materials in instruction is a very effective means of improving achievement.

7. Some interactions of children with other children or with teachers are needed. Again, in grade 5 mathematics at school 333, there are almost no interactions, and the children's performance is disappointing.

On reflection, it is now clear that self-declaration as "IGE school" or "WDRSD user" or "DMP user" is not an adequate basis for testing either the use of IGE's instructional programming model or the use of the particular instructional materials. For both, a school's use of the label is no guarantee that the ideas associated with either the instructional programming model or the program are being followed. In fact, what seems to be the case is that the underlying conceptual ideas which guided the developers of IGE or WDRSD or DMP are not clearly reflected in the way in

which instruction is carried out. This conclusion may be an artifact of the samples chosen or it may be more pervasive. In fact, it may be unreasonable to expect people to change as much as was expected in an IGE/WDRSD or IGE/DMP setting.

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Appendix

Table 8A-1 - Table 8A-8

Table 8A-1
Grade 2 Allocated Hours to Reading Instruction
Per Child Over the Total Study Period

	Skill Instruction on					
	Word Attack		Study Skills		Comprehension	
School	Hours	% Total Skill	Hours	% Total Skill	Hours	% Total Skill
IGE/WDRSD						
466	31.6	71	-	-	13.0	29
451	8.7	61	1.3	9	4.2	30
476	24.3	100	-	-	-	-
507	23.5	57	7.3	18	10.7	26
IGE/non-WDRSD						
372	112.0	64	9.8	6	54.3	31
410	15.8	60	.8	3	9.8	37
493	36.2	65	2.1	4	17.3	31
non-IGE/WDRSD						
900	8.2	49	8.4	51	-	-
902	28.5	61	18.6	39	-	-
901	38.1	39	33.2	34	25.9	27
903	12.8	59	-	-	8.8	41

[a]Hours of general reading were estimated from reported total allocation to reading and allocation to skills.

Skill Instruction				
Total		General Reading		
Hours	% Total Hours	Hours	% Total Hours	Total Hours
44.6	23	178.4[a]	77	232.0[a]
14.2	15	80.5[a]	85	94.7[a]
24.3	13	158.0[a]	87	182.3[a]
41.5	23	141.1[a]	77	182.6[a]
176.1	76	55.4	24	231.5
26.4	41	37.9	59	64.3
55.6	58	40.0	42	95.6
16.6	20	67.9[a]	80	84.5[a]
47.1	25	141.3[a]	75	188.4[a]
97.2	68	45.5	32	142.7
21.6	33	43.2[a]	67	64.8[a]

Table 8A-2
Grade 2 Reading Achievement Scores (Proportion Correct)

	Content Area					
	Word Attack				Study Skills	
School	Time 1	Time 8	Change	Residual	Time 1	Time 8
IGE/WDRSD						
466	.56	.64	+.08	-.06	.50	.57
451	.56	.71	+.15	+.01	.49	.74
476	.67	.78	+.11	-.02	.61	.67
507	.61	.74	+.13	-.01	.51	.72
Average	.60	.72	+.12		.53	.68
IGE/non WDRSD						
372	.52	.67	+.15	+.00	.47	.60
410	.57	.72	+.15	+.01	.52	.65
493	.57	.78	+.21	+.07	.45	.56
Average	.55	.72	+.17		.48	.60
non-IGE/WDRSD						
900	.61	.73	+.12	-.02	.56	.69
902	.65	.83	+.18	+.05	.58	.71
901	.64	.74	+.10	-.03	.67	.74
903	.54	.68	+.14	-.01	.45	.56
Average	.61	.75	+.14		.57	.68
Grand Mean	.59	.73	+ 14		.53	.66

Content Area					
Study Skills		Comprehension			
Change	Residual	Time 1	Time 8	Change	Residual
+.07	-.07	.78	.80	+.02	-.02
+.25	+.11	.70	.91	+.21	+.08
+.06	-.04	.69	.81	+.12	-.02
+.21	+.08	.73	.82	+.09	+.00
+.15		.73	.84	+.11	
+.13	-.02	.71	.84	+.13	+.01
+.13	+.00	.78	.84	+.06	+.04
+.11	-.04	.71	.81	+.10	-.02
+.12		.73	.83	+.10	
+.13	+.01	.68	.83	+.15	-.00
+.13	+.02	.68	.84	+.16	+.01
+.07	-.01	.70	.79	+.09	-.04
+.11	-.04	.77	.77	0.00	-.04
+.11		.71	.81	+.10	
+.13		.72	.82	+.10	

Table 8A-3
Grade 5 Allocated Hours to Reading Instruction
Per Child Over the Total Study Period

School	Skill Instruction: Word Attack Hours	Word Attack % Total Skill	Study Skills Hours	Study Skills % Total Skill	Comprehension Hours	Comprehension % Total Skill
IGE/WDRSD						
466	6.6	41	2.4	15	7.1	44
451	-	-	5.9	60	3.9	40
476	-	-	9.8	45	11.8	55
IGE/non-WDRSD						
372	27.1	28	10.8	11	60.3	61
410	16.2	29	15.7	28	24.9	44
493	6.9	22	9.3	30	14.7	48
non-IGE/WDRSD						
900	.1	0+	14.6	100	-	-
902	-	-	17.1	46	19.8	54
901	11.7	14	31.9	39	37.6	46
903	.7	3	-	-	19.1	96

[a]Hours of general reading were estimated from reported total allocation to reading and allocation to skills.

Skill Instruction

Total		General Reading		
Hours	% Total Hours	Hours	% Total Hours	Total Hours
16.1	13	104.7[a]	87	120.8
9.8	30	22.8[a]	70	32.6
21.6	11	172.8[a]	83	187.8
98.2	67	48.2	33	146.4
56.8	50	56.9	50	113.7
30.9	35	57.9	65	88.8
14.7	13	94.5[a]	87	109.2
36.9	33	73.8[a]	67	110.7
81.2	77	24.7	^	105.9
19.8	33	39.6[a]		59.4

Table 8A-4
Grade 5 Reading Achievement Results

	Content Area					
	Word Attack				Study Skills	
School	Time 1	Time 8	Change	Residual	Time 1	Time 8
IGE/WDRSD						
466	.59	.55	-.04	-.08	.43	.52
451	.48	.70	+.22	+.11	.58	.59
476	.61	.59	-.02	-.04	.49	.59
507	.61	.60	-.01	-.03	.60	.68
Average	.57	.61	+.04		.53	.60
IGE/non-WDRSD						
372	.47	.46	-.01	-.13	.43	.46
410	.45	.57	+.12	-.01	.54	.55
493	.72	.64	-.08	-.03	.58	.66
Average	.55	.56	+.01		.52	.56
non-IGE/WDRSD						
900	.59	.65	+.06	+.02	.53	.67
902	.59	.80	+.21	+.17	.53	.67
901	.55	.64	+.09	+.03	.39	.54
903	.59	.62	+.03	-.01	.49	.58
Average	.58	.68	+.10		.49	.62
Grand Mean	.57	.62	+.05		.51	.59

Content Area					
Study Skills		Comprehension			
Change	Residual	Time 1	Time 8	Change	Residual
+.09	-.01	.63	.64	+.01	-.07
+.01	-.06	.69	.69	0.00	-.04
+.10	+.01	.68	.72	+.04	-.01
+.08	+.02	.67	.78	+.11	+.06
+.07		.56	.71	+.04	
+.03	-.07	.62	.59	-.03	-.11
+.01	-.07	.54	.74	+.20	+.07
+.08	+.01	.72	.77	+.05	+.03
+.04		.63	.70	+.07	
+.14	+.06	.64	.72	+.08	+.01
+.14	+.06	.62	.78	+.16	+.08
+.15	+.04	.50	.63	+.13	-.02
+.09	+.00	.67	.75	+.10	+.03
+.13		.61	.72	+.11	
+.08		.63	.71	+.08	

Table 8A-5
Grade 2 Average Allocated Hours of Mathematics Skills Instruction Per Child Over the Total Study Period

	General Objective									1 Ob
	Writing Numbers 01		Inequalities 02		Other place value or numeration 03		Addition and Subtraction 04		Multiplication 05	
SCHOOL	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%
IGE/DMP										
440	18.7	31	1.8	5	.5	1	12.2	20	--	--
503	14.2	15	1.0	1	1.8	2	39.0	42	--	--
Mean	16.5	21	1.4	2	1.2	1	25.6	33	--	--
IGE/non-DMP										
428	3.2	7	3.9	8	1.5	3	22.2	47	1.4	3
421	.3	1	.0	0+	9.3	17	24.7	45	.5	1
333	.3	1	.2	0+	1.8	4	26.5	64	2.3	6
Mean	1.3	3	1.4	3	4.2	9	24.5	51	1.4	3
non-IGE/DMP										
904	4.8	10	3.3	7	--	--	21.8	44	--	--
906	10.2	11	5.3	6	--	--	26.4	29	--	--
762	5.6	9	1.7	3	.4	1	21.6	36	2.5	4
Mean	6.9	10	3.4	5	.1	0+	23.3	35	.8	1
Grand Mean	7.2	12	2.2	3	1.9	3	24.3	39	.8	1

NOTE: No allocated time is indicated by --; less than .05 hours is indicated by .0. 0+ indicates less than 0.5%.

In developing this table, it was necessary to assume that time for each objective was allocated equally to all children for whom logs were maintained; that is, if 18 hours were allocated

General Objective												
Fractions 07		Measurement 11		Word Problems 12		Applications 13		Geometry 14		Miscellaneous 15		TOTAL HOURS
Hours	%	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%	
.7	1	3.1	5	15.0	25	.2	0+	6.2	10	2.8	5	60.9
1.6	2	5.2	6	16.5	18	2.2	2	--	--	12.2	13	93.7
1.2	1	4.2	5	15.8	20	1.2	2	3.1	4	7.5	10	77.3
.5	1	2.3	5	1.2	3	--	--	1.6	3	9.1	19	46.9
3.8	7	3.1	6	.7	1	.9	2	1.9	3	9.4	17	54.6
2.3	6	1.7	4	--	--	--	--	2.4	6	3.7	9	41.2
2.2	5	2.4	5	.6	1	.3	1	2.0	4	7.4	16	47.6
5.4	11	.1	0+	9.6	19	.8	2	2.1	4	1.7	3	49.6
9.7	11	--	--	34.5	38	3.6	4	2.0	2	--	--	91.7
8.3	14	--	--	9.9	17	6.6	11	6.6	11	3.2	5	59.8
7.8	12	.0	0+	18.0	27	3.7	5	3.6	5	1.6	2	67.0
4.0	6	1.9	3	10.9	18	1.8	3	2.9	5	5.3	8	62.3

during one period to addition and subtraction (04), that time would have been recorded as 3 hours per child where logs were maintained for 6 children, 2-1/4 hours per child where logs were maintained for 8 children, and so on.

Table 8A-6
Mathematics Achievement Results for the Grade 2 Schools

SCHOOL	01--Writing Numbers				02--Inequalities				16--Place Value and Numeration	
	1	8	Change	Residual	1	8	Change	Residual	1	8
IGE/DMP										
440	.49	.78	+.29	+.07	.24	.57	+.33	-.06	.44	.74
593	.58	.87	+.29	+.07	.40	.84	+.44	+.14	.54	.86
Mean	.54	.83	+.29		.32	.70	+.38		.49	.80
IGE/non-DMP										
428	.48	.71	+.23	+.01	.31	.60	+.29	-.06	.45	.69
421	.49	.71	+.22	-.00	.43	.78	+.35	+.06	.48	.72
333	.62	.77	+.15	-.07	.36	.79	+.43	+.10	.57	.77
Mean	.53	.73	+.20		.37	.72	+.35		.50	.73
non-IGE/DMP										
904	.51	.73	+.22	-.00	.41	.72	+.31	+.01	.49	.73
906	.62	.84	+.22	+.00	.27	.73	+.46	+.08	.55	.82
767	.45	.60	+.15	-.07	.41	.44	+.03	-.27	.44	.57
Mean	.53	.72	+.19		.36	.63	+.27		.49	.71
Grand Mean	.53	.75	+.22		.35	.68	+.33		.50	.74
Standard Deviation	.07	.08			.07	.14			.05	.09

16--Place Value and Numeration		04/17--+/- Operations				07/18--Fractions			
Change	Residual	1	8	Change	Residual	1	8	Change	Residual
+.30	+.07	.32	.44	+.12	-.08	.34	.54	+.20	+.02
+.32	+.07	.40	.78	+.38	+.14	.51	.56	+.05	-.00
+.31		.36	.61	+.25		.42	.55	+.13	
+.24	+.01	.32	.46	+.14	-.06	.41	.41	.00	-.13
+.28	+.00	.35	.53	+.18	-.04	.59	.67	+.08	+.08
+.20	-.06	.43	.61	+.18	-.08	.52	.53	+.01	-.04
+.23		.37	.53	+.16		.51	.54	+.03	
+.24	-.00	.31	.54	+.23	+.04	.30	.60	+.30	+.09
+.27	+.01	.37	.63	+.26	+.03	.38	.59	+.21	+.06
+.13	-.10	.24	.44	+.20	+.04	.38	.43	+.05	-.10
+.23		.31	.54	+.23		.35	.54	+.19	
+.24		.34	.55	+.21		.43	.54	+.09	
		.06	.12			.10	.09		

(Continued)

Table 8A-6 (continued)

SCHOOL	11--Measurement 1	8	Change	Residual	12--Word Problems 1	8	Change	Residual
IGE/DMP								
440	.56	.57	+.01	-.16	.26	.48	+.22	+.13
593	.56	.75	+.19	+.02	.46	.71	+.25	+.05
Mean	.56	.66	+.10		.36	.60	+.24	
IGE/non-DMP								
428	.88	.97	+.09	+.15	.31	.43	+.12	+.00
421	.25	.88	+.53	+.23	.33	.48	+.15	+.02
331	.70	.83	+.13	+.06	.34	.49	+.15	+.01
Mean	.61	.89	+.28		.33	.47	+.14	
non-IGE/DMP								
904	.11	.80	+.69	+.19	.28	.33	+.05	-.05
906	.38	.32	-.06	-.37	.32	.47	+.15	+.02
762	.28	.53	+.25	-.13	.33	.28	-.05	-.18
Mean	.26	.55	+.29		.31	.36	+.05	
Grand Mean	.47	.71	+.24		.33	.46	+.13	
Standard Deviation	.26	.22			.06	.13		

13--Applications				20--Problem Solving			
1	8	Change	Resid-ual	1	8	Change	Resid-ual
.36	.46	+.10	-.00	.30	.47	+.17	+.10
.28	.62	+.34	+.23	.39	.67	+.28	+.10
.32	.54	+.22		.35	.57	+.22	
.28	.40	+.12	+.01	.30	.42	+.12	+.05
.46	.65	+.19	+.10	.38	.55	+.15	+.05
.43	.44	+.01	-.08	.38	.47	+.09	-.08
.39	.50	+.11		.35	.48	+.13	
.44	.54	+.10	+.01	.34	.41	+.07	-.05
.36	.30	-.06	-.16	.34	.40	+.06	-.06
.32	.24	+.02	-.10	.29	.26	-.03	-.08
.34	.36	+.02		.32	.36	+.04	
.35	.46	+.11		.34	.46	+.12	
.09	.14			.04	.12		

Table 8A-7
Grade 5 Average Allocated Hours of Mathematics Skills Instruction per Child Over the Total Study Period, by Objective

	General Objective													
	Addition/ Subtraction 04		Multi- plication 05		Division 06		Fraction Concepts 07		Fractions Computes 08		Decimal Concepts 09		Decimal Computes 10	
SCHOOL	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%	Hours	%
IGE/DMP														
440	2.7	3	11.0	12	16.7	18	28.0	31	13.3	15	.3	0+	.5	1
593	3.0	4	--	--	18.9	27	13.8	20	4.7	7	1.1	2	22.9	33
Mean	2.9		5.5		17.8		20.9		9.0		.7		11.7	
IGE/non-DMP														
428	.9	1	8.5	10	16.7	20	17.7	22	8.5	10	2.8	3	6.5	8
333	--	--	6.4	8	13.0	15	5.6	7	17.6	21	--	--	3.0	4
Mean	.5		7.5		14.9		11.7		13.1		1.4		4.8	
non-IGE/DMP														
905	.6	1	22.0	29	14.6	19	8.4	11	20.0	26	.3	0+	2.3	3
906	1..	2	18.0	21	20.1	24	12.9	15	14.5	17	4.5	5	1.5	2
Mean	1.0		20		17.4		10.7		17.3		2.4		1.9	
Grand Mean	1.4		11.0		16.7		14.4		13.1		1.5		6.1	

(Continued)

NOTE: No allocated time is indicated by--; less than .05 hours is indicated by .0. 0+ indicates less than 0.5%.

Table 8A-7 (continued)

SCHOOL	General Objective: Measurement 11 Hours	%	Word Problems 12 Hours	%	Applications 13 Hours	%	Geometry 14 Hours	%	Miscellaneous 15 Hours	%	TOTAL HOURS
IGE/DMP											
440	4.9	5	2.4	3	1.8	2	3.7	4	5.6	6	90.9
593	--	--	--	--	--	--	--	--	4.9	7	69.3
Mean	2.5		1.2		.9		1.9		5.3		80.1
IGE/non-DMP											
428	3.2	4	3.2	4	1.1	1	3.7	5	9.4	11	82.2
333	--	--	4.8	6	--	--	19.5	23	15.7	18	85.1
Mean	1.6		4.0		.6		11.6		12.3		83.7
non IGE/DMP											
905	--	--	3.6	5	--	--	4.2	5	.9	1	76.9
906	6.8	8	1.6	2	1.0	1	1.5	2	1.6	2	85.7
Mean	3.4		2.6		.5		2.9		1.3		81.1
Grand Mean	2.5		2.6		.65		5.4		6.3		81.6

Table 8A-8
Mathematics Achievement Results for Grade 5 Schools

SCHOOLS	04--Addition/Subtraction 1	8	Change	Residual	05--Multiplication 1	8	Change	Residual
IGE/DMP								
440	.83	.74	-.09	-.06	.62	.63	+.01	-.12
593	1.00	.96	-.04	+.02	.71	.86	+.15	+.11
Mean	.92	.85	-.07		.66	.74	+.08	
IGE/non-DMP								
428	.78	.81	+.03	+.05	.58	.76	+.18	+.02
333	.92	.88	-.04	+.00	.79	.73	-.06	-.02
Mean	.85	.85	-.01		.68	.74	+.06	
non-IGE/DMP								
905	.89	.85	-.04	-.00	.39	.76	+.37	+.0.
906	.86	.82	-.04	-.00	.65	.74	+.09	-.31
Mean	.88	.84	-.04		.52	.75	+.23	
Grand Mean	.88	.84	-.04		.62	.75	+.13	
Standard Deviation	.08	.07			.14	.07		

06--Division				17-Operations				07--Fractions Concepts			
1	8	Change	Residual	1	8	Change	Residual	1	8	Change	Residual
.31	.48	+.17	-.11	.55	.60	+.05	-.11	.50	.76	+.26	+.06
.37	.82	+.45	+.21	.66	.86	+.20	+.12	.40	.58	+.18	-.03
.34	.65	+.31		.61	.73	+.12		.45	.67	+.22	
.36	.54	+.18	-.06	.54	.70	+.16	-.01	.31	.55	+.24	+.02
.60	.65	+.04	-.04	.75	.73	-.02	-.03	.40	.60	+.20	-.01
.48	.59	+.11		.64	.72	+.08		.36	.58	+ 22	
.11	.52	+.41	-.01	.38	.70	+.32	+.04	.28	.48	+.20	-.02
.36	.60	+.24	-.00	.59	.71	+.12	-.00	.70	.85	+.15	-.02
.24	.56	+.32		.49	.71	+.22		.49	.66	+.17	
. .	.60	+.35		.58	.72	+.14		.43	.64	+.21	
.16	.12			.12	.08			.15	.14		

(Continued)

Table 8A-8 (continued)

SCHOOL	08-Fractions Computes 1	8	Change	Residual	18--Fractions 1	8	Change	Residual
IGE/DMP								
440	.18	.40	+.22	+.07	.37	.62	+.25	+.07
593	.22	.29	+.07	-.08	.33	.46	+.13	-.05
Mean	.20	.34	+.14		.35	.54	+.19	
IGE/non DMP								
428	.11	.33	+.22	+.06	.23	.46	+.23	+.04
333	.19	.23	+.04	-.11	.32	.45	+.13	-.05
Mean	.15	.28	+.13		.28	.46	+.18	
non-IGE/DMP								
905	.11	.26	+.15	-.01	.21	.39	+.18	-.01
906	.32	.51	+.19	+.06	.55	.71	+.16	-.00
Mean	.22	.38	+.16		.38	.55	+.17	
Grand Mean	.19	.34	+.15		.34	.52	+.18	
Standard Deviation	.08	.10			.12	.12		

09--Decimal Concepts				10--Decimal Computes				19--Decimal Fractions			
1	8	Change	Residual	1	8	Change	Residual	1	8	Change	Residual
.21	.42	+.19	+.09	.28	.43	+.15	-.03	.27	.43	+.16	-.00
.36	.43	+.07	+.02	.54	.84	+.30	+.15	.50	.74	+.24	+.12
.30	.42	+.12		.41	.64	+.23		.39	.59	+.20	
.25	.21	-.02	-.11	.44	.59	+.15	-.01	.39	.50	+.11	-.03
.33	.39	+.06	.00	.47	.47	+.00	-.16	.44	.45	+.01	-.12
.29	.31	+.02		.46	.53	+.07		.42	.48	+.06	
.11	.26	+.15	+.00	.31	.42	+.11	-.07	.26	.38	+.12	-.05
.28	.36	+.08	.00	.23	.54	+.31	+.12	.24	.50	+.26	+.09
.20	.31	+.11		.27	.48	+.21		.25	.44	+.19	
.26	.35	+.09		.38	.55	+.17		.35	.50	+.15	
.09	.08			.12	.16			.11	.13		

(Continued)

Table 8A-8 (continued)

SCHOOL	12--Word Problems				13--Applications				20--Problem Solving			
	1	8	Change	Residual	1	8	Change	Residual	1	8	Change	Residual
IGE/DMP												
440	.39	.51	+.12	+.05	.17	.23	+.06	-.02	.28	.39	+.11	+.03
591	.50	.55	+.05	-.00	.23	.26	+.03	-.02	.37	.41	+.04	-.03
Mean	.44	.53	+.09		.20	.24	+.04		.33	.40	+.07	
IGE/non DMP												
428	.28	.38	+.10	+.01	.20	.27	+.07	+.01	.24	.33	+.09	+.01
333	.48	.54	+.06	+.01	.23	.27	+.04	-.01	.36	.41	+.05	-.02
Mean	.38	.46	+.08		.22	.27	+.05		.30	.37	+.07	
non-IGE/DMP												
905	.43	.42	-.01	-.07	.07	.17	+.10	-.03	.25	.30	+.05	-.03
906	.58	.63	+.05	+.02	.15	.31	+.16	+.07	.37	.47	+.10	+.03
Mean	.50	.52	+.02		.11	.24	+.13		.31	.39	+.08	
Grand Mean	.44	.51	+.07		.18	.25	+.07		.31	.39	+.08	
Standard Deviation	.10	.09			.06	.05			.06	.06		

Part 3: IMPLICATIONS ABOUT IGE AND ITS EVALUATION

In the overview to Part 2, we stated why evidence about the effects of planned change is important. A second reason for establishing evaluation procedures for a large reform project is to share with practitioners and scholars what is learned, in this case about IGE and evaluation, and how that knowledge relates to the general literature on schooling and change. For example, the recent history of education in the United States is in large part characterized by massive efforts, sponsored by foundations or the federal government, to engineer and implement changes such as team teaching, programmed learning, individualized curriculum programs, modern mathematics, modern science, open multigraded schools, and so forth. But several authors, Goodlad (1976), Bellack (1978), and recently Wilcox (1982), have argued that it is difficult to find evidence that significant changes have indeed occurred in spite of these efforts. Schools seem to be very stable institutions which are inherently resistant to such changes. Since we observed the same phenomena in this project, some of the things we learned might be useful to others who are studying why schools resist change or how one might produce change.

When this project began, we planned that the members of the evaluation team would try to interrelate ideas from each of the different phases of the study and discuss them in light of specific problems associated with schooling. Unfortunately, that did not happen. Large projects are embedded in the social reality of the times. Interest in IGE and its evaluation which had been paramount in 1973 had waned by 1978.

Thus, we conclude this book about IGE with a single, brief chapter. However the staff of the project did attempt to convey our findings to a wide audience of educators. Following chapter 9 is a partial list of presentations and papers by staff of the IGE Evaluation Project.

CHAPTER 9

A CENTER GOES TO SCHOOL

Thomas A. Romberg

IGE AND ITS EVALUATION

The Center's program of Individually Guided Education is a product of the curriculum-school reform of the 1960s. It addressed the problem of directing elementary schooling toward the individual child. Traditionally, instruction is provided to groups, not individuals, with the groups formed by age (third graders) or by ability subgroups (slow fifth graders). Instruction under these conditions was seen as both ineffective and inefficient: ineffective in that the particular learning needs of many children were not being met, and inefficient in that time and resources were being wasted or poorly used.

In attempting to solve this problem, notions from the then current ideology in educational psychology (e.g., systems analysis, behavioral objectives, learning hierarchies) were merged with the intellectual bases of the "new" curricula being developed. The contrast between the existing typical elementary school and the school of the future was summarized by Klausmeier, Morrow, and Walter in 1967. (See Table 9-1.) As the ideas were given form in cooperating classrooms and schools, what emerged was a set of procedures schools could use and adapt to [illegible]r instruction to the needs of individual children. The comprehensive program that evolved was hailed as "one of the most powerful and flexible sets of approaches yet devised for the continuing renewal of educational institutions and the facilitation of teaching and learning" (Chase, 1970, p. 2).

By the 1975-76 school year, nearly 3,000 elementary schools in the U.S. were identified with IGE. The IGE evaluation project began in May of that year to portray the extent of the impact of IGE on elementary schooling. Data collection was completed at the end of the 1978-79 school year; analysis and reporting of results continued from that time. The basic results of the evaluation study were presented in chapters 4-8 of this volume and are briefly summarized here.

Table 9-1
Summary of Functions of an Elementary School
Today and in the Future

Functions of the Elementary School Today	Functions of the Elementary School in the Decades Ahead
(1) Attempting to execute a system-wide standard instructional program designed by others	(1) Developing and executing an effective total system of education within each building
(2) Accepting sporadic attempts by other agencies to update the teaching staff	(2) Initiating and performing inservice education of teachers and other instructional personnel within each building as part of systematic statewide program
(3) Accepting some innovations recommended by others without systematic testing	(3) a. Selecting carefully and testing innovations prior to acceptance within each building b. Developing and testing new procedures and materials
(4) Accepting pre-student teachers, student teachers, and interns without adequate provisions for their instruction in the school and without adequate supervision by college or other personnel	(4) Conducting preservice education of teachers and other instructional personnel within some buildings as part of a systematic statewide program
(5) Permitting others to use students and instructional staff as subjects for short-term studies that are usually unrelated to instructional improvement	(5) Initiating small-scale development-based research on instruction and participating with other agencies in descriptive research, controlled experimentation, and comprehensive development-based research

(From Klausmeier, Morrow, & Walter, 1967, p. 2.)

1. While responses to an IGE implementation questionnaire were received from over 900 schools, in many of those schools IGE was never truly adopted. The degree of implementation of IGE components was low. Nearly 60% of the sample could at best be called "nominal" adopters of IGE, and only about 20% could be called true implementers.

2. The staff and student survey (Phase I) conducted in October 1977 in over 150 schools using the IGE label showed that the variation in implementation of certain IGE organizational components had no relationship to variation in student achievement in reading and mathematics. However, the implementation of IGE components was found to be directly related to level of teacher job satisfaction. Participation in a larger IGE movement and satisfaction with the effectiveness of their instructional program seem to be the key aspects of teachers' job satisfaction.

3. Phase II, a validation study of the Phase I survey and an extension in the area of implementation, substantiated the survey results of Phase I for the sample of 30 schools drawn from the Phase I sample. A key finding of Phase II relates to variation in IGE implementation among the schools, reflecting differential understanding of the IGE components; the more successful IGE schools were those in which the program had been installed in a well planned fashion, with prior staff commitment and parent approval and provision for sufficient training. This phase was conducted in spring 1978 by Research Triangle Institute under a subcontract with the Center.

4. Phase III, a case study carried out during the 1977-78 school year in six schools, focused on institutional life as characterized by work, knowledge, and occupational ideologies. Three institutional configurations were identified--technical, constructive, and illusory. Different assumptions about teaching, learning, and schooling in the three types of schools determined the form that IGE took in those schools. All six schools had been nominated by regional IGE leaders as exemplars of IGE schooling. Thus, even in schools reported to be exemplary IGE schools, quite different patterns of use were observed.

5. Phase IV was conducted to study the implementation and effectiveness of the Center's curriculum programs: DMP, WDRSD, and PRS. In the DMP descriptive study, instructional time was found to predict student achievement on some of the instructional objectives; that finding did not hold for

the WDRSD and PRS descriptive studies. Interrelationships examined in the comparative studies failed to find major differences which could be attributed to either IGE or the curriculum programs. We found that each classroom or Unit is unique, with differences in what content is taught and how much time is allocated to the content; what operationally constitutes an instructional program differs among classes, particularly in reading; and IGE and non-IGE schools did not systematically differ on content or time variables.

Both the Center's system of Individually Guided Education and the Ford Foundation's Comprehensive School Improvement Program (CSIP) were begun in the 1960s to "change the traditional habits of school systems" (Ford Foundation, 1972, p. 40). Both used the same R → D → D (center → periphery) strategy for change. The Ford Foundation approached change through the process of teacher development, a "professional" approach based on its research experience of the 1950s; the Center's approach was based on research on individual student differences and needs. Both saw the need for bringing "new ideas and techniques together to achieve not just a patchwork of improvement, but a coherent design of advancement" (Ford Foundation, 1961, p. 105). The same analysis of results can be applied to both programs.

> The limited outcomes . . . strongly suggest that a program aspiring to be "comprehensive" must look beyond the manipulation of variables within the school, and reckon more directly with outside factors such as financing, parent expectations, and local social and political pressures. The more fundamental the changes conceived, the more central such issues become. (*A Foundation Goes to School*, Ford Foundation, 1972, p. 40)

WHAT WE LEARNED BY GOING TO SCHOOL

To summarize all that we learned by examining IGE in schools is impossible. Many important findings have already been discussed. Here I would like to emphasize ideas that illustrate what we learned about evaluation, about schools and reform, about IGE and its implementation, and about the r & d center program and federal efforts to change education.

About Evaluation Design

Gathering data from several different perspectives about the same program in schools provides a more complete, and more complex, picture of how the program is given meaning in

schools. The combination of self-report survey data, interview validation data, field study data, and time-on-task observational data provided a more complete picture of IGE in practice than any one of the procedures would have by itself.

Some of the methodological details used in this study warrant the attention of other researchers and evaluators. For example, the use of causal modeling in Phase I was very helpful both in conceptualizing the problem of relationships and in testing relationships. The validation-interview procedure used in Phase II should be used in similar studies. In Phase III, the selection of a sample of exemplary IGE schools using a "reputational" survey and the socio-political framework for the field study of those schools should be of considerable interest. And finally, in Phase IV, the repeated measures of primary objectives, the use of teacher logs and extensive observations of pupils and teachers should be attended to by other scholars.

About Measuring Achievement Outcomes

When designing the study, we recognized that there were problems with the measures of student outcomes. Scores from standardized tests (adjusted for aptitude) were used as outcome variables in Phase I, and scores from matrix-sampled objective-referenced tests were used in Phase IV. Then scores were aggregated to form unit or class means. There are both conceptual-validity problems and unit-of-analysis problems associated with these procedures.

A standardized test score is not sensitive to variations in need and instruction. Similarly, objective-referenced tests, while more sensitive to instruction, would only capture group growth if there were considerable common instruction within groups. The data in Phase IV (see chapter 8) clearly show this is not the case. There is not a "common core" of instruction in either reading or mathematics. What is clear to us now is that scores from norm-referenced and objective-referenced tests, no matter how adjusted or aggregated, were inadequate.

The ideal outcome measure would have been an index of how well the planned variations in instruction met the needs of each individual. Thus, the student would be the unit for data collection, and the index would relate student needs, instructional intent, and pupil performance. For example, one student may need to learn how to group and partition

sets. The index would indicate the match between this need, the related instructional activities, and how much the student learned.

About Schools and Reform

The rational procedures which evolved in school settings to solve a particular problem were adopted and adapted as procedures which could be used to solve other problems. Changes in schooling frequently occurred to meet practitioners' short-term needs, rather than to adopt the comprehensive system of IGE.

As stated earlier, the primary problem IGE addressed was how to shift instructional planning from the group to the child. In making such a shift, the key step was identifying the intellectual needs of the child; instructional planning was to proceed from that point. It was assumed that schools agreed with this goal and that practitioners would see the IGE procedures as means to be used to reach the goal.

In most schools that used the IGE label, there was neither understanding of nor agreement with this goal. The procedures were used for other ends. Very often the label was used symbolically to justify the maintenance of current practice, as in the nominal or illusory IGE schools. In other schools adopting IGE, the goal became to increase efficiency of current practices (as in the technical schools), or to have a different administrative organization, or to increase students' sense of community and cooperation (as in /I/D/E/A/ IGE schools). However, the procedures of IGE were not developed to foster independent-individualized instruction or to provide an open learning environment; the multiunit school was not devised as a new administrative arrangement to be used with conventional instructional goals. It is obvious that the label *IGE school* does not have a clear and consistent meaning. We now believe the impact of IGE was limited because most schools did not identify meeting individual student learning needs as their goal and did not see the procedures which had been developed as means to that end.

Further, the grouping and regrouping of students for instruction seemed to be the most misunderstood and poorly implemented aspect of IGE. The assumption made in IGE was that students should be grouped for instruction according to need; instruction should proceed for two to three weeks; then new groups should be formed. The determination of need was to be based on test data, motivation procedures, and profes-

sional judgement about each student. Data particularly from Phases II and IV of this study show this was not the case. The age-graded, self-contained classroom was still the norm; grouping was done annually, often on general ability not need; motivational procedures were not followed; and shared decision-making about grouping and regrouping was rare. Basic changes in the traditional classroom structure simply were not made in most schools.

There was little evidence of change in instructional habits--and where change was made it was inappropriate. As stated in chapter 1, content traditionally is segmented and sequenced with little possible variation. Students in classes compete among themselves on the lessons within each segment; evaluation is based on within-group standing; and control is maintained through behavior constraints unrelated to instruction. The intent of instructional programming in IGE was to challenge this set of habits by expecting variations in what students were taught, having students compete against objectives rather than peers, evaluating students on objective-referenced tests, and stressing goal setting and other motivational procedures as the basis of group control. In most schools, the old habits remained. Changes from the traditional practices were evident in some schools, but most often behavioral objectives, related testing, and pacing were emphasized. What became important was that all students master the same set of objectives, and variation in pace was assumed. Variations in need, grouping and regrouping, motivation, and so on were replaced by independent-individual instruction, a most inefficient instructional procedure.

The idea that there is a monolithic American educational system is a myth. While there are common traditional characteristics of schooling that are hard to change, change is seen as important. However, the focus of that change is more likely to reflect local social and political pressures than grand designs for fundamental reforms of the system. Thus, it is not surprising that the procedures of IGE were adapted to the pathology of the urban environment in the illusory schools, or that reading became no more than a set of procedures for mastery of objectives in rural and working class schools.

About IGE and Its Implementation

The limited positive outcomes of IGE are to some extent due to the program itself. The eclectic basis for the procedures meant practitioners could select what they wanted from the components, and the issues and problem-solving

orientation which surrounded the development of IGE were lost in the implementation strategy utilized.

Because IGE was developed in an eclectic manner, it lacks a strict ideological structure. The problem being addressed dealt with organizing instruction for student learning, but there was never adoption of one theory of learning. IGE, because of its functional evolution, drew on ideas from both the behavioral and constructive psychological traditions. Constructivist activities which allow students to explore and discover, as in DMP and PRS, are organized via task analyses and assessed via tests related to behavioral objectives. The management and administrative procedures are based on notions from systems analysis where knowledge to be acquired is fixed, yet instructional procedures remained flexible. The original notion of student needs thus was open to different interpretations.

The center→out implementation strategy adopted was inconsistent with the problem-solving history from which IGE had developed. In the message that was disseminated, the issues were lost. The early dissemination materials emphasized children ("Think Kids"), the contrast between age-graded, self-contained classrooms and instruction in I & R Units, enthusiasm for innovations and experimentation (the original notion of a facilitative environment), and optimism about reform ("Away with Tradition"). In later dissemination materials the emphasis shifted to procedural rules and performance objectives. The learning child was hardly mentioned, discussion of motivational procedures and professional judgments was omitted, and facilitation became associated with the supportive network of other IGE schools.

About University-Based R & D Centers

These centers have a role in educational reform that is special in two often contradictory ways. First, because of the talent located at major universities and the stable structure of faculty tenure, the setting is ideal for carrying out long-term research and development. The scholarly interests of a particular professor in generating knowledge about a phenomenon are not apt to be affected by varying social concerns. For example, it is hard to see how research-based programs such as *Individually Guided Motivation* or *Developing Mathematical Processes* could have been produced in another setting.

Second, as a consequence of this role of universities, many people overestimate the utility of both the knowledge base and the programs produced. As new knowledge is generated, the basis of the program is eroded. For example, today, as a result of extensive research, our knowledge of how students learn has expanded exponentially. Hence, the fundamental problem of "student learning needs" today would be approached quite differently than it was in the 1960s. (See Case & Bereiter, 1982, or Romberg & Carpenter, in press, for details of this evolution.) Also, school staffs (and federal funding agents) fail to see that programs developed to produce long-term fundamental changes in school practices are of little use in dealing with short-term operational problems.

About Long-Term R & D Efforts to Change Education

It has been 20 years since the federal government established r & d centers; the IGE program, the major product of the Wisconsin Center in its initial dozen years, has been held up as an example of the impact such centers can have on education.

Long-term research and development activities are difficult to carry out in periods of varying social concern. The federal r & d center program and IGE are products of the post-Sputnik curriculum reform era when the intellectual growth of students was of prime concern. By the time initial elements of IGE were being produced in 1969-71 (the word-attack management materials in reading and the multiunit school), U.S. involvement in Vietnam, racial unrest, environmental awareness, and inequality of educational opportunity were the concerns. It is not surprising then that schools saw the IGE procedures as techniques to address these social concerns. In particular, the /I/D/E/A/ implementation efforts for IGE were clearly focused on social concerns. Next, by the time the WDRSD and DMP programs were completed and an extensive set of IGE implementation materials was prepared in 1975, there had been a conservative retrenchment. For example, in reaction to the controversial elementary social studies program *Man: A Course of Study*, funds to develop and implement curriculum programs were stopped. Thus, just at the time a concerted and coherent implementation effort for IGE could have been mounted, concerns about the role of the federal government in school reform were paramount. The IGE evaluation effort was started in response to this concern, to document the impact of IGE on schooling practice.

New and different social concerns are regularly drawn to the attention of policy makers and school staffs. Each concern reflects a problem and, in most cases, a different conception of student needs. Federal funding agencies find it difficult to allocate resources for long-term efforts. Federal support is closely tied to political needs and social pressures. Also, in the period of 1963-83, there have been several changes in administration and bureaucratic reorganization. Each change brought in new people with new interests who expected new and different products. And, given that the administration may change every four years, results must be produced in that period.

A FINAL WORD

In today's political discussions, identifying features of "effective" schools has gained prominence (Purkey & Smith, 1983). In one sense, we have come full cycle with concern again on student learning; but in another sense, the current concern is quite different. Curriculum engineering has given way to identifying organizational features and policy actions. The notion of "effectiveness" is still very fuzzy. There should be open debate over such questions as What constitutes the knowledge that students should acquire? and How does one decide whether that knowledge has been acquired? Improved scores on standardized tests are not adequate evidence.

It is important to remember that procedural change takes place only at the school level. Policy changes at the federal or state level may influence change but are likely to result only in ameliorative, nominal, or symbolic changes. Change at the operating school level will only happen when the problem is identified, staff are committed, and traditions openly challenged. Changed outcomes are not enough to demonstrate that change has taken place. One must be able to see changes in what students and teachers do.

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PRESENTATIONS AND PUBLICATIONS

PRESENTATIONS

AMERICAN EDUCATION RESEARCH ASSOCIATION (AREA) ANNUAL MEETING, Boston, April 1980.

A Study of Schooling and School Reform: An Evaluation of IGE (Symposium, Division H)

CHICRITIC
Arno Bellack, Teachers College, Columbia University

PARTICIPANTS
Evaluating a Structural Model Implicit in IGE: Can the Variables Be Wrung from Questionnaire Responses and What Can the Approach Say About an Educational Program? Gary G. Price.
What Can be Learned from Validation of Self-Report Data? Roderick A. Ironside.
Linking System Variables and Pupil Performance Via Core Curriculum. Norman L. Webb.
A Methodological Approach to the Study of Educational Reform. B. Robert Tabachnick.
The Social Context of Schooling and the Planning of Change. Thomas S. Popkewitz.
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478 Procedures used in Phase I of the IGE evaluation to scale the variable General Staff Background. (ED 182 329)

479 Procedures used in Phase I of the IGE evaluation to scale the variable Interorganizational Structure. (ED 182 333)

480 Procedures used in Phase I of the IGE evaluation to scale the variable Belief in Individual Differences. (ED 182 327)

481 Procedures used in Phase I of the IGE evaluation to scale the variable View of Learning: Constructivism vs. Behaviorism. (ED 182 339)

482 Procedures used in Phase I of the IGE evaluation to scale the variable School's Demographic Setting. (ED 182 336)

483 Procedures used in Phase I of the IGE evaluation to scale the variable General Implementation of the Instructional Programming Model. " (ED 182 328)

484 Procedures used in Phase I of the IGE evaluation to scale the variable Teacher Job Satisfaction. (ED 182 337)

485 Procedures used in Phase I of the IGE evaluation to scale the variable Utilization of Curriculum Resources. (ED 182 338)

486 Procedures used in Phase I of the IGE evaluation to scale the variable Information Acquisition. (ED 182 331)

487 Procedures used in Phase I of the IGE evaluation to scale the variable Individualization of Instructional Decisions. (ED 182 330)

488 Procedures used in Phase I of the IGE evaluation to scale the variable Management of Grouping and of Instructional Continuity. (ED 182 334)

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