8-073

JAN 08 2001

ABSTRACT

THE EFFECTS OF INDIVIDUALIZING INSTRUCTION BY THE USE OF MULTI-SENSORY MULTI-MEDIA LEARNING CENTERS ON READING AND ARITHMETIC ACHIEVEMENT OF INNER-CITY CHILDREN

by

Jasmine Fernando Jacob

The Purpose

The purpose of this study was to determine the effects of an individualized instructional approach on inner-city school children. More specifically, the study attempted to determine what effect an individualized, diagnostic, prescriptive instructional approach has on achievement gains in arithmetic and reading and whether children in such a program evidence greater independence than children not in the program.

The content in both subjects remained the same for the experimental and control students, only the method of instruction was changed so the experimental students learned through multi-sensory, multi-media, learning centers.

The Hypothesis

The general hypothesis tested was that the children who receive the experimental treatment in reading and arithmetic will have higher achievement

scores on the California Achievement Test reading and arithmetic batteries than the children who receive the control treatment and that the experimental children will evidence more independence as measured by a questionnaire.

The above general hypothesis was particularized in the following statistical sub-hypotheses:

1. There is no difference in achievement in reading between the experimental and control groups.

2. There is no difference in arithmetic achievement between the experimental and control groups.

3. There is no difference in reading achievement between the girls and the boys in the two groups.

4. There is no difference in arithmetic achievement between the girls and the boys in the two groups.

5. There is no difference in reading achievement between the high ability students or the low ability students in the two groups.

6. There is no difference in arithmetic achievement between the high ability students or the low ability students in the two groups.

7. There is no difference in the number of children exercising self-direction and independence in the two groups.

Procedures

The sample selected for this study consisted of 211 inner-city fifth and sixth grade students from Seely

McCord and Martin Luther King Jr. Elementary Schools in Benton Harbor, Michigan.

The design of the study was the non-randomized control group pre-test, post-test design. This design was used since the researcher was unable to achieve the rigorously controlled design that requires the subjects to be assigned to comparison groups at random; therefore, equivalent pre-assembled groups were used.

The univariate analysis of covariance was applied to the above statistical sub-hypotheses.

Findings

Using an analysis of covariance of the California Achievement Test scores with the pre-test scores used as the covariate and the post-test scores used as the dependent measure it was found that:

1. The subjects in the experimental reading program achieved significantly higher than the subjects in the control program.

2. There was no significant difference between the experimental and control groups in arithmetic achievement, however, high ability students in the experimental arithmetic program achieved slightly more than the high ability control students and the low ability control students achieved slightly more than the low ability experimental students in arithmetic.

3. The girls in the experimental reading program achieved significantly higher than the girls in the control program. The girls in the control program scored higher than the boys in the control program.

4. Sex differences were not significantly related to achievement in arithmetic for either of the groups.

5. High ability students in the experimental reading program scored significantly higher than the high ability control students.

6. The low ability students in the experimental reading program achieved significantly higher than the low ability control students.

7. An appreciably higher number of experimental students displayed independence and self-direction than the control students.

The conclusion is that individualizing instruction for reading by the use of multi-sensory, multi-media learning centers accounts for increased achievement gains on the California Achievement Test and that individualizing instruction in reading and arithmetic promotes self-direction and independence as measured by a questionnaire, observations, and general comments by students and teachers.

THE EFFECTS OF INDIVIDUALIZING INSTRUCTION BY THE USE OF MULTI-SENSORY MULTI-MEDIA LEARNING CENTERS ON READING AND ARITHMETIC ACHIEVEMENT OF INNER-CITY CHILDREN

by

Jasmine Fernando Jacob

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

The Department of Elementary and Special Education

1976

ACKNOWLEDGEMENTS

The writer expresses her deepest gratitude to the chairman of her committee, who is also the chairman of the dissertation committee; Dr. William K. Durr on whose kindness and patience she has leaned not a little. His interest, guidance, encouragement, and succinct criticism throughout this study have been indispensable. Sincere appreciation is also expressed to Dr. Louis Romano, Dr. Perry Lanier and Dr. Christopher Sower for helpful suggestions and encouragement.

The writer is deeply indebted to her colleagues Barbara Pence and Pat Rodez for proofreading, Dr. Wahbah Sayagh, and Gali Edon for statistical assistance, Mr. Joseph Shurn, Mrs. Greeta Hines, and the teachers, Marcia Goff, Kathy Hiler, Virginia Tilly, Mr. Brandon, Mrs. Reed and Sherry Collins and all their students for their cooperation and help in making this study a possibility.

The author also wants to thank Ernest and Savithri Fernando, Andy and Wilma Moore and a host of other friends, and relations, to list them all by name is of course beyond possibility, and though here they must remain nameless, her gratitude to them is nonetheless deep and sincere.

Finally the writer wishes to express her deepest and heartfelt thanks to her husband, Narasimiah, and children Cheryl and Mark and her mother, Mrs. Prelenthina Fernando for their sacrifices, encouragement, and understanding throughout the years of graduate study.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

CHAPTER I

THE PROBLEM

Man has witnessed a series of startling scientific breakthroughs that have led to a renewed faith in his intellectual potential. The explosion of knowledge challenges that potential while research on how learning takes place has denied the notion that each student should learn the same limited facts in the same, identifiable ways.

Education is in the process of changing its emphasis from content to abilities, from a selective mode to an adaptive mode, from product to process, from group paced to individual based, from the average child as the center of the instructional program to the recognition of each student as unique and in need of a curriculum geared to his personal needs. Many types of grouping procedures have been used to facilitate this change, but none has proven completely acceptable. Educators are beginning to recognize that perhaps the best way to provide needed flexibility is to eliminate the lock-step graded structure and to substitute an individualized, self-directed form of instruction.

Nature of the Problem

This study is an attempt to evaluate one self-directed, individualized form of instruction: Individualizing Instruction by the use of Multi-sensory, Multi-media, Learning Centers. Although there has been a proliferation of approaches and models for individualizing instruction, very few programs have been developed through controlled stages of refinement to a polished state, and very few, if any, can be recommended on the grounds of proven, desirable increments in student accomplishments.[1]

Most programs have limited options and allow only minimal variations in the conditions under which individuals are expected to learn. Therefore, the adaptability of the programs to the individual needs of the students are limited. Because of this rigidity, most programs do not lend themselves to true individualization.

Ideally, individualized instruction means an arrangement that makes it possible at all times for each student to be engaged in learning those things that are most appropriate for him as an individual. This ideal may never be reached, but we should move toward it. "Individualized instruction is not a clearly defined point

---

[1]Maurice Gibbons, Individualized Instruction (New York: Teachers College Press, 1971), p. 10.

at which we arrive in teaching as much as it is a target at which we aim, and toward which we progress."[1]

> Individualized instruction is not the same thing as "teaching students individually." An instructional system is individualized when the characteristics of each student play a major part in the selection of objectives, materials, procedures, and time. It is individualized when decisions about objectives and how to achieve them are based on the individual student. One does not simply say that a system is or is not individualized, however, for it is not a black or white matter. Rather one tries to identify the nature and degree of individualization.[2]

Individualization is not a method. It is a way to manage a classroom so that each child has his share of the teacher. Teaching is a human act. It fades away when it is dehumanized. Children whose individual differences are truly met will be better taught because of these differences and not in spite of them.[3]

Individualization of instruction is consistent with the basic American goal of helping each individual achieve his full potential. The realization of that goal, however, is complicated by the wide range of individual differences among learners. These differences span ability, rate of learning, learning style, level of motivation, linguistic

---

[1]Thorwald Esbensen, Working With Individualized Instruction (Palo Alto, California: Fearon Publishers, 1968), p. 1.

[2]Ibid., p. vii.

[3]Gene E. Talbert, and Larry E. Frase, Individualized Instruction (Columbus, Ohio: Charles Merrill Publishing Company, 1972), p. 92.

skills, learning environment, and the subject matter, to mention a few. In order to accommodate these differences, the teacher must know children as never before and provide them with flexible alternatives from which to choose.

When instruction is individualized, the classroom becomes the setting for an experience in cooperative group living and learning. Children learn while working alone, while working with others, or while working with the teacher. The room is organized into learning centers to allow for individual and group efficiency rather than the traditional total class standard of quietness. And children actively participate in their own learning.

Need for the Study

For some years now the academic achievement levels in the Benton Harbor inner city schools have been deteriorating and disciplinary problems have been increasing. Many attempts have been made to remedy these problems. For example, differentiated staffing has been initiated, curricula have been changed or modified to meet the needs of the community, textbooks have been changed to be relevant to the local population, and criterion referenced measuring instruments have been developed. New programs, such as Individually Guided Education, High Scope, Distar, T.V. Reading, Project Conquest, Impact, and Soar were implemented. None has been proven to lead to significant changes in attitude or achievement.

In another attempt to turn the tide of academic failure, a program of inservice training and follow-up, called Staff Development, was initiated to help teachers individualize instruction through multi-sensory, multi-media learning centers. Since programs frequently come and go without adequate evaluation, this is an endeavor to evaluate that program to determine its effects on the test scores and the attitudes of the students.

Purpose of the Study

The purpose of this study is to determine some of the cognitive and affective results of individualizing instruction through multi-sensory, multi-media, learning centers. This study is specifically, designed to answer the following five questions:

1. Will students who receive individualized instruction in reading and arithmetic have higher test scores on the California Achievement Test than those whose instruction is not individualized?

2. Will there be differences in achievement gains in reading and arithmetic between boys and girls in the two treatment groups.

3. Will students with high cognitive ability who receive individualized instruction have higher test scores than their counterparts whose instruction is not individualized?

4. Will students with low cognitive ability who receive individualized instruction have higher test scores than their counterparts whose instruction is not individualized?

5. Will students who receive individualized instruction be more self-directed and independent than students who do not receive individualized instruction?

Design and Methodology

The sample for this study is taken from the Martin Luther King and the Seely McCord Schools in Benton Harbor, Michigan. Two hundred and eleven fourth and fifth grade students from six classrooms constitute the experimental and control groups.

The California Achievement Test batteries in reading and arithmetic are used as pre- and post-tests. The Lorge Thorndike Intelligence Test, multi-level edition, non-verbal battery, is used to assess the cognitive abilities of the students. The affective changes are assessed by a questionnaire and an interview.

Three experimental classrooms provide individualized learning experiences and continuous progress for each child. In these classrooms pupil activity does not revolve around the teacher even though the teacher is still the most influential person in the classroom. With the teacher's guidance, the students are encouraged

to set up their own goals and standards for classroom behavior.

Flexible scheduling with large blocks of time allow the children to become directly involved with learning. Manipulative devices and games are used as primary learning materials rather than as supplementary activities. In this flexible system of multiple materials and procedures the student is given substantial responsibility for planning and carrying out his own organized program of study with the assistance of his teachers.

In the control classrooms, the teachers teach in traditional settings with children sitting in neat, straight rows and the teacher controlling the interaction. The instruction is group paced, the children study the same lesson from the same book, and they are expected to do the same amount of work at the same speed. Textbooks and lectures dominate the instruction. The students have no choice of materials or content. The teacher is the attendance taker, the lecturer, the assignment giver, the test checker, the drill master, and the controller of all interaction or the absence of it.

Educational Implications

It is the right of every individual to acquire an education up to his own individual potential within

the school system. This means that the educational system must be an adaptive rather than a selective one. In other words, the system must adapt to the needs of children rather than simply select the children who are most likely to succeed in the educational system. It also means harnessing the available innovations and techniques of modern, educational technology to assist the individual toward self-development and self-fulfillment.

In order to reach the goal of self-fulfillment, schools must produce self-directed citizens who have learned how to learn, and can go on learning and adapting themselves to new knowledge as it occurs. In other words, schools must produce citizens who accept the major responsibility for their own learning.

> Schools which do not produce self-directed citizens have failed everyone--the student, the profession, and the society they are designed to serve. The goal of modern education cannot be achieved without self-direction. We have a world in which there is no longer a common body of information which everyone must have. . . . This calls for student cooperation and acceptance of the major responsibility for his own learning.[1]

If a democracy like ours is to survive, students must be encouraged to question, to criticize, to make choices, and to take the responsibility for those choices. Students who have everything decided for them will lack

---

[1]Arthur Combs, "Fostering Self-Direction," Educational Leadership, February 1966, pp. 373-376.

experience in making correct decisions; they will lack experience in making any decisions at all.

Definition of Terms

Individualized Instruction is a system which tailors learning in terms of learner needs and characteristics.[1] It is a flexible system of multiple materials and procedures in which the student takes substantial responsibility for his own learning.

Traditional Instruction is group paced, teacher controlled, and based primarily on the textbooks and lectures. Children generally sit in neat rows facing the teacher and are expected to work quietly at their desks.

Learning Style in individualized instruction means those factors that ease and facilitate learning for an individual student in a given situation.[2] Does he work best in a small group, large group, one-to-one, or independently? Which sensory factors does he use best? What is his learning tempo? How does he go about solving problems?

---

[1]James E. Duane, Individualized Instruction Programs and Materials (Englewood Cliffs, New Jersey: 1973), p. 26.

[2]William Bechtol, Individualizing Instruction and Keeping Your Sanity (Chicago: Follett Publishing Company, 1973), p. 46.

Learning Rate is the speed at which an individual accomplishes the task of learning. Each individual learns at a different rate, some needing less time than others to learn a task.

Learning Environment is the aggregate of surroundings, things, conditions, and influences that effect learning.

Learning Center is a specific area in a classroom where the necessary components for specified objectives are located for students to use independently and conveniently.[1]

Multi-Sensory Materials are instructional materials designed to facilitate learning through the use of the senses, such as sand, clay, geometric objects, pictures, records, and other materials.

Limitations

The results from the study must be received in light of several limitations:

1. The study was limited to one sample of elementary students which was not chosen randomly from all elementary students.

2. The study was limited to changes in instructional strategies and the result from those changes which could be accomplished in a single year.

---

[1]Ibid., p. 80.

3. The study was limited to selected cognitive and affective changes in students and did not encompass all cognitive and affective changes which could occur.

Overview

Chapter II contains a review of the literature related to this study.

A discussion of the methods and procedures used in this study are found in Chapter III.

In Chapter IV a case study of the change process from group paced to individual based instruction is presented.

Chapter V contains the statistical findings.

Conclusions, implications and summary are presented in Chapter VI.

CHAPTER II

REVIEW OF RELATED LITERATURE

Although many experiments in individualized instruction have been conducted, educators still disagree about the best format, approach, and techniques of individualization. The search continues as experimentation in individualizing instruction broadens both in the number of schools involved and in the types of individualized instruction available.

In this chapter an attempt is made to briefly look at the history, philosophy, theory, practices, and research of individualized instruction.

Historical Background of Individualizing Instruction

The recognition of, and the concern for, human variabilities in the process of education at least dates back to the time of Confucius, Plato, and Socrates.

Confucius adapted his teachings to the needs and capabilities of individual students. Plato suggested that the philosophers should attempt to educate each person only as far as his limitations would permit. Socrates

emphasized self-knowledge and he wanted people to live meaningful lives within their own individual capacities.[1]

Jesus Christ in His teachings dealt with men individually.

> It was by personal contact and association that He trained the twelve. It was in private, often to but one listener, that He gave His most precious instructions. To the honored rabbi at the night conference on the Mount of Olives, to the despised woman at the well of Sycher, He opened His richest treasures; for in these hearers He discerned the impressible heart, the open mind, the receptive spirit. Even the crowd that so often thronged His steps was not to Christ an indiscriminate mass of human beings. He spoke directly to every mind and appealed to every heart. He watched the faces of His hearers, marked the lighting up of the countenance, the quick responsive glance, which told that truth had reached the soul.[2]

During the Middle Ages it is said that Charlemagne called a teacher to his high court to teach because he had heard that this person paid particular attention to individual differences.

During the Renaissance in Italy and the Reformation in England, various individual interests of students were recognized. Students were encouraged to do those things for which they had a natural inclination. Although most of the instruction of this period was group oriented, the masters assigned work to students and then worked with

---

[1]Howard E. Blake and Ann McPherson, "Individualized Instruction: Where Are We," Educational Technology (December 1969):63.

[2]Ellen G. White, Education (Mountain View, California: Pacific Press Publishing Association, 1903), p. 231.

small groups of children in order to provide for individual differences.

In the 17th century Comenius formulated rules for teaching that suggested education should fit the comprehension level of the child and that children should learn by doing.

Rousseau criticized teachers of his day for giving the same exercise to all the children, thus destroying any special individuality which might exist in the classroom. Pestalozzi believed that each child possessed individual power and capabilities and that the methods of teaching were to be individualized to develop these capabilities.

In the more recent past, educators like Alfred Binet gave recognition to individual differences by his invention of a scale for measuring intelligence. He believed that the aptitude of children was important to instruction and that children learned according to their individual abilities and aptitudes.

Madam Maria Montessori firmly believed that it was the first duty of every human being to be himself and that anything which checked this development did him serious injury. She also encouraged children to work at their own rates, to concentrate on what interested them, and to use school materials in ways that they saw best. She made every effort to adapt her teaching to the needs

of each child and often taught pupils individually to get the greatest possible adaptation for her technique.

As educational advantages became available to the larger population, educators increasingly dealt with pupils in groups or grade levels rather than individually.[1]

> Then, the United States as the land of opportunity opened schools to every child regardless of money or ability. Some of what had formerly been packed into eight years was stretched out over twelve to accommodate the slower learners. Standardization became the order of the day. . . .[2]

In the early decades of this century education in the United States generally was reduced to detailed formulas; it was mass produced for the masses. Every subject had a textbook, and for every text there was a firm order of learning. The basic assumption underlying most textbook teaching is that children should be classified into homogeneous groups and taught the material uniformly by standardized procedures. Thus American education moved toward group instruction and away from providing for the individual differences of children. In a sense, schools were being organized to get rid of individual differences, not to foster them.[3] Soon the grade standard became the goal for all children. Each pupil was expected to master the skills and content outlined

---

[1]Blake and McPherson, pp. 63-65.

[2]John M. Lembo, Learning and Teaching in Today's Schools (Columbus, Ohio: Charles E. Merrill Publishing Company, 1972), p. 258.

[3]Blake and McPherson, p. 64.

without too much consideration for his past experiences or his intellectual capacity.

> Sorting pupils into grades was a revolutionary step in educational circles, but early educators failed to see the unique nature of children. All children were considered alike in capacity. Pupils who failed to make progress were essentially failures because they would not behave or follow directions. Laziness or a lack of interest were frequent excuses for failures. The diligent scholar would succeed through mere perseverance. There was little recognition of the need to vary the rate or method of instruction for individual pupils. Since imparting knowledge was the chief purpose of education, textbooks became the driving force in the classroom. . . . Success was measured in terms of the pupil's ability to pass oral or written examinations.[1]

Even as the mechanistic pattern of education developed, some educators were dissatisfied with one phase or another. This dissatisfaction led to the introduction of early procedures for individualizing such as the St. Louis Plan, the Cambridge Plan, the Dalton Plan, the Winnetka Plan, and Multitrack Grouping.

In 1916, psychologist Terman suggested a need for differentiated courses of study to permit each pupil "to progress at the rate which is normal for him, whether that rate be rapid or slow." He proposed to teachers that they measure out the work for each child in proportion to his mental ability.[2] Between 1900 and 1930 disciples of

---

[1]George Thomas and Joseph Crescimbeni, Individualizing Instruction in the Elementary School (New York: Random House, 1967), p. 24.

[2]Lewis A. Terman, The Measurement of Intelligence (Boston: Houghton Mifflin Co., 1916), p. 4.

Frederick Burk devised and implemented several laboratory type plans for self instruction in the lower grades. These were self pacing plans for the learner and demanded a great deal of versatility on the part of the teacher.[1]

Since the 1930's, providing for variations in rates of learning has continued to be the main interest of persons advocating various plans for individualizing instruction. Many of the plans emphasize some form of homogeneous grouping, though this form of grouping has not been found to be consistently effective.[2] During the 1950's and even into the early sixties there was an increase in grouping according to ability or achievement levels, as reported by fifty-two per cent of the principals of large elementary school districts.[3]

Although many proposals for individualizing deal only with varying the rate for mastering standard content, educators have learned that rate of learning of prescribed content should be only one of the considerations in individualizing instruction.

---

[1]Madan Mohan and Ronald E. Hull, Individualized Instruction and Learning (Chicago: Nelson Hall Company, 1974), p. 68.

[2]Ruth B. Eckstrom, Experimental Studies of Homogeneous Grouping: A Review of the Literature (Princeton, New Jersey: 1959).

[3]The Project on the Instructional Program of the Public Schools, National Education Association, The Principals Look at the Schools (Washington D.C.: The Association, 1962), p. 15.

> . . . Learning is personal, unique, unstandardized. Furthermore, learning has numerous dimensions, and it is without limit.[1]

Providing only for variations in rates of learning does not seem to be the total answer in how to best individualize instruction.

Criticisms of Contemporary Education

In the last decade schools have come under severe criticism from all segments of society. Educators have become aware of, and are concerned about, the crisis in our public schools. Much has been written about the shortcomings of American education, and many solutions have been suggested.

Some of the most scathing rebukes come from contemporary educators such as Paul Goodman, Jonathan Kozal, Charles Silberman, John Holt, Edgar Friedenberg, David Riesman, and others.

Silberman claims,

> . . . It is not possible to spend any prolonged period visiting public schools without being appalled by the mutilation visible everywhere; mutilation of spontaneity, of joy in learning, of pleasure in creating, of sense of self. . . . Because adults take the schools so much for granted, they fail to appreciate what grim, joyless places most American schools are, how oppressive and petty are the rules by which they are governed, how intellectually sterile and aesthetically barren the atmosphere, what an appalling lack of civility obtains on the

---

[1]Ronald C. Doll, "Fostering Student Individuality in the Schools," John R. Fitzsimmons, ed. Individualizing Instruction for Individualized Learning (New York: Bess House, Hofstra University, 1972), p. 11.

> part of teachers and principals, what contempt they unconsciously display for children as children.[1]

The atmosphere in many schools is more reminiscent of some penal institution than a place devoted to learning. Everyone is locked into position on a given signal such as a bell. Not only is the atmosphere representative of penal institutions but so are the structures and the rules.

John Goodlad, after visiting 100 elementary schools in 13 states, says that the schools are ". . . anything but 'places' of an affluent society." On the contrary, he says, they look ". . . more like the artifacts of a society that did not really care about its schools, a society that expressed its disregard by creating schools less suited to human habitation than its prisons."[2]

Both students and teachers are victimized by the way in which many schools are presently organized and run. For instance:

> The school board has no faith in the central administration, the central administration has no faith in the principals, the principals have no faith in the teachers, and the teachers have no faith in the students. . . .[3]

The result of course, is that the classroom becomes a battleground, with the students and the teachers devoting

---

[1]Charles E. Silberman, "How the Public Schools Kill Dreams and Mutilate Minds," Learning and Teaching in Today's Schools, John M. Lembo, editor (Columbus, Ohio: Charles E. Merrill Publishing Company, 1972), p. 3.

[2]Ibid., p. 17.

[3]Ibid., p. 12.

large amounts of energy to searching out ways to outwit one another.

Charles Silberman concludes that, "the most important characteristic that nearly all schools share is a preoccupation with order and control."[1]

> Even a cursory examination of the traditional school shows the punitive uses of discipline. Coercive grading systems, veiled threats, planned failures, teacher-centered planning, meaningless dull assignments, and social pressures based on the belief that sutdents must be forced to remain active.[2]

Carl Rogers quotes Albert Einstein as having said:

> . . . It is in fact nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant aside from stimulation, stands mainly in need of freedom; without this it goes to wrack and ruin without fail.[3]

Stimulation and freedom to learn are sadly lacking in our public schools. Carl Rogers further states:

> . . . I want to speak to them about learning. But not the lifeless, sterile, futile, quickly forgotten stuff which is crammed into the mind of the poor helpless individual tied into his seat by iron clad bonds of conformity! I am talking about LEARNING--the insatiable curiosity. . . .[4]

Carl Rogers goes on to explain that there are two types of learning along a continuum of meaning. At one

---

[1]Ibid., p. 5.

[2]Jack D. Riegle, "Open Concept Education: A Human Enterprise," NASSP Bulletin, January 1973.

[3]Carl R. Rogers, Freedom to Learn (Columbus, Ohio: Charles E. Merrill Publishing Company, 1969), p. iv.

[4]Ibid., p. 3.

end is the type of learning exemplified by memorizing nonsense syllables and on the other end is significant, meaningful, experimental learning. He defines the latter type of learning as having a quality of personal involvement, self-initiated, pervasive, evaluated by the learner, and its essence is meaning. He continues:

> . . . Yet in the vast majority of our schools, at all educational levels, we are locked into a traditional and conventional approach which makes significant learning improbable if not impossible. When we put together in one scheme such elements as a prescribed curriculum, similar assignments for all students, lecturing as almost the only mode of instruction, standard tests by which all students are externally evaluated, and instructor-chosen grades as the measure of learning, then we can almost guarantee that meaningful learning will be at an absolute minimum.[1]

To meet the educational needs of children, we must free ourselves from the yoke of tradition and utilize research findings to achieve the goal of providing each student with a learning program appropriate for him.

The structure of present day public education frequently makes it impossible for a youngster to take responsibility for his own education. It makes the student totally dependent upon the teacher. "Most schools define education as something teachers do to, or for, students, not something students do for themselves."[2]

---

[1]Ibid., p. 5.

[2]Lembo, p. 14.

Traditionally the teacher decides what the student will learn and when. He also decides who will speak, and in what order; he decides who uses what materials, if any; he assigns the jobs around the classroom; and he does most of the talking and decision making. Students are expected to be silent and motionless, in other words, passive. Children must sit still at their desks and listen. Passivity and silence seems to be the hallmark of good teaching.

In the United States, training in sitting still begins in kindergarten, the function of which is, in large measure, to instill the behavior patterns the rest of the school demands.[1]

> . . . A teacher will rarely, if ever, be called on the carpet or denied tenure because his or her students haven't learned anything; she most certainly will if her students are talking or moving about the classroom, or, even worse, found outside the room, and she may earn the censure of her colleagues as well. Nor will teachers receive suggestions from their supervisors as to how to improve their teaching methods and materials; they will receive suggestions for improving discipline. Thus, the vows of silence and stillness are often imposed on teachers who might prefer a more open, lively classroom.[2]

Many schools operate as if children learn only by listening. Children may learn by listening, but they are more likely to learn by doing, talking, and teaching.

---

[1]Ibid., p. 14.

[2]Ibid., p. 19.

Learning rarely occurs by passive listening alone. More often than not the children tune out the teacher who possesses and recites the information. Learning requires active participation in the learning process; the learner must be aggressively involved in acquiring knowledge.[1]

To meet the educational needs of eager active learners, teachers must free themselves from the yoke of tradition, and free the innate potential in the human organism to explore, to question, to think, and to actively participate in learning.

> Teachers hold the key to a power of unpredictable proportions and dimensions--the key to human potential, too few teachers use this key. They conceal the key--the possibility of releasing human potential--by resorting to . . . group pacing; thus preventing the student from experiencing and developing self-responsibility, self-direction, and self-respect.[2]

The tremendous advancement of science and technology now compel man to develop inner resources for controlling an increasingly complex, dynamic, and stimulating environment. Educators must realize that rote memorization of facts and learning factual information alone is not

---

[1]Rita Dunn and Kenneth Dunn, Practical Approaches to Individualizing Instruction: Contracts and Other Effective Teaching Strategies (West Nyack, New York: Parker Publishing Company, Inc., 1972), p. 21.

[2]Gene Talbert and Larry E. Fraze, Individualized Instruction (Columbus, Ohio: Charles Merrill Publishing Company, 1972), p. 118.

adequate to meet the challenges of a constantly expanding cadre of knowledge.

Education must prepare man not just to earn a living but to live a full, creative, humane, sensitive, and productive life. The school must provide a liberal humanizing education that will enable him to continue learning.[1]

There is also a movement toward a fairer, more humane, more kindly, more enlightened treatment of people. There is a new tolerance of pluralism, divergent views, and divergent life-styles.[2]

In view of these developments, education must become a humane enterprise. Educators must emphasize the human aspects rather than the organizational aspects. The bright eyed, eager, happy kindergarten child can remain bright eyed, eager, and happy if he is exposed to a theory of education where people believe that:

1. Students are not by nature passive, lazy, or resistant to organizational needs.

2. Indifference expressed by students is a result of negative experiences in the school organization.

3. It is the responsibility of teachers to make it possible for students to develop their character for themselves.

---

[1]Lembo, p. 13.

[2]Phillip Jackson, "Trends Toward Individualization," Instructor, January 1975, p. 45.

4. The essential task of teachers is to arrange organizational conditions and methods of operation so that students can achieve their own goals.

5. The process of teaching must create many opportunities, release potential, remove obstacles, encourage growth, and provide guidance.

"Simple to state but difficult to achieve" seems to summarize these five concepts of education. Teachers must believe in the natural eagerness of students to improve themselves. Teachers must totally commit themselves to allowing students opportunities to develop self-control, self-direction, and individually-tailored educational experiences.[1]

Identifying and Influencing Cognitive Processes

New developments in learning theory, psychometrics, developmental psychology, and educational technology have contributed to new directions in educational thought. These developments also suggest new directions for educational research and practice, such as adapting education to meet the needs of each learner.

In 1925 Carleton Washburne stated:

> . . . the widespread use of intelligence and achievement tests has made every educator realize that children vary greatly as individuals and, throughout the educational world, there has therefore awakened

---

[1]Riegle, pp. 10-14.

> the desire to find some way of adapting schools to the differing individuals who attend them.[1]

Although half a century later we have still not solved the problem of individualizing, we appear to be on the threshold of a solution because the research in human behavior over the past twenty years now points to possible answers. Current research shows that we can experimentally identify and influence a variety of cognitive processes that are involved in learning.

For example, William Rohwer found that, when we provide children with freedom and encouragement, they begin to generate their own forms of mental elaborations which they can use to enhance their own learning.[2]

Kagan and Kagan studied the influences of individual differences in non-cognitive domains that have a bearing on the cognitive processes. Their research includes studies on the effects of cultural background on the dominance of visual, auditory, and tactile sense modalities, the relationship between anxiety and the quality of immediate memory, the ability to hold changing images in memory, called "levelling and sharpening," and the degree to which an individual pauses to evaluate the

---

[1]Robert Glaser, "Individuals and Learning: The New Aptitudes," Individualized Instruction and Learning, Madan Mohan and Robert E. Hull, eds. (Chicago: Nelson-Hall Co., 1974), p. 85.

[2]Ibid., p. 59.

quality of cognitive products in the course of problem solving.[1]

There have been some interesting attempts to modify cognitive style. Studies done by Yanda and Kagan show that when first grade children were placed in classes with experienced teachers who have a reflective style, the children became more reflective during the school year than children who were placed with impulsive teachers.[2]

Suchman investigated the effects of cognitive style on inquiry and concluded that a child high on cognitive control, impulsivity, and autonomy will be a more effective inquirer than a child who is low on any one of the three.[3]

Over a period of years, Suchman has tried to identify the necessary conditions for inquiry to occur in classroom settings. The conditions are essentially these:

> . . . first, we find that the children need some kind of focus for their attention, some kind of problem. . . . Secondly they need the condition of freedom. . . . The third condition is what O. K. Moore calls the "responsive environment." These, then, are three

---

[1]J. Kagan and N. Kagan, "Individual Variation in Cognitive Process," P. H. Mussen, ed. Carmichael's Manual of Child Psychology (Palo Alto: Annual Reviews, 1972), pp. 207-276.

[2]R. M. Yanda and J. Kagan, "The Effects of Teacher Tempo on the Child," Child Development, 1968, pp. 27-34.

[3]Richard J. Suchman, "The Illinois Studies in Inquiry Training," Richard Ripple and Verne Rockcastle, eds., Piaget Rediscovered, A report of the Jean Piaget Conferences at Cornell University and the University of California, 1964, p. 108.

> conditions for inquiry; the focus, the freedom to operate, and the responsive environment. If we provide these conditions we find that children inquire at the elementary school age, and that inquiry will progress at a rate that is far in excess of what would happen if one didn't have these conditions.[1]

In order to be pedagogically sound and successful school must provide for these needs of inquiry. Many schools are set up at present to stifle curiosity and inquiry. Suchman found that "as children move from the first grade to the sixth grade, they become less empirical and base more hypotheses and tests of hypotheses on conclusions of authorities and less on their own empirical operations."[2]

The work and theories of Jean Paiget also support and influence individualized instruction. The stages of cognitive development described in the Piagetian theory of intelligence are thought to make major qualitative changes in the modes of thinking available to the child. These, in turn, effect the kinds of specific learnings of which the child is capable. Therefore, these stages provide individual modes of performance available to different children which would have to be considered in educational design.[3]

According to Piaget:

---

[1]Ibid., pp. 105, 106.

[2]Ibid., p. 105.

[3]Glaser, p. 97.

> . . . Children go through certain stages of intellectual development from birth through adolescence. These stages materialize, fully constructed, when their time has come, and there is little we can do to advance them. What we must do in education is to realize the limits of children's understanding at certain ages, and plan our teaching so it falls within these limits.[1]

If children must go through the stages of development that Piaget describes, it is no use trying to teach them something for which they are not ready. Again, individualization is the answer.

Research on the variables of learning done by John Carroll and supported by others such as Bruner, Glaser, Morrison, and Goodlad, makes it clear that if the students are normally distributed with respect to aptitude for any subject, and they are provided with exactly the same instruction in terms of quantity, quality, and time, the end result will be a normal distribution on achievement. Conversely, if the students are normally distributed with respect to aptitude, but the kind and quality of instruction and the time available for learning are made appropriate to the characteristics and needs of each individual child, the majority of the students may be expected to master the subject. Given enough time all students can attain mastery of a learning task.[2]

---

[1]Ripple and Rockcastle.

[2]John B. Carroll, pp. 33-49.

The concept of nongrading evolved from an acceptance of the notion that there is no such thing as a total class of students at one level of learning.

> In a fully graded plan, all children in a given grade are expected to do the same work in a year's time, while in a nongraded program each child works at the level in each subject for which he is ready.[1]

Studies of non graded programs have shown positive results in achievement. Generally, students in nongraded programs have been doing as well as or better than their peers in the graded programs--usually better, according to several comparative studies. In all cases where students were matched for IQ, the non graded achievement scores were significantly higher.[2]

Nongraded programs generally provide for individualization only in one respect; pupils proceed through the same materials in much the same way, except that they do so at their own rate.

The collective insights or research seem to indicate that when instruction is adapted to the needs of the individual, or, in other words, when accommodative teaching takes place, that the levels of cognitive achievement tend to increase.

---

[1]Lyn S. Martin and Barbara N. Pavan, "Current Research on Open Space, Nongrading, Vertical Grouping, and Team Teaching," Phi Delta Kappan, January 1976, p. 311.

[2]Ibid., p. 312.

Accommodating the Individual Differences of Children

We reap insufficient results when we neglect individual differences in children, when we ignore their strengths, highlight their weaknesses, and try to force them to fit into the mold of traditional education.

> . . . Group oriented instructional programs and materials of a past age are no longer appropriate or effective in meeting the needs of today's youngsters. Professionals equipped with methods and techniques designed only for group consumption in the conventional self-contained classroom must be retrained in order to provide appropriate instructional alternatives for the individual as a unique creative entity. Conventional educational programs are inadequate and obsolete when we consider the diversity of skills, conceptual developments, attitudes and values and capabilities required and rightfully demanded by students for survival in our complex technological society.[1]

We know now that learning is a personal matter that varies for different children, it proceeds at many different rates, and develops best when children are actively engaged in their own learning. Learning also takes place in a variety of setting, in and out of school, and it gains in intensity in an environment where children and childhood are taken seriously.[2]

Since learning is such a personal matter, it is the right of every individual to acquire an education

---

[1]Loyd K. Bishop, Individualized Educational Systems (New York: Harper and Row Publishers, 1971), p. ix.

[2]Vito Perrone, Open Education: Promise and Problems (Bloomington, Indiana: Phi Delta Kappa Education Foundation, 1972), p. 37.

within the school system in his own way and at his own rate. This means that the school must adapt its system to the individual rather than the individual to the system. It also means harnessing all the techniques of modern education and communication and technology available to assist the individual toward self-development, self-fulfillment, and self-direction.

> Schools which do not produce self-directed citizens have failed everyone--the student, the profession and the society they are designed to serve. The goals of modern education cannot be achieved without self-direction. . . . This calls for student cooperation and acceptance of major responsibility for his own learning.[1]

The world we live in demands self-starting, self-directing citizens capable of independent action. Our world is changing so fast, we cannot hope to teach each person what he will need to know in twenty years. Our only hope to meet the demands of the future is the production of intelligent, independent people.[2]

We cannot be simply satisfied by teaching the basic skills. To be practical, an education must prepare men for jobs that haven't been discovered as yet. This can be done only by teaching people how to learn, by giving them the kind of intellectual discipline that will

---

[1]Arthur Combs, "Fostering Self-Direction," Educational Leadership, February 1966, p. 373.

[2]Virgina M. Howes, Individualization of Instruction (London: The Macmillan Company, 1970), p. 31.

enable them to apply man's accumulated wisdom to new problems as they arise.

Education should prepare people not just to earn a living but to live a life, a creative life. This means that the school must provide a liberal humanizing education.[1]

In recent years instructional methods and organizational patterns have reflected a strong desire to develop more effective techniques for coping with the individual differences and individual needs of students.

One of the most pervasive themes dominating American education during the last decade has been the concept of individualization of instruction.

> Individualized instruction is no one way of conducting education, nor any one special program. It is the process of custom-tailoring instruction so it fits a particular learner. An individualized program is not necessarily different for each learner, but must be appropriate for each.[2]

The challenge of individualizing instruction is that of finding the best fit for each child. No single method can be considered the best method, just as no method can be categorically labeled inappropriate.

---

[1]Lembo, p. 4.

[2]Sidney Rauch, "Individualized Reading Programs," John R. Fitzsimmons, ed., Individualizing Instruction for Individualized Learning: Proceedings of a conference at Hofstra University (Hempstead, New York: The Bureau of Educational Studies and Services, Bess House Hofstra University, 1972), p. 25.

Our commitment to individualized instruction is based on the following hypotheses about children and learning:

1. There are many patterns of learning and no one teaching method meets the varied needs of all children; therefore it is vitally important to provide alternatives in the educational program.

2. Learning is an active not a passive process and must involve participation in a task rather than mere absorption of information. As a result of learning, there should be a change in pupil behavior or no learning has taken place.

3. The teacher cannot tell a child how to think, but must provide him with the freedom, the encouragement, and the opportunity to do so.

4. Children are consistent in their need for success experiences, but vary greatly in their levels and rates of achievement.

5. Discovering and developing uniqueness in individuals is a major goal not to be thwarted by ignoring or minimizing differences.

6. Children bring to each new experience varying amounts of information and misinformation, which may clarify or distort concept formation.

7. Setting goals and evaluating progress are the privilege and responsibility of the child, and are

essential to long-term learning. Teachers must not let a marking system distort evaluation.

8. The unstructured and inductive experiences which occur in a child's life are often the most profound and influential activities of childhood.

9. Children learn from each other, through observation, imitation, and cooperative consideration of a mutually challenging task.

10. Learning is both positive and negative. When the activity does not fit the child's unique personal need, negative learning is certain to occur.

11. It is more important for children to appreciate and practice self control than to be controlled by an adult authority figure.

12. Intrinsic motivation makes children capable of meaningful self-selection and self correction of appropriate learning activities.[1]

In order to capitalize on this available knowledge of children and learning we need to have a flexible school environment which encourages greater interaction between students and their peers. This environment should eliminate the conventional grouping of students by chronological age into arbitrary grade levels and allow for large group, small group or individual interaction and learning.

---

[1]Dona Kofod Stahl and Patricia Murphy Anzalone, Individualized Teaching in Elementary Schools (West Nyack, New York: Parker Publishing Company, 1970), p. 24.

Multiple interaction and multiple instructional exposure play a major part in an individualized educational set up.

> Thus, individualization requires an organization which allows the student to engage in activities uniquely appropriate to his own style and rate of learning. In this type of organization, instruction promotes independence, provides opportunities for study beyond the regular curriculum, and permits maximum use of instructional resources.[1]

Therefore, an instructional model which includes specifications for a nongraded, continuous progress based on behavioral objectives with pre- and post-tests to measure student competencies, complete with multi-sensory, multi-media instructional resources, must be available.

Many attractive alternative models that offer new approaches to student learning which can provide almost all students with rewarding school experiences have been developed. For example, Individually Prescribed Instruction (IPI),[2] Program for Learning in Accordance with Needs (PLAN), Computer Assisted Instruction (CAI), and Individually Guided Education (IGE), are some of the major models in existence. These and others represent significant steps toward improving learning by individualized instruction. They strive to actively involve the student

---

[1]Bishop, p. 5.

[2]William W. Cooley and Robert Glaser, "The Computer and Individualized Instruction," Robert A. Weisgerber, ed., Developmental Efforts in Individualized Learning (Palo Alto, California: P. E. Peacock Publishers, Inc., 1971), pp. 92-168.

in the learning process, allow students in the same class to be at different points in the curriculum, and permit the teacher to give more individual attention to the students.

The Learning Center Approach to Individualization

One of the most exciting ideas for individualizing instruction is the learning center approach. It is a creative way of teaching which provides an invitation to learn, to explore, to share and to discover. It is designed to encourage self-selection, self-direction, and self-motivation.

By definition, a learning center is a designated area organized and set up to allow students to work independently, in small groups or individually, on tasks related to specific curriculum goals. A learning center provides a variety of learning activities using many different kinds of materials. It may include directions and a built-in management and evaluating system.[1]

For the purpose of this study a learning center is neither an interest center, a media center, a materials center, nor a learning package, which is sometimes referred to as a learning center. The words "station" and "center" are used interchangeably, and the working definition remains as stated above.

---

[1]Ibid., pp. 80-81.

Learning centers are designed to provide for a better organization of resources and materials to enhance learning opportunities for more individual students whose learning rates and learning modes or styles differ.

> The development and use of learning centers is only one method for individualizing learning. They provide a beginning point but are not intended to be the only source of individualizing instruction. Learning centers become the vehicles for moving students away from teacher dominated learning experiences and toward student selected learning activities. Learning centers organize and direct learning experiences for students by allowing freedom while providing structure.[1]

In other words learning centers are designed to individualize instruction for more effective education for children. They deserve to exist only if evaluation shows that more effective education does result. Individualized instruction requires continuous diagnosis and continuous modification of programs to meet the diagnosed need.

Individualizing learning and teaching with stations is an alternative to the traditional concept of seatwork, in which children stay at their desks all or most of the time using ditto sheets or working from the chalkboard. The learning center approach gives some choice of activities each day. Children assume more responsibility for

---

[1]Sandra Nina Kaplan, Jo Ann Butom Kaplan, Sheila Kunishima Madsen, and Bette K. Taylor, Change for Children: Ideas and Activities for Individualizing Learning (Pacific Palisades, California: Goodyear Publishing Company, Inc., 1973), p. xv.

self-direction which includes recording and evaluating their own progress when the activities are completed. In such a flexible environment, children's enthusiasm is reflected in their attitudes and in their work.

The students function better in a less restricted, pressure free atmosphere, which also frees the teacher to work with small groups and individuals while the other students are involved in meaningful activities. Such an environment also promotes a more positive attitude toward school. The school becomes an exciting part of living rather than just a place where one has to be from nine to three.

In order to promote excitement and positive attitudes the school must provide for the individual needs of students. A varied educational diet is essential to promote individual growth and satisfaction. Multi-media, multi-sensory equipment and materials provide the variety and extend considerably the range of possible approaches to learning. Adapting audio visual material for direct and developmental instruction will involve careful organization and training.

Stahl and Anzalone states:

> You will employ a multisensory approach to learning with far more varied materials designed to stimulate visual, auditory, and tactile responses. Many children will use manipulative devices and games as primary learning materials rather than as supplemental activities.[1]

---

[1]Stahl and Anzalone, p. 27.

According to Loyd Bishop, individualization requires an organization which allows the student to engage in activities uniquely appropriate to his own mode and rate of learning. In this type of organization, instruction promotes independence, provides opportunities for study beyond the regular curriculum, and permits maximum use of instructional resources. Therefore, the curriculum must be designed to meet the individual requirements of each child at his own particular level of ability, achievement, progression, and style.[1]

According to Culver and Lieberman we need to believe:

> . . . that children have a natural style of learning, a style that fits their condition, their ways. We need to allow children to work more independently, seek their own levels of understanding, and use and improve the style of thinking and learning which is natural to them.[2]

If this is true, then these learners will function better in a less-restricted, pressure free atmosphere where there is a wide choice of stimulating, multisensory, attractively packaged, meaningful activities that are self-managed by the learner himself.

The learning center integrates and embodies these characteristics in a systematic organized manageable way.

---

[1]Bishop, p. 4.

[2]David A. Shiman, Carmen M. Culver, and Ann Lieberman, Teachers on Individualization: The Way We Do It (New York: McGraw Hill Book Company, 1974), p. 98.

It frees the teacher to give individualized attention and instruction to the students.

> . . . The teacher's task in the classroom is to facilitate learning. It might be pointed out that students actually do not learn from teachers; they learn from materials. In much the same way, sick people do not get well from doctors but from medication. The doctor, however, is important in prescribing and facilitating the proper kind of medication, just as the teacher is very important in facilitating learning through the proper utilization of instructional materials in the classroom.[1]

The teacher must also become a specialist in child to child, child to teacher, and child to learning relationships. By interacting with students while promoting learning, the teacher becomes the intermediary between the child and his environment. The teacher must question, conference, encourage, and share in the activities of learning. In this way he will help to make the environment useful for the student. Although the teacher's age, experience, and training are the basis for his authority in the classroom, he must exercise it to make learning available to students rather than to impose it on them.[2]

Some of the more obvious advantages for setting up learning centers are flexibility, variety, and the organization that such an arrangement provides. The variety of centers provides diverse settings in which pupils can

---

[1]Bishop, pp. 41-42.

[2]Sandra Kaplan, Jo Ann Kaplan, Sheila Madsen and Bette Taylor, Change for Children (Palisades, California: Goodyear Publishing Company, Inc., 1975), pp. xiii, xiv.

work autonomously or in small groups and have the opportunity to make choices.

Some specific advantages of learning centers include:

1. A relaxed and happy atmosphere with openness in pupil-teacher relationships.

2. Increased opportunities for flexible grouping to meet individual needs.

3. Children find more satisfaction in learning.

4. Children develop a sense of responsibility and greater self-discipline.

5. The development of a more positive self concept.

6. Emphasis on learning rather than teaching.

7. Creativity is enhanced.

8. Increased opportunities for diagnosis, prescription and evaluation of individual learning needs.

9. Less competition and more cooperation among students.

10. More human interaction.

11. Classroom living based on real-life processes.[1]

Individualizing learning does not imply that the teacher will abdicate the responsibility for making some decisions and directing some learnings for the student.

---

[1]Lee L. Smith, Jack Out of the Box (West Nyack, New York: Parker Publishing Co., 1974), p. 197.

Neither does it mean that the teacher will allow or accept anything students do. The goal of individualized instruction is to create new standards for learning and behavior, not to abolish or disregard all standards. As the adult, facilitator, friend, and teacher, the teacher is still accountable for the behavior and performance of his students.

Teacher accountability assumes a different dimension in the individualized classroom. Although not accountable for teaching all the students the same body of knowledge and skills, he is accountable for teaching each student how to direct his own learning in relationship to his own individual learning style and needs. In an individualized classroom the major emphasis in evaluating students is on the process of learning, not on the product.[1]

Current Research and Evaluation of Cognitive and Affective Outcomes of Individualization

As already indicated, there is a widespread interest in individualizing instruction in the United States today. What are some of the educational or pedagogical reasons for encouraging individualized instructional methods? The strongest reason to support individualized instruction is the increasing awareness of educators that

---

[1]Kaplan, Kaplan, Madsen and Taylor, p. xiv.

each child learns differently at different rates. The shift is from the average child as the center of the instructional program to that of recognizing each student as unique and in need of a curriculum geared to his personal needs.

There is now some convincing evidence that it is possible to teach children the basic academic skills (the 3 R's) by the application of intensive drill and traditional instruction. But the need today is not just the acquisition of skills. At the same time children need to strengthen and enhance their feelings of self-respect, self-responsibility and a sense of dignity. Individualized instructional methods promise the achievements of academic, intellectual and personal growth.

Does individualized instruction really work? Research evidence is not in complete agreement, but there is some evidence supporting it.

Rothrock, in 1968, reported a survey of teachers from five states to determine how widely individualized reading was used and how teachers who were using it or had used it felt about the program. Of those who had participated in individualized reading programs, eighty-six per cent were continuing to do so. Fourteen per cent had discontinued the program.

The theoretical base of individualized instruction was generally supported by the teachers Rothrock surveyed.

He found pupils' reactions to be highly favorable. Individualized instruction was perceived as fostering self-respect and giving a sense of security to slower learners. Several teachers reported positive effects of individual attention and close pupil-teacher interaction.

Rothrock, also found that time, class size, inadequate preparation of teachers, and insufficient materials for independent use were frequently mentioned problems when individualizing.[1]

Joyce Epstein and James McPartland studied more than 7,200 students in individualized and traditional schools in grades 5, 6, 7, 9, and 12. The individualized school program had a positive effect on student academic achievement in grades 5 and 12, a negative effect in grade 9, and no significant effect in grade 7. However, in every grade studied, the students in the individualized schools had higher average scores on self-reliance, greater satisfaction with their school experiences, and more positive actions toward their teachers than students in nonindividualized schools.[2]

Glass and Yager, in a study of individualized science instruction, found that students who dealt with scientific problems individually or in small groups showed a significantly greater understanding of science and of

---

[1]Talbert and Frace, pp. 141, 142.

[2]Ibid., p. 63.

scientists as a group than those students who encountered the problems and solved them as a class.[1]

Shavelson and Munger found that biology students in a self-paced program demonstrated higher achievement in less class time than those who received group instruction.[2]

Eisman carried out a three-year study of the effects of self-paced learning in spelling. He concluded that learning is most successful when the learner is allowed to proceed at his own rate.[3]

Bigelow and Egbert reported no significant differences in personality characteristics, as measured on the California Psychological Inventory, between individualized and traditional groups of students. However, within the individualized study groups, successful students scored significantly higher on responsibility and intellectual efficiency than non-successful students. Students were considered successful if their grades in the course were equal to or higher than their cumulative grade point averages prior to taking the course in which the study was conducted.[4]

---

[1]Ibid., p. 144.

[2]Ibid.

[3]Ibid.

[4]Ibid.

In a PREP (Putting Research into Educational Practice) study, the U.S. Office of Education reviewed current developments in individualized instruction. The study looked at forty-six schools around the country and concluded that while there is little objective evidence concerning the impact of individualization on learning, there are strong indications that the results are highly positive. About half of the forty-six schools with individualized instruction programs studied by PREP had no formal evidence of success or failure in learning achievement. Seventeen schools had test results which, in most cases, showed academic success. Many others used questionnaires, attendance rates, dropout rates and data on disciplinary problems in reviewing results.[1]

Parkside Elementary School, Murray, Utah, has sought to document learning achievements of individual children. They report gains of from two to four years within a single school year, based upon standardized test results in an individualized program. The data, however, have not been treated statistically and there is no firm proof of such achievement.[2]

Contrary to this, Duluth, Minnesota, Public Schools using the Iowa Test of Basic Skills had found no

---

[1] Individualization in Schools: The Challenge and the Options (A Publication of the National School Public Relations Association, Washington, D.C., 1971), p. 4.

[2] Ibid.

greater gains from individualized instruction than from traditional instruction. The superintendent has explained that the "overall objective in the whole program is attitude change, and we don't have the kinds of instruments for an evaluation of that objective."[1]

Wilson Elementary School, Jamesville, Wisconsin, administered standardized tests seven months apart. Their results showed that all of the different levels grew a year in reading comprehension after individualization. In spelling, the pattern averaged 1.2 years for one 7-month period.[2]

PREP found that the reaction to individualized systems were mostly favorable. Teachers, students, parents, and school board members generally have shown favorable reaction to programs of individualized instruction. Teachers report that while the program involves more work than is required in the traditional classroom, they obtain far greater satisfaction from the job and find it more stimulating. A few teachers, however, are uncomfortable in an individualized setting and request to go back to traditional classrooms because they are less demanding.

PREP studied pupil surveys and concluded that students are unanimous in their support of the program.

---

[1]Ibid., p. 8.

[2]Ibid., p. 13.

The initial parent reaction tended to be skeptical. But this attitude quickly faded after children began to reflect enthusiasm for the program.

PREP found that individualized instruction tended to reduce disciplinary problems in the schools. School officials in general had kind words for the resulting improvement. They reported that truants and dropouts declined significantly following the introduction of individualized instructional programs.

In most of the schools observed by PREP, emphasis continued to focus upon traditional skills and subject matter, but the trend was toward permitting the children to practice decision making by choosing alternatives and noting the results of their decisions.

Twenty per cent of the schools studied stress the development of lifelong independent learning.

PREP concludes that individualization is not a magic cure for the ills of education. But schools which have adopted the technique generally agree they will never return to the traditional classroom.[1]

Individualized instruction is many things to many people. It is not one program or kind of program. It is a movement, a liberal movement, with a spectrum which stretches from simply doing away with mass teaching to

---

[1]Ibid., pp. 12-17.

complete emancipation of the student from the constraints of education planned by others.

This study is an attempt to evaluate the affective and cognitive outcomes of one program of individualizing instruction.

CHAPTER III

METHODS AND PROCEDURES

This report of methods and procedures includes a description of the population, of methods used for selecting the sample, of the instruments used, of the kinds of data collected, and of the methods of analyses selected.

Identification of the Population

The investigation reported in this study was conducted in the Benton Harbor Area Schools in Benton Harbor, Michigan.

The twin cities of Benton Harbor and St. Joseph are located on the Southwestern corner of Lake Michigan. Benton Harbor's origins date back to the early 1800's when it was known as Bronson's Harbor. In 1869 it was incorporated as a village, and at this time the name was changed to Benton Harbor.[1]

Today, Benton Harbor has a population of approximately 16,500. It is located in Berrien County, which is known as "the buckle of the fruit belt."

---

[1]Catherine Moulds, Chips Fell in the Valley (Berrien Springs, Michigan: Andrews University Press, 1963), p. 28.

This twin cities area is the home of more than 250 diversified industries. It is located approximately 90 miles east of Chicago, 184 miles west of Detroit, 47 miles west of Kalamazoo, and 35 miles north of South Bend, Indiana.

Benton Harbor is the home of Lake Michigan Junior College and extension centers of Western Michigan University and Michigan State University. Within fifteen miles of Benton Harbor is Andrews University, and within forty miles are the University of Notre Dame, St. Mary's College, and the University of Indiana at South Bend.

The Benton Harbor Area Schools include a high school, Continuing Education Center, Skill Center, Technical Center, three seventh and eighth grade centers, and twenty-three elementary schools. The racial make-up of the district is 60 per cent black, 7.2 per cent Indian and Spanish, and 32.3 per cent white and oriental. The school district encompasses 56 square miles with a total population of 42,037 people. The State Equalized Valuation per child is $18,976.00.

The two schools in which the study was conducted are Martin Luther King, Jr., Elementary School and Seely McCord Elementary School. Both schools are located in the inner city of Benton Harbor, a very low socio-economic area. The majority of the students live in project housing in crowded living quarters, usually with a single parent

or guardian who maintains a large family on a meager earned income or some form of social aid.

Selection of the Schools

Martin Luther King Jr. Elementary School and Seely McCord Elementary School were selected for this study on the basis of their similarities. (1) Both schools are participating in an Individually Guided Educational Program (IGE). (2) The children who attend the two schools live in the same neighborhood, within walking distance of the schools which are located across the street from each other. (3) Both schools have the same Staff Development consultant who did the training and the follow-up. (4) Both principals supported the Staff Development Program enthusiastically.

Seely McCord Elementary School has an enrollment of approximately five hundred students and a faculty of twenty-one regular classroom teachers who teach classes ranging from kindergarten through the sixth grade. Martin Luther King Elementary School has an enrollment of approximately four hundred fifty students and seventeen regular teachers teaching classes ranging from fourth to sixth grades.

Selection of the Students

Fifth and sixth grade students from the two schools were selected for the study. The general practice of

regrouping students in the IGE concept posed a problem. In order to eliminate this problem the teachers who were participating in the study were asked to keep the same group for the entire year.

As reading and mathematics were the two areas of individualization for the first year, the students in these classes were chosen as the subjects for this study.

Selection of the Teachers

The three experimental teachers, one from Seely McCord and two from Martin Luther King School, were chosen on the basis of their advanced progress in individualizing instruction of reading and mathematics.

The three teachers for the control classes, one from Seely McCord and two from Martin Luther King Schools, were chosen on the basis of the subjective judgment of the principals and fellow unit members who considered them to be good teachers.

An analysis of covariance of class gain scores for the previous two years showed no significant difference in the academic growth of the students taught by the two groups of teachers. The results of this analysis are shown in Table 3.1.

Treatment of Experimental Teachers

The three teachers in the experimental classrooms were given a three day inservice workshop in

TABLE 3.1

ANALYSIS OF VARIANCE BETWEEN TEACHERS

Source	MS	df	F	P
Experimental and Control Group	Time '73 .0833	1	.1328	.725
	Time '74 .2977	1	.8548	.382
Error	.627733 .348258	8		

individualizing instruction and management of behavior and materials. The in-service workshop was a practical, individualized attempt to help teachers learn how to make the transition from a group paced to an individually paced approach to instruction.

The in-service lab was set up like a model classroom with multi-sensory, multi-media learning centers. The material was organized into modules called Behavioral Skills Labs (BSLs). Each BSL had pre- and post-tests and multi-sensory multi-media materials.

The in-service program consisted of thirteen BSLs. The first eight numerically listed BSLs dealt with pupil-teacher interaction. The last five alphabetically listed BSLs dealt with instruction.

The first eight provided learnings on pupil-teacher interaction in the areas of punishment, reinforcement,

incompatible behavior, categories of reinforcement, direct and indirect reinforcement, schedules of reinforcement, contracts, and indirect reinforcement systems.

The next five modules provided learnings dealing with instruction in the areas of individualizing instruction, pre- and post-tests, behavioral objectives, sequencing of objectives, and Bloom's Taxonomy of cognitive abilities.

Besides the individualizing instruction in the thirteen Behavioral Skills Labs, the trainess experienced five management systems ranging from total trainer control to total trainee control.

In the first management system the trainees experienced a totally trainer controlled lecture session with minimal trainee participation.

The second management system consisted of small groups moving from center to center with the movement controlled by a timer. The trainer prepared the materials and controlled the time; the trainess controlled the interaction within the group. These two management systems covered the first five modules. A diagnostic test covering the material of all thirteen BSLs was administered to the participants before the end of the first day.

On the second day the trainees were grouped according to their achievement on the diagnostic test. Management system three was group paced; the group had

to stay together, work together, and move together as a group from center to center and module to module. Movement was determined by task completion and mastery of the post-test.

Management system four was experienced during the second half of the second day. This was individually paced. The trainees decided which centers to use and when to take the post-test.

Management system five was experienced in the morning of the third day. This was a completely individualized system. The trainee decided which BSL to work on, what centers to go to, whether to ask for direct instruction from the trainer, and when to take the post-test. The trainees kept individual records of their growth while peer checkers kept the cumulative growth charts. The trainer assigned peer checkers, gave direct instruction when asked to, and attended to the general welfare of the classroom while interacting with the trainees, encouraging, praising, reinforcing, listening, observing, and, in general, acting as a guide to the trainees in their efforts to increase their knowledge of the given subject matter.

After each management system, the trainer discussed the feelings of the trainees in a large group direct instructional setting. The purpose of this discussion was to help the trainees understand the frustrations of their students in similar circumstances.

During the second half of the third day the trainees were introduced to the follow-up procedures and available resources. Teachers were encouraged to use the resources available and individualize instruction in their classrooms. The services of the trainer and the Teacher Resource Center were available to all teachers.

Treatment of Control Teachers

The three control classroom teachers were scheduled to attend the three day in-service training session during the month of April 1974. It was felt that the in-service training at such a late date would not affect the teaching style of the teachers enough to make a significant difference for the students involved in the study. The teachers were not urged to make any changes for that school year; they were asked to plan for the next school year.

The control teachers had access to the Teacher Resource Center and to the same trainer as the experimental teachers; however, since they had not had the in-service training, they did not make much use of either the center or the trainer. The trainer visited their rooms at regular intervals, the teachers were content with their performance and did not seek to change their mode of instruction.

Treatment of Experimental Students

The experimental classrooms were set up with at least five learning centers, with multi-sensory, multi-media materials for reading and mathematics. The ABC Read System and it's objectives published by the American Book Company provided the structure for the reading, while Silver Burdett Mathematics provided the structure for mathematics.

Each center was designed with comfort, efficiency, and desirability in mind. Partitions provided privacy and storage of materials. All materials were color coded to objectives for easy retrieval and most of the materials were self checking. Each center was identified by a symbol and rules for the use of the center were posted.

Initially the students had to be taught to use the equipment and to care for it properly. Rules and procedures for general classroom conduct and management were set. A system was designed to take care of routine emergencies and anticipated needs of the students.

After the classroom routines were established, the children were arbitrarily grouped and assigned to centers for scheduled periods of time. When the test taking, record keeping, self-checking and orderly movement from center to center were established, the time element was removed and the grouping was eliminated. This gradually eased the children out of the original groups and

other groups were formed and dissolved as the teacher saw fit for purposes of direct instruction. Whenever the need arose, the whole group met together to discuss a problem for enrichment or for direct instruction at the teacher's discretion.

The children were encouraged to make decisions and choices. They were responsible for the upkeep of the classroom, for keeping their own growth charts and folders up to date, for keeping conference appointments with the teacher, and for managing their time wisely. A few children required either behavior or learning contracts to help them manage themselves.

The teachers and the paraprofessionals made sure that the materials were reusable so that when one child completed a segment of the program, new materials would not have to be made for other children using that segment. Any piece of material that was not needed at the center was taken to a review center for future use or stored away. Cumulative growth charts were maintained so teachers would know what each child was or should be doing at any given time. As the teachers became more at ease with the procedures, more centers were set and some optional centers were provided for purposes of enrichment.

The students in the experimental classrooms were free to learn as fast as they were able to learn. They followed sequentially through a continuum of objectives,

but, in order to master an objective, they could choose from a number of options. Pre- and post-tests were used to guide selection of learning, which was diagnostic and prescriptive in nature. Immediate feedback was provided by self-checking materials. The students actively participated in making decisions about their own learning.

Treatment of Control Students

The three control classrooms were generally set up with the desks in neat rows, with the teacher's desk in the middle front of the room. Each child had an assigned seat and he was expected to be in his seat.

At the beginning of the school year an ABC Read System book and a Silver Burdett Mathematics book was assigned to each child. The teacher taught every new mathematics lesson to the whole class at the same time by the use of the chalkboard and the textbook. After the lecture session, textbook pages were assigned for the children to complete and hand in to be checked by the teacher or the aide. The teacher spent much of the mathematics period disciplining students or trying to help slow learners catch up with the rest. When the majority of the students had turned in the assigned work, they went to the next lesson. The brighter students were assigned the enrichment pages at the end of the unit or they were given more duplicated worksheets to do. Very few visual aids were used to supplement the textbook.

In reading, the teachers had two reading groups, each in a different book. Each morning the teacher assigned some boardwork and workbook pages or duplicated worksheets to both groups. The teacher worked with one group by introducing the lesson and listening to them read or by teaching them reading skills while the other group was doing assigned work. Then the groups were switched and the process was repeated. Very few audio visual material were used to supplement the textbook.

In the control classrooms, learning was group paced. No pre- and post-tests were used systematically to determine levels of competency. Objectives were not specified in detail. There was no wide variety of materials. The teacher was the primary source of knowledge. No provision was made for student variables. There was no immediate feedback and learning did not progress continuously.

Instrumentation

The California Achievement Test, 1970 Edition, was designed for the measurement, evaluation, and analysis of school achievement. The standardization of this test was accomplished in late February and March of 1970 on a nationwide sample of approximately 203,684 students.[1]

---

[1]Ernest W. Tiegs and Willis W. Clark, Examiner's Manual: California Achievement Tests (USA: CTB/McGraw Hill, 1970), p. 5.

The emphasis of the California Achievement Test is upon content and objectives in the basic curricular areas of reading and mathematics. The intended measurement is one of performance in these curricular areas.[1]

In developing the California Achievement Test, the most important consideration was the analysis and selection of content. This was accomplished by a thorough review of reading and mathematics curricula and by a study of the recommended curricular objectives and courses of study in states representing all sections of the country.[2]

The test generally measures the following areas:

1. The ability to understand the meaning of the content of material presented.

2. The performance of the student in applying rules, facts, concepts, conventions, and principles of problem solving in the basic curricular materials.

3. The level of performance of the student in using the tools of reading and arithmetic in increasingly more difficult situations.[3]

Level 2 of the California Achievement Test was selected as the measuring instrument for the pre- and post-test examinations of the experimental and control groups.

---

[1]Ibid., p. 7.

[2]Ibid., p. 5.

[3]Ibid., p. 6.

All students were given the Cognitive Abilities Test, Nonverbal Battery. The Cognitive Abilities Test was normed jointly with the Iowa Test of Basic Skills (grades 3-8) and the Test of Academic Progress (grades 9-12). The reliability for the Cognitive Abilities Tests are currently based on data from a single testing with the first form of the test.[1]

The Cognitive Abilities Test has evolved from the well-accepted Lorge-Thorndike Intelligence Test series. The test provides a set of measures of the individual's ability to use and manipulate abstract and symbolic relationships. Three main types of symbols play substantial roles in the thinking of students and adults: symbols representing words, symbols representing quantities, and symbols representing spatial, geometric, or figural patterns. Three separate batteries have been developed to test student competence in working with each of the three types of symbols: a verbal battery, a quantitative battery, and a non verbal battery.[2]

The nonverbal battery consists of three subtests: figure analogies, figure classification, and figure synthesis. The items in this subtest involve no words or numbers and the figural elements used in this subtest

---

[1]Robert L. Thorndike, and Elizabeth Hagen, Examiner's Manual Cognitive Abilities Test (Boston: Houghton Mifflin Company, 1971), p. 5.

[2]Ibid., pp. 3, 4.

bear little direct relationship to formal school instruction. The subtest emphasizes discovery of, and flexibility in manipulating, relationships expressed in figural symbols or patterns.

The nonverbal battery measures more nearly what has been called "fluid intelligence;" that is, ability not bound by normal school instruction.[1]

The nonverbal battery was chosen specifically to provide an opportunity for students with good reasoning abilities but poorly developed reading and quantitative skills to have an equal chance.

Collection of Non-Statistical Data

The non-statistical data were collected in two ways. First, a stratified sample of students was given a questionnaire consisting of twenty multiple choice test items (Appendix A), administered to small groups of five to eight students. The questions were read to the group and each child responded by circling his answer. The second type of non-statistical data was collected by an interview questionnaire consisting of twelve items (Appendix B) administered to a random sample of the students. The interviews were taped and then transcribed for analysis.

---

[1]Ibid., p. 4.

Collection of the Statistical Data

To test hypotheses concerning improvement of two groups under different treatments, it was necessary to have a base line measurement which was not affected by the treatment on the subjects in each group. The pupils of both the experimental group and the control group were administered the California Achievement Test as a pre-test in September, 1974.

The pupils in the experimental group were subjected to an experimental period from November, 1974, through April, 1975. The experimental group was exposed to individualized reading and/or mathematics instruction, while the control group was exposed to traditional reading and/or mathematics instruction from September to April.

Students in both groups were given the California Achievement Test of reading and arithmetic as the post-test during the last two weeks of April. The results of the post-test were subjected to an Analysis of covariance with the pre-test scores as the covariate and the post-test scores as the dependent measure.

In preparing the data for analysis, computer cards were punched for each pupil in the study, experimental and control. The FINN program was employed to compute the data on the CDC computer located on the Michigan State University Campus.

The Design

The design of this study is the "non-randomized control-group pre-test - post-test design," as defined by Van Dalen.[1] This design is utilized when the researcher is unable to provide full experimental control through randomization. In this study the researcher was unable to achieve the rigorously controlled design that requires the subjects to be assigned to comparison groups at random; therefore, preassembled groups for the experimental and control subjects had to be used.

Treatment of Data

The test score data which were collected were to be used in determining pupil achievement during the time of participation in the study. Inasmuch as the experimental and control classes represented naturally preassembled groups, an analysis of covariance was used to insure the necessary adjustment for initial differences in ability and achievement. Pre-test scores on The California Achievement tests of reading and arithmetic served as the covariate and the post-test scores were used as the dependent measure. The univariate analysis of covariance was used to determine if differences existed.

---

[1]Deobold B. Van Dalen, Understanding Educational Research (New York: McGraw-Hill Book Company, Inc., 1966), p. 275.

The univariate analysis of covariance was applied to the following null hypotheses:

Total experimental versus total control.

1. There is no significant difference in reading achievement between the experimental group and the control group.

2. There is no significant difference in arithmetic achievement between the experimental group and the control group.

Sex

3. There is no significant difference in reading achievement between the girls and the boys in the experimental group and the girls and the boys in the control group.

4. There is no significant difference in arithmetic achievement between the girls and the boys in the experimental group and the girls and the boys in the control group.

Ability

Reading

5. There is no significant difference in reading achievement between the high and low ability experimental group and the high and low ability control group.

Arithmetic

6. There is no significant difference in arithmetic achievement between the high and low ability experimental group and the high and low ability control group.

Affective

7. There is no appreciable difference in the number of children exercising self-direction and independence between the experimental group and the control group.

The level of significance chosen for all F-ratios in the study was set at $p < .05$.

Summary

This experimental study was designed to investigate the reading and mathematics achievement of two groups of students, one taught by the traditional method and the other taught by individualizing instruction through learning centers. Two hundred and eleven students participated in the study; one hundred and fifteen in reading and ninety-six in mathematics.

The techniques of measurement involved using the California Achievement Test, and the Lorge Thorndike Cognitive Abilities Test, Multi-level Edition, Form 1, levels B and C of the Nonverbal Battery.

The data were treated statistically by methods explained in this chapter. In Chapter IV a case study of the change process from group paced to individual based instruction is presented. The presentation of the findings and analysis of data are included in Chapter V. The conclusions and recommendations are presented in Chapter VI.

CHAPTER IV

A CASE STUDY OF THE STAFF DEVELOPMENT PROGRAM

The Staff Development Program, which is an in-service and follow-up model funded by Title I, was first introduced to Benton Harbor Area Schools by the Assistant Superintendent of Instruction, Mr. Edward Parpart.

In May 1974, a team of three administrators visited the Houston, Texas, Schools to observe the program in operation and to participate in the three day inservice training session. They were favorably impressed by what they saw and experienced and recommended that the program be adopted by the Benton Harbor Area Title One Schools. On the basis of their recommendation, a budget of $69,000 was approved and the materials that constituted the program were bought from Houston. These materials included filmstrips and cassette tapes, games, problem cards, readings, show and tell charts, transparencies, a movie film and script, pre- and post-tests for each of the BSL's (Behavioral Skills Lab), a diagnostic test, management systems, and KIT (Keeping In Touch) box.

In August, Dr. Robert Howell, a former teacher of the Western Michigan University Special Education Department, was hired as the coordinator for the program. He had the task of hiring three teacher-trainers and locating and organizing the Staff Development Center, which consisted of the training center and the teacher resource center. Since neither the coordinator nor the trainers were familiar with the program, Susan Dollar, who was instrumental in the organization and implementation of the program in Houston, was hired for a three day inservice program to prepare the trainers. After the initial program to train the trainers, they spent two weeks practicing and refining their own presentations with each other and with volunteer college students.

There were obstacles to overcome before the program could actually be implemented in the classroom. As in many educational bureaucracies, the interpersonal relationships between the administrators and the teachers were strained. For example, mutual distrust, concern over unsettled contracts, and teacher unhappiness because programs were added without teacher consultation created a general feeling of dissatisfaction and unrest among teachers.

To ease this dissatisfaction and because the principal is the instructional leader in the school, it was decided to train all the principals and the other

administrators first. This move ultimately helped to ease the teacher tension.

Although the principals were initially skeptical of the new program and did not appreciate attending a three day inservice session, most left with positive feelings and some were even enthusiastic about the implications of the program for the instruction in their buildings. Most principals were eager to have their teachers participate in the inservice training and to have the teacher-trainers follow-up and help the classroom teacher evaluate her teaching techniques and procedures and make the changes necessary to individualize instruction.

Several steps were taken to win the confidence of the teachers. They were given the choice of participating in the inservice training. Rumors were stopped by telling the facts officially. The teacher-trainers tried to accommodate the teachers' needs. Positive publicity was encouraged.

In addition, steps were taken to ease the burden of the classroom teachers. For example, teachers in one building had not been allowed to use any of the office machines such as the duplicator, 3M copier, or the laminator. Teachers were irritated because they had to turn their work into the office and wait up to a week to get it back. The coordinator found that the principal's reason for this reservation was his belief that the

teachers did not know how to use the equipment. An in-service session for the teachers in the use and care of the equipment saved face for the principal and gave the teachers the freedom to use the machines. In another building the teachers were reluctant to use the audio-visual equipment for the program because they had to check it out every morning and check it in every evening to the principal's office where it was locked for the night. A conference with the principal resulted in the equipment being locked in the individual rooms each night.

As the news of these changes spread, the confidence of the teachers began to grow so much that the program came to be nicknamed "The Staff Deliverance Program." It took a long time and considerable effort to gain the faith and trust of most of the teachers, but it was worth the effort.

As the credibility of the program grew, most teachers were eager to come to the training sessions, a few took a non-committal attitude, and only two refused to participate. These two were retiring the following year and did not feel the need. The majority of the teachers attended the three day in-service sessions eagerly and returned to their classrooms with good intentions of making individualization work.

In-Service Training

The training session consisted of three full days of training that dealt with knowledge and skills related to behavior management and management of instructional materials.

The training center was located in a classroom in the old building of the Seely McCord Elementary school. The room was set up to simulate a classroom environment which provided a variety of options to meet the varied and individual needs of the students.

Seven multi-sensory, multi-media centers were set up to organize the material and to provide for an orderly progress of learning. The centers were: direct instruction center, reading center, problem solving center, games center, visual center, audio center, and show and tell center. Each center was located in a well defined area with an identifying symbol such as a red triangle or a picture of an apple, a set of rules that governed the use of the center, and materials for each of the thirteen BSLs arranged and stored for easy retrieval.

The content of the training sessions were organized into BSLs (Behavioral Skills Labs) or modules consisting of a number of objectives on a topic such as punishment or reinforcement. Each center contained material for each of the BSLs that was appropriate for that center. For example, if the BSL was on punishment

there was a game to teach the content of the BSL in the games center, there was a film on the subject in the visual center, there were problems on punishment to solve at the problem solving center, and so on.

The BSLs were organized numerically and alphabetically. Numbers referred to the BSLs that dealt with the management of behavior and the letters referred to the BSLs on instruction. The following is a list of the thirteen BSLS:

BSL 1 Punishment

BSL 2 Reinforcement

BSL 3 Incompatible Behaviors

BSL 4 Categories of Reinforcers

BSL 5 Direct and Indirect Reinforcers

BSL 6 Schedule of Reinforcement

BSL 7 Contracts

BSL 8 Indirect Reinforcement Systems

BSL A Variables of Individualization

BSL B Behavioral Objectives

BSL C Pre- and Post-tests

BSL D Sequencing skills or Objectives

BSL E Bloom's Taxonomy

Multi-sensory, multi-media materials for each of the above BSLs was organized at each of the learning centers. The progression of the trainees through the learning centers was facilitated by the use of management

systems. Management systems are merely ways of informing the trainees of what they are to do and where available learning resources are found.

Between fifteen to eighteen teachers from the Title One schools were scheduled to attend the three day in-service session at one time. The teachers were notified of the training dates by letter. The Staff Development personnel secured the substitutes for the teachers. The in-service sessions maintained the regular working hours of teachers.

As the teachers (referred to as trainees) came in on the first day, they were greeted by their trainer, and each one was given a manila folder with his or her name on it. In the folder were some blank sheets of paper for note taking, a name tag, and a management system form (See Appendix C) on which they were to analyze the five management systems they were about to experience.

In the first session they experienced the first management system, which consisted of a large group lecture session where the trainer controlled the interaction, the materials, and the movement. The trainees made no decisions, they experienced a totally trainer controlled lecture session with minimal trainee participation.

At the end of each management system a discussion was held to talk about the feelings of joy and frustration that were felt during the management system, in the hope

of exposing the trainees to some of the joys and frustrations that their students might experience under similar situations.

In the second management system the trainees were arbitrarily grouped into small groups of four or five people. Each group moved from center to center on a timed schedule which was controlled by a bell-timer. The trainer chose the material and controlled the time and movement while the trainees controlled the interaction within the group. These two management systems covered the first five BSLs.

At the end of the first day a diagnostic test was given to all the participants. The test covered the content of all thirteen BSLs. The results of this test were used to group the trainees for the second day. Other reasons for administering the test were to let the trainees experience some of the tensions and frustrations of test taking which might be experienced by their students and to exemplify the use of a diagnostic test to diagnose and prescribe instruction.

On the second day the trainees were grouped according to their achievement on the diagnostic test. Management system number three was group paced. The groups stayed together and worked together, moving only as a group. Movement from center to center was determined by task completion and movement from BSL to BSL

was determined by mastery of the post-test. At the beginning of this session the trainer assigned a few centers that were compulsory and the trainees chose to go to any of the others. The trainer checked all post-tests and the trainees checked the pre-tests for each BSL. The trainer maintained a cumulative growth chart and the trainee maintained individual growth charts (See Appendix D).

Management system four was experienced during the second half of the second day. Each management system progressively freed the trainee to be more responsible for his own learning. This management system was individually paced. The trainee was free to work alone or with a friend, to choose the centers he wanted, to take the post-test when desired, and to maintain his own growth chart. The trainee had to progress through the BSL's sequentially, to ask the trainer to check the post-test, and to follow the trainers schedule for direct instruction.

Management system five was experienced on the morning of the third day. This management system freed the trainees to be responsible for their own learning to a large extent. The trainees still continued to work on the BSLs they had not mastered in sequence. They could work individually or choose to work with others. Peer-checkers, provided with guide sheets or keys to the

tests, were assigned to check some of the post-tests. The trainees requested direct instruction if they felt a need by signing up for it. The trainer decided the time to give direct instruction. The trainee controlled the learning resources, learning style, the amount of time they spend at each center and on each BSL, the interaction with the peers, when to ask for direct instruction, and when to take the post-test. In other words, a large part of the responsibility for his own learning was borne by the trainee.

By exposing the trainees to a gradually sequenced progression for making the change from a group paced to an individual based system of instruction, it was hoped that they would see the importance of making the changes in their own classrooms, to release the human potential locked up in their students, and to give them the joy of learning, of making decisions, and of being responsible for their own learning.

The second half of the third day was spent in discussing the follow-up procedures and getting acquainted with KIT (Keeping In Touch). KIT is a body of printed material organized in a box which serves as the guidance system for change. The purpose of KIT is to provide additional information about the important variables which influence the teacher's achievement of an individualized classroom.

The organization of the program materials in KIT enables the teacher to move in small steps from the current level of individualization to a more complex and efficient level of instructional management. Thus, the KIT represents a continuum of skills through which teachers progress on an individual basis.

The KIT materials cover four major strands of variables which account for many of the differences about how children learn and teachers teach. Each of these variables is presented in a concept strand. They are: learning environment, learning rate, learning style, and learning content. Each strand includes task cards, flow charts, problem cards, and magazine articles (See Appendix E). Task cards are different colored cards, each color indicating a different level of difficulty, on which there are step-by-step activities for the teacher to follow. Flow charts illustrate the movement through the various steps from the point of entry into a specific flow chart to the point of exit into another flow chart and serve as progress records. Problem cards contain problems encountered by other teachers in various stages of individualization and are presented as helps in solving similar problems. Magazine articles that correlate to the strands are provided to strengthen the theoretical base of individualization. KIT also contains a built-in reinforcement system of bonus passes that teachers can

earn when they reach certain points on the flow charts. A bonus pass is a certificate that provide the teacher a half-day substitute so that she can spend that time in the Teacher Resource Center preparing materials for her centers.

Follow-up Procedures

Follow-up may be defined as the interaction or activities of the teacher-trainer with school personnel following Staff Development training.

A severe weakness of most training and in-service programs is insufficient or lack of follow-up. In-service programs frequently end with the consultant leaving with a fee and the teacher left excited with no specific plan to implement change. Unlike most in-service training programs, this program has a built-in follow-up system to support the teachers in classroom performance.

The purpose of the follow-up program is to ensure that teachers have the support necessary for implementing change in the classroom. The framework for the follow-up is KIT.

Each teacher was assigned to a teacher-trainer so that she might be assisted in using KIT to individualize instruction. The teacher-trainer visited teachers on a regular basis and was also available on call throughout the school day. The trainer provided the following supportive services:

1. Assist in interpreting and following KIT.
2. Demonstrate teaching techniques.
3. Assist in setting up the classroom environment.
4. Aid in developing teaching materials.
5. Help set up management schedules.
6. Assist in setting up contracts.
7. Aid in correlating instructional materials to sequenced objectives.
8. Assist in procuring needed equipment and materials.
9. Act as general problem solver or trouble shooter.
10. Act as a rewarder and reinforcer of teacher behavior.

Teacher Resource Center

Individualization of instruction requires new materials or requires the reorganization of materials presently on hand. In the initial stages of the Staff Development Program it became evident that teachers were in need of resources to assist them in altering their classroom programs and instructional strategies. For this reason the Teacher Resource Center was developed.

The Teacher Resource Center is a vacant classroom adjoining the training center classroom in the old building of Seely McCord Elementary school. It is set up to

accommodate fifteen to twenty teacher at one time. The center is equipped with work tables, paper cutters, laminators, a ditto machine, a 3M copier, a Thermofax machine, and other miscellaneous equipment. The soft ware and other sundry expendable supplies necessary to make multi-sensory, multi-media, instructional materials are provided.

The purpose of the Teacher Resource Center is to provide the necessary support for teachers as they progress in individualizing instruction. As teachers began initiating change in their respective classrooms, they needed materials such as games, charts, tapes for listening centers, and various self-checking materials correlated to objectives. The technical help and the materials to meet this need were provided in the Teacher Resource Center.

The Resource Center was manned by a consultant, a paraprofessional, and a secretary who were available to the teachers at all times.

There were numerous ways of gaining access to the Center. One was by earning a bonus pass; another was to arrange with the unit lead-teachers for released time to go to the Center. Teachers could also come after school or during the lunch break.

A strong follow-up program by the trainer, coupled with the assistance of the Teacher Resource Center, made

it possible for every teacher to individualize instruction. Many teachers took advantage of the opportunity and made significant amounts of change, although some individualized in just one subject area and some individualized only moderately. Overall, however, almost every teacher who participated in the in-service program made some visible changes in the classrooms.

Teacher Reactions

Change does not come easily. Many interested, dedicated teachers and paraprofessionals put in many hours of tedious work setting up and organizing the materials into multi-media, multi-sensory learning centers, changing learning environments to give the students more options from which to choose, and setting up management and record keeping systems.

In addition to reorganizing the classrooms, it was also necessary to retrain the students to be more involved in their own learning. They had to be taught to operate the equipment, move around quietly in the classroom, complete a task before taking on another task, keep accurate records, check their own work, and be responsible and self-reliant. This was a slow and gradual process that called for patient, unending attention.

Teachers had a lot of learning and adjusting to do themselves. They had to learn to step back and

let children learn, let children make decisions and mistakes, and forget the urge to lecture at the children. They had to learn new skills or sharpen dormant skills, such as questioning, conferencing, analyzing, evaluating, and problem solving. Some of these same skills had to be taught to children to some degree of sophistication so that they could pursue their own learning.

Once the initial adjustments were well under way and the stage was set for learning, the teachers felt the joy of accomplishment and a new zest for teaching was awakened. The following are some comments made by teachers:

"I am so pleased with the way my children are learning."

"I'll never be able to teach everybody the same thing again."

"The children are so motivated to learn, they don't even want to go our for recess any more."

"I have to work harder than ever before, but I don't mind it because the reward of seeing children learn happily and eagerly is worth it all."

"There is more satisfaction in teaching."

"Students have a renewed interest in academic activities and in school in general."

"I have more time to give individual attention to children."

"My fast group just took-off and covered so much material I could hardly believe it."

"At first I was worried that the children might be careless in their work. It was not so. As long as I set the standard, they turned in good work."

"A few find it difficult to make the transition, and perhaps may never make it completely. These few need a lot of teacher attention and I can give it to them."

"Children like what they do."

"Here it is the last day of school and these children have not slowed down yet. To them it is as important as the first day of school. I don't know what it is that makes them want to work and work."

Student Reactions

By the same token, the children in the experimental classrooms seemed happier and more relaxed than the children in the control classes. They seemed to be more actively involved in their own learning and seemed to feel less threatened by tests. Test taking was part of the normal day's activities and the children used the test results to either find out what skills needed more work or to see if they could advance to the next objective. Tests were more of a goal to achieve than a threat to avoid.

The experimental classrooms provided the children with many attractive and exciting alternatives to choose

from. They enabled the learner to gain knowledge and information from multi-sensory, multi-media materials. This made learning more enjoyable and successful, which, in turn, produced happier learners with more positive self-concepts.

The following are some children's comments about the change:

"We learn by ourselves."

"I like to learn by myself."

"I can choose to work with my friends."

"I don't have to sit at the same desk all the time."

"Other children help me learn."

"We are not bored; boardwork is so boring."

"Our teacher doesn't put any boardwork anymore."

"When you learn from a book it is not fun, but when you learn from a machine it is fun."

"The teacher runs around too much, the tape will stay and help you many times without fussing."

"The tape doesn't yell at me when I make mistakes."

"I like learning centers because if I can read better I can learn faster; I don't have to wait for anybody."

"We like reading this year because we can learn at centers."

"If I don't like to do worksheets, I can go to a center that doesn't have worksheets."

"Centers are more fun than staying in one place and doing the same thing all the time."

"I can learn more at learning centers."

"When the teacher puts a lot of work on the board you may not have time to do it all. At the center you can take your own time to do it."

"I like some of the centers and I don't like some of them. I don't like the problem solving center, it is too hard."

"I like the games center the best, because I can learn by playing games."

"I like games they are fun."

"Centers are good because we have more fun."

"Centers are fun because we learn alone."

"The teacher works with me privately, I like that."

"I like taking the test by myself when I am ready."

"I like to do the test without the teacher hollering at me."

"I like contracts, they help me control myself."

"I have a contract to reduce fighting and talking too much but do more work; if I don't fight I get a piece of candy."

"I like contracts because it helps me be good."

"I like to know exactly what I have to do."

"I like contracts because we get candy bars, free time, we get to paint, make tapes, and even put on puppet shows."

"Contracts help me to do my work better."

The largely positive reactions of both the students and the teachers spoke well for the experimental method. It was felt that the intrinsic affective results of the experimental program were quite marked. The observations of the teachers in terms of pupil motivation, self-direction, independence, and stimulation of learning made for a more effective teaching-learning situation. Therefore, the advantages of individualizing instruction through multi-sensory, multi-media learning centers cannot be denied. (See photographs in Appendix F.)

CHAPTER V

STATISTICAL FINDINGS

The results of the statistical tests on the null hypotheses and the responses to the general questionnaire are presented in this chapter.

Introduction

In studies of learning such as the present one, interest is centered in improvement or change in performance as a result of instruction. The basic idea of research design where control and experimental groups are used is to control extraneous differences and vary the experimental group's treatment while the control group's treatment is held constant. Post-test means are computed on all groups. The greater the difference between the means, the more the experimental treatment can be presumed to have operated. If there is little or no difference between means, then the presumption must be that the experimental treatment has had little or no effect.

A comparison of pre-test and post-test measures was made to see if there were differences in mean scores between the two groups. Since the basic difference

between the two groups was the treatment, it was presumed that differences in performance were basically due to the experimental treatment.

Statistical Data

Conclusions concerning "significant achievement gains" were based upon the establishment and testing of null hypotheses.

The first hypothesis tested in the present study for differences due to treatment was:

Null Hypothesis 1. There is no significant difference in achievement in reading as measured by The California Achievement Reading Test between the experimental group and the control group.

TABLE 4.1

ANCOVA READING EXPERIMENTAL VERSUS CONTROL

Source	df	MS	F	P
Instruction	1	1004.27	10.04	.002
Error	110	99.99		

Table 4.1 illustrates the analysis of covariance for The California Achievement Reading Test scores, using the pre-test scores as the covariate and the post-test scores as the dependent measure. According to this analysis, there is a significant difference between the

experimental group and the control group in reading achievement as indicated by $p < .002$, far beyond $p < .05$ chosen for the study. The experimental group performed significantly better than the control group.

TABLE 4.2

READING MEAN SCORES

Source	N	Pre-test Mean	Post-test Mean	Difference
Control	58	27.46	35.50	8.04
Experimental	57	23.67	37.84	14.17

Table 4.2, the table of means for the California Achievement Reading Test scores, shows the pre-test means, the post-test means, and the gain in reading achievement made by each group during the experiment.

On the basis of the statistical findings, it can be said that the experimental group benefited more from the instruction they received in reading than the control group and that the null hypothesis is rejected.

Null Hypothesis 2. There is no significant difference in achievement in arithmetic as measured by The California Achievement Arithmetic Test between the experimental group and the control group.

Table 4.3 illustrates the analysis of covariance for The California Achievement Arithmetic Test scores,

TABLE 4.3

ANCOVA ARITHMETIC EXPERIMENTAL VERSUS CONTROL

Source	df	MS	F	P
Instruction	1	27.456	.4145	.52
Error	91	66.23		

using the pre-test scores as the covariate and the post-test scores as the dependent measure. According to this analysis, there is no significant difference between the experimental group and the control group in arithmetic achievement since $p < .52$ is more than $p < .05$, the level of significance chosen for this study. The experimental group did not perform significantly better than the control group.

Table 4.4, the table of means for the California Achievement Arithmetic Test, shows the pre-test scores, the post-test scores, and the gain in arithmetic achievement made by each group during the experiment.

TABLE 4.4

ARITHMETIC MEAN SCORES

Source	N	Pre-test Means	Post-Test Means	Difference
Control	43	35.60	42.79	7.19
Experimental	53	28.47	36.56	8.09

On the basis of the statistical findings, it can be said that the experimental group did not benefit more from the instruction they received in arithmetic than the control group and that the null hypothesis cannot be rejected.

Null Hypothesis 3. There is no significant difference in achievement in reading between the boys and the girls in the experimental group and the boys and the girls in the control group.

TABLE 4.5

ANCOVA READING ACCORDING TO SEX

Source	df	MS	F	P
Sex	1	590.40	5.907	.016
Error	110	99.99		

Table 4.5 illustrates the analysis of covariance for The California Achievement Reading Test scores for the variables sex versus instruction using the pre-test scores as the covariate and the post-test scores as the dependent measure. According to this analysis, there is a significant difference between the girls and the boys in reading achievement as indicated by $p < .016$, is less than $p < .05$, the chosen level of significance for this study. The girls in the experimental group did significantly better than the boys in either group or the girls in the control group.

Table 4.6, the table of means for reading scores for the boys and the girls for the experimental and control groups, shows the pre-test means, the post-test means, and the gain in reading achievement made by the groups during the experiment.

TABLE 4.6

READING MEAN SCORES FOR THE BOYS AND THE GIRLS

Treatment	N	Sex	Pre-test Means	Post-test Means	Difference
Control	25	B	30.88	34.36	3.48
Control	33	G	25.67	36.36	10.69
Experimental	25	B	23.08	35.80	12.72
Experimental	32	G	24.13	39.44	15.31

On the basis of the statistical findings it can be said that the experimental girls benefited more from the instruction they received than the control girls, and the experimental boys benefited more from the instruction they received than the control boys. In addition, the post-test means for the girls were higher than the post-test means for the boys in each of the two groups. Therefore the null hypothesis is rejected.

Null Hypothesis 4. There is no significant difference in achievement in arithmetic between the girls

and the boys in the experimental group and the girls and the boys in the control group.

TABLE 4.7

ANCOVA ARITHMETIC ACCORDING TO SEX

Source	df	MS	F	P
Sex	1	14.282	.2156	.64
Error	91	66.23		

Table 4.7 illustrates the analysis of covariance for The California Achievement Arithmetic Test scores for the variables of sex versus instruction using the pre-test scores as the covariate and the post-test scores as the dependent measure. The F-ratio for the data was not significant at the chosen level of $p < .05$. This indicates that sex differences were not significantly related to achievement in arithmetic.

Table 4.8, the table of means for arithmetic scores for the boys and girls in the experimental and control groups, shows the pre-test means, the post-test means, and the gains in arithmetic achievement made by the groups during the experiment.

The control boys made greater gains in arithmetic than the experimental boys and the experimental girls made greater gains in arithmetic than the control girls. However, because differences were not statistically significant the null hypothesis cannot be rejected.

TABLE 4.8

ARITHMETIC MEAN SCORES FOR THE BOYS AND THE GIRLS

Treatment	N	Sex	Pre-test Means	Post-test Means	Difference
Control	19	B	35.89	44.00	8.11
Control	24	G	35.37	41.83	6.46
Experi-mental	22	B	28.86	36.72	7.86
Experi-mental	31	G	28.32	36.45	8.13

Null Hypothesis 5. There is no significant difference in reading achievement between the experimental group and the control group for the high ability students or for the low ability students.

For the purpose of this study any child who attained an adjusted raw score of 100 or above on the Lorge Thorndike Cognitive Abilities Test, non-verbal battery, was considered to be of high ability. Any child whose adjusted raw score was 99 or less was considered to be of low ability.

Table 4.9 illustrates the analysis of covariance for The California Achievement Reading Test scores for the variables ability versus instruction. The pre-test scores were used as the covariate and the post-test scores were the dependent measures. According to this analysis there is a significant difference between the high ability

TABLE 4.9

ANCOVA FOR READING, ABILITY VERSUS INSTRUCTION

Source	df	MS	F	P
Instruction	1	654.51	6.47	.0124
Ability	1	774.91	7.66	.0067
Inst. X Ability	1	14.72	.1456	.7035
Error	110	101.098		

experimental group and the high ability control group. However, there seems to be no significant interaction between ability and instruction, which means that there are some common elements between both groups and that they are completely independent of each other.

The difference between the experimental treatment and the control treatment is significant at the $p < .01$ level which is far beyond the $p < .05$ level chosen for this study, which indicates that the high ability students in the experimental group achieved much higher scores than the control group.

Table 4.10, the table of means for the reading scores for the high and low ability experimental and control groups, shows the pre-test means, the post-test means, and the gains in reading achievement made by the groups during the experiment.

TABLE 4.10

READING MEANS HIGH AND LOW ABILITY

Instruction	N	Pre-test Means	Post-test Means	Difference
Control - High	11	30.45	40.90	10.45
Experimental - High	18	26.94	44.44	17.50
Control - Low	47	27.31	34.23	6.92
Experimental - Low	39	22.15	34.79	12.64

On the basis of the statistical findings, it can be said that the experimental group benefited significantly more from the instruction they received in reading than the control group regardless of ability and the null hypothesis must be rejected.

Null Hypothesis 6. There is no significant difference in arithmetic achievement between the experimental group and the control group for the high ability students or for the low ability students.

Table 4.11 illustrates the analysis of covariance for The California Achievement Arithmetic Test scores for the variables ability versus instruction. The pre-test scores were used as the covariate and the post-test scores were the dependent measures. According to this analysis there is no significant difference between ability and instruction, however, there seems to be significant

TABLE 4.11

ANCOVA FOR ARITHMETIC ABILITY VERSUS INSTRUCTION

Source	df	MS	F	P
Ability	1	139.83	2.37	.127
Instruction	1	24.35	.413	.5222
Ability X Instruction	1	341.25	5.786	.0182
Error	90	58.978		

interaction between ability and instruction, $p < .018$ which is less than $p < .05$ level chosen for this study. Which means that there are some common elements between both groups and that they are not completely independent of each other.

Table 4.12, the table of means for the arithmetic scores for the high and low ability experimental and control groups, shows the pre-test means, the post-test means, and the gains in arithmetic achievement made by the groups during the experiment.

On the basis of the findings, it can be said that the high ability experimental group benefited more from the instruction they received in arithmetic than the control group. The low ability control group benefited more from the instruction they received in arithmetic than the low ability experimental group. However, since no statistical significance was found between ability and instruction the null hypothesis cannot be rejected.

TABLE 4.12

ARITHMETIC MEANS, HIGH AND LOW ABILITY

Instruction	N	Pre-test Means	Post-test Means	Difference
Control - High	16	37.81	43.25	5.44
Experimental - High	12	32.50	44.75	12.25
Control - Low	27	34.29	42.51	8.22
Experimental - Low	40	28.07	35.03	6.96

Hypothesis 7. There is no appreciable difference in the number of children exercising independence and self-direction between the experimental group and the control group.

The responses to the questionnaire administered to a stratified random sample of 84 students, 42 in the control group and 42 in the experimental group, is tabulated in the following pages, after which a table of cumulative percentages will further summarize the responses to the questionnaire.

TABLE 4.13

PUPIL RESPONSES TO THE QUESTIONNAIRE

Items	Pupil Responses	
What happens when you:	Cont.	Exp.
1. Need books or other materials?		
a. Teacher passes them out?	98%	0%
b. Go to the shelves and get them.	2%	100%
2. Want to know what to do next and the teacher is busy?		
a. Wait until the teacher isn't busy and ask him.	100%	2%
b. Take out a contract and decide which activity to work on.	0%	98%
3. Want to know what you will be doing in the next period?		
a. Ask the teacher	99%	5%
b. Plan my work for the next period	1%	95%
4. Are finished with a book or material?		
a. Wait until the teacher calls for it to be passed in.	76%	2%
b. Return it to the shelf.	24%	98%
5. Come into the room in the morning, at noon, or after recess?		
a. Sit down and wait until the teacher starts the class.	95%	2%
b. Start work.	5%	98%

TABLE 4.13 Continued

Items		Pupil Responses	
6.	Need help on your work?	Cont.	Exp.
	a. Raise my hand and wait for the teacher.	98%	16%
	b. Find someone to help me.	2%	84%
7.	See that materials have been left out?		
	a. Leave them until the teacher says to put them away.	90%	0%
	b. Put them away.	10%	100%
8.	Need to discuss a question with others?		
	a. Ask the teacher if we can?	86%	12%
	b. Ask several others to have a discussion with me.	14%	88%
9.	See that someone needs help?		
	a. Wait to see if the teacher will help him.	30%	0%
	b. Offer to help.	70%	100%
10.	Want to use an audio, tape, record, or other machine?		
	a. Ask the teacher if I can use it.	100%	20%
	b. Use it.	0%	80%
11.	Want to write a story about some thing that happened to you?		
	a. Ask the teacher if I can.	100%	4%
	b. Write it.	0%	96%

TABLE 4.13 Continued

Items		Pupil Responses	
12.	Want to work with another student?	Cont.	Exp.
	a. Ask the teacher if I can.	90%	15%
	b. Ask the other student if he will work with me.	10%	85%
13.	Think you are ready to take the test on math problems you have studied?		
	a. Take the test when the teacher passes it out.	100%	0%
	b. Take the test when you are ready.	0%	100%
14.	Would rather see a film strip than read about the topic.		
	a. Ask the teacher if I can look at it.	95%	0%
	b. Look at the filmstrip.	5%	100%
15.	Don't know when you are supposed to have task finished?		
	a. Ask the teacher.	98%	5%
	b. Decide when I want to finish it.	2%	95%
How do you decide:			
16.	Where to sit when you study?		
	a. Sit at my desk or ask the teacher if I can move.	100%	4%
	b. Sit in the area where the materials are or where I want.	0%	96%

TABLE 4.13 Continued

Items		Pupil Responses	
17.	If you need to continue working on a lesson?	Cont.	Exp.
	a. Ask the teacher.	100%	14%
	b. Check to see if I've learned enough to master the objectives.	9%	86%
18.	If you are ready to take a test?		
	a. Ask the teacher.	95%	2%
	b. Review the activity to see if I can master it.	5%	98%
19.	What objective to work on the first thing in the morning.		
	a. Ask the teacher.	96%	0%
	b. Look to see what I need most work on.	4%	100%
20.	If you can make a project that occurs to you when you are reading.		
	a. Ask the teacher if I can.	100%	13%
	b. Look for the materials I need to start it.	0%	87%

The following table summarizes the responses to the twenty questions in the questionnaire.

The cumulative percentages show that there is an appreciable difference between the number of children showing tendencies of independence in the experimental group and the number of children showing tendencies of independence in the control group. A much larger

TABLE 4.14

CUMULATIVE PERCENTAGES OF RESPONSES

	Experimental	Control
Dependent	6%	91%
Independent	94%	9%

percentage of children in the experimental group indicated a willingness to act independently.

Summary

The California Achievement Test of reading and arithmetic was administered to the students in order to determine whether or not the students in the experimental program made significant academic gains in reading and arithmetic. In the analysis of covariance the pre-test scores were used as the covariate and the post-test scores were used as the dependent measure.

A statistically significant difference in achievement gains was found for the experimental group in reading. There was no significant difference in achievement in arithmetic.

In evaluating reading achievement according to sex, the girls had higher scores than the boys. The experimental girls were higher than the experimental boys and the control girls were higher than the control boys. The experimental boys and girls scored higher than the control boys and girls.

In evaluating arithmetic achievement according to sex, there was no significant difference in achievement by either the boys or the girls of either group. Both boys and girls seem to perform equally well in arithmetic under both treatments.

The Lorge Thorndike Cognitive Abilities Test was used to categorize the students into high and low ability. When the analysis of covariance was applied to the test scores of these two groups, significantly different achievement gains were found in reading for both the experimental high ability and the low ability groups. Therefore, we may conclude that, regardless of ability, the students benefited from the experimental treatment.

In the analysis of covariance for arithmetic no significant differences were found between the experimental and the control groups for either the high or the low ability students. However, there was significant interaction between ability and instruction, which means that there are some common elements between both groups and that they are not completely independent of each other. Therefore we may conclude that the high ability students in the experimental group benefited more from the experimental treatment than the high ability students in the control group. The reverse was true for the low ability, the low ability control group benefited slightly more from the control treatment than the low ability experimental group.

In general we may conclude that the experimental reading program was beneficial to all the students regardless of sex or ability, that the students in both groups performed equally well in arithmetic, and that the experimental program was conducive to growth in independence and self-direction.

CHAPTER VI

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

In this chapter a brief summary of the effects of individualizing instruction through a multi-sensory, multi-media learning centers approach will be presented, together with the outcomes and conclusions that were arrived at by an objective analysis of the data collected. The implications of the study and recommendations for future studies are also made.

Summary of the Design

This study examined the effects of individualizing instruction by the use of multi-sensory, multi-media learning centers on fifth and sixth grade inner-city students at Seely McCord and Martin Luther King Elementary Schools in Benton Harbor, Michigan.

The study consisted of three experimental classes and three control classes containing two hundred and eleven students. The control classes were conducted in the traditional manner of large group paced and teacher controlled instruction. The experimental classrooms were set up in multi-sensory, multi-media learning centers

with instruction individually diagnosed and prescribed according to the needs of each child. Children had a variety of alternative materials and methods to choose from and an attempt was made to let each child learn in his own style and at his own rate.

The purpose of the study was to determine some of the affective and cognitive outcomes of individualizing instruction through a multi-media, multi-sensory learning centers approach. It was designed specifically to answer the following questions:

1. Will students who receive individualized instruction in reading and arithmetic have higher test scores on the California Achievement Test than those whose instruction was not individualized?

2. Will there be differences in achievement gains in reading and arithmetic between boys and girls in the two treatment groups?

3. Will students with high cognitive ability in the experimental treatment have higher test scores than those in the control treatment group?

4. Will students with low cognitive ability in the experimental group have higher test scores than those in the control group?

5. Will students who receive individualized instruction be more self-directed and independent than those students who do not receive individualized instruction?

Tests, a questionnaire, and an interview were employed to find the answers to the above questions. The subjects were pre-tested in reading and arithmetic by the California Achievement Test in September and post-tested by the same test in April. The Lorge Thorndike Cognitive Abilities Test was administered in May. A stratified random sample of the students received a questionnaire and a random sample of the students was interviewed.

The California Achievement Test scores for the pre and post-tests were subjected to an analysis of covariance to compare scholastic achievement of the two groups. The Cognitive Abilities Test scores were used to categorize the students into high and low ability groups. The interview and the questionnaire were used to determine other effects of the treatment.

Statistical Findings

The achievement test results were treated with an analysis of covariance with the pre-test scores used as the covariate and the post-test scores used as the dependent measure.

The achievement scores in reading for the experimental group were significantly higher than the achievement scores in reading for the control group. There were no significant differences in achievement in arithmetic between the groups; both groups performed equally well.

In evaluating reading achievement according to sex, the girls were superior to the boys in both groups; however, the girls in the experimental group were superior to the girls in the control group and the boys in the experimental group were superior to the boys in the control group.

In arithmetic there was no significant difference in achievement by either the boys or the girls of either the control or the experimental groups. Both boys and girls seem to perform equally well under both treatments.

Significantly higher achievement gains were found in reading for both the experimental high ability and the experimental low ability groups; therefore, we can say that both the high and the low ability students in the experimental group seem to have benefited from the treatment. In the analysis of covariance for arithmetic no significant differences were found for either the high or low ability groups of the two treatments; however there was significant interaction between ability and instruction. Therefore we conclude that the high ability students benefited slightly more from the experimental treatment and that the low ability students benefited slightly more from the control treatment.

In general we conclude that the experimental reading program was beneficial to all the students regardless of sex or ability, and that the students in

both treatment groups performed equally well in arithmetic. The experimental program was conducive to promoting independence and self-direction in students.

Non-Statistical Findings

The non-statistical data were collected in two ways. A stratified random sample of the students was given a questionnaire consisting of 20 multiple choice test items, and a random sample of the students was interviewed. The interviews were taped and later transcribed for analysis.

By the use of the above mentioned instruments and periodic visits to the classrooms it was found that student reactions to individualized instruction was highly favorable. The students seemed to have gained self-respect and a sense of security and confidence. These were especially evident in the slower learners. Individualized instruction permitted self-pacing and better met the demands of individual differences among students. Closer pupil teacher interaction was also reported by teachers.

The attitudes of the experimental students toward school and learning were positive; children freely expressed their enjoyment of school by their words and actions. Many students did not want to stop long enough to take a recess. Even on the last day of school, the

children in the experimental rooms were working as hard as if it were the first day of school.

Interpretation of Results

The results of this study suggest several implications. The raw score data show that, although all the children benefited from the experimental treatment in reading, the more able students seem to benefit more from both the reading and the arithmetic.

In the normal, traditional classroom, especially in the inner-city, teachers are often concerned more with teaching the majority of the learners who tend to be slow; the more able child is neglected and consequently bored. When the more able child is given structure and materials and released from the bonds of the group, he can learn as fast and as far as he is able.

There was increased evidence of intrinsic motivation in both the cognitive and affective domains. The students were relaxed, task oriented, and displayed pleasure in learning. Decision making, organizing their own learning activities, acquiring skills of independent inquiry, and the sheer of joy of learning were markedly noticeable. These humanizing variables may have a dynamic function in a relevant experiential learning process; therefore, a program that fosters such qualities as these is of great value to education.

The low ability control students benefited slightly more from the control treatment in arithmetic than the experimental low ability students did from their treatment. This may be due to many factors, such as the nature of the subject, the needs of the slow learners, or general exposure to wider areas of the subject matter. In order to arrive at more conclusive understanding of the implications the duration of the treatment must be continued over a longer period.

Instructional materials played an important role in the experimental treatment. The lack of high quality multi-sensory, multi-media material specially designed for independent use was keenly felt. Commercial materials tended to deal excessively with low level cognitive development. Much of the teachers' time was spent in preparing material to meet the needs of the students.

As in any other program, much of the success of this program depended upon the competence, enthusiasm, and initiative of the individual teacher. Organization and materials alone will not counteract poor teachers. However, when teachers are provided with effective in-service training and when that training results in increased competence in providing for individual pupil differences, the combination of factors can lead to improved performance

teacher training by a competent trainer was invaluable to the success of the program.

Implications for Future Research

The findings of this study point to the need for replicating it. Since statistically significant differences were identified in this particular situation, further investigation could determine whether these differences would be found in other situations. Does individualized instruction through multi-sensory, multi-media learning centers have a favorable effect on the reading achievement and self-directing activities of other inner-city children? Additional research might answer this question.

It is also recommended that this study be replicated with other than inner-city children. Would this experimental approach lead to greater reading achievement for such children? Additional research might answer this question.

Although the experimental treatment made statistically significant differences in the experimental group, we do not know yet what variables within the treatment made the differences. It may be that the total, unified, multi-faceted, multi-dimensional treatment accounted for the differences or it may be that certain variables within the treatment made the differences. Is there a finite

number of factors within the total experimental approach which accounts for the differences? Additional research might answer this question.

Since this study did not investigate the characteristics of the teacher in the process of individualization, it is recommended that an investigation be carried out to discover the teacher characteristics vital to individualization. Are there certain characteristics of teachers which are essential for successful individualizing? Additional research might answer this question.

Much research needs to be conducted to determine the outcomes of individualized instruction. At present, the shortage of valid instruments for measuring affective learning limits the conclusions which can be drawn. Until adequate assessment means are available, one can only say that individualized instruction, properly implemented and executed, holds its own in academic achievement and promises more in the development of personal characteristics, such as self-direction, self-respect and responsibility.

Implications for Implementation in Schools

Since the Staff Development Program may sound complicated and expensive, educators who may wish to adopt it could be discouraged from trying. However, large sums of money are not needed for implementation. Teachers or

school districts may contact the Benton Harbor Area Schools for necessary information or they can obtain information about it from the literature in the field.

Most of the materials used in the program were developed by teachers from everyday school supplies; other materials were donated by area business people. Empty ten-gallon ice cream cartons, discarded bricks, boards, large card board boxes, and carpet samples were some of the donated materials. The only equipment purchased was a cassette player, a listening station (a set of eight earphones on a rack), and an individual film strip viewer for each teacher. No expensive or extravagent equipment was involved. Committed, creative, and energetic teachers can individualize instruction by using the available resources in the school and community at a minimum expenditure.

A P P E N D I X

APPENDIX A

QUESTIONNAIRE

QUESTIONNAIRE

What happens when you:

1. Need books or other materials?
   A. Teacher passes them out.
   B. Go to the shelves and get them.

2. Want to know what to do next and the teacher is busy?
   A. Wait until the teacher isn't busy and ask him.
   B. Take out a contract and decide which activity to work on.

3. Want to know what you will be doing in the next period?
   A. Ask the teacher.
   B. Plan my work for the next period.

4. Are finished with a book or material?
   A. Wait until the teacher calls for it to be passed in.
   B. Return it to the shelf.

5. Come into the room in the morning, at noon, or after recess?
   A. Sit down and wait until the teacher starts the class.
   B. Start work.

6. Need help on your work?
   A. Raise my hand and wait for the teacher.
   B. Find someone to help me.

7. See that materials have been left out?
   A. Leave them until the teacher says to put them away.
   B. Put them away.

8. Need to discuss a question with others?
   A. Ask the teacher if we can?
   B. Ask several others to have a discussion with me.

9. See that someone needs help?
   A. Wait to see if the teacher will help him.
   B. Offer to help.

10. Want to use an audio, tape, record, or other machine?
    A. Ask the teacher if I can use it.
    B. Use it.

11. Want to write a story about some thing that happened to you?
    A. Ask the teacher if I can.
    B. Write it.

12. Want to work with another student?
    A. Ask the teacher if I can.
    B. Ask the other stude-t if he will work with me.

13. Think you are ready to take the test on math problems you have studied?
    A. Take the test when the teacher passes it out.
    B. Take the test when you are ready.

14. Would rather see a film strip than read about the topic.
    A. Ask the teacher if I can look at it.
    B. Look at the filmstrip.

15. Don't know when you are supposed to have task finished?
    A. Ask the teacher.
    B. Decide when I want to finish it.

How do you decide:

16. Where to sit when you study?
    A. Sit at my desk or ask the teacher if I can move.
    B. Sit in the area where the materials are or where I want.

17. If you need to continue working on a lesson?
    A. Ask the teacher.
    B. Check to see if I've learned enough to master the objectives.

18. If you are ready to take a test?
    A. Ask the teacher.
    B. Review the activity to see if I can master it.

19. What objective to work on the first thing in the morning.
    A. Ask the teacher.
    B. Look to see what I need most work on.

20. If you can make a project that occurs to you when you are reading.
    A. Ask the teacher if I can.
    B. Look for the materials I need to start it.

APPENDIX B

INTERVIEW QUESTIONNAIRE

INTERVIEW QUESTIONNAIRE

1. What is different about the things you are doing in reading (arithmetic) class this year?
2. Why do you like learning at centers?
3. Do you like all the centers the same amount or do you have some centers that you like better than others?
4. How do you know which center to go to?
5. Do you like to have your own folder?
6. Why do you have contracts?
7. Why do you like making contracts with the teacher?
8. When you are done with your work, what do you do?
9. How do you know when to go to the next objective?
10. Do you like taking tests?
11. Who checks the test?
12. You don't have a desk of your own so how do you know where to sit when you come to class?
13. Do you always get to work with your friends?
14. Which is the thing you like most about school this year?
15. If there was one thing that you could change what would it be?

APPENDIX C

MANAGEMENT SYSTEMS

MANAGEMENT SYSTEMS

	GROUPING	MOVEMENT SCHEDULES	MATERIALS	RECORD KEEPING	AMOUNT OF TEACHER CONT
1					
2					
3					
4					
5					

APPENDIX D

GROWTH CHARTS, CUMULATIVE AND INDIVIDUAL

CONTENT PROGRESS RECORD

SCHOOL _____ AREA _____

NAME	BSL 1	BSL 2	BSL 3	BSL 4	BSL 5	BSL 6	BSL 7	BSL 8	BSL A	BSL B	BSL C	BSL D	BSL E

Student Growth Chart

NAME _____

BEHAVIOR SKILLS LABS	Pre Test									Post Test
1 Punishment										
2 Reinforcement										
3 Incompatible Behaviors										
4 Categories of Reinforcers										
5 Direct & Indirect Reinforcers										
6 Schedules of Reinforcement										
7 Contracts										
8 Indirect Reinforcement Systems										
A Variables in Individualization										
B Behavioral Objectives										
C Pre and Post Tests										
D Sequencing Skills or Objectives										
E Bloom's Taxonomy										

APPENDIX E

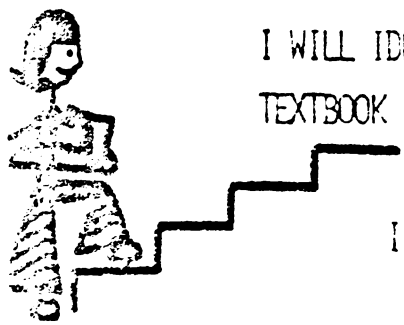
TASK CARD, FLOW CHARTS, AND STRAND CARD

TASK CARD 1

C ONTENT - CONCEPTS AND PROCESSES WHICH A CHILD IS TO LEARN

TASK CARD GOAL:

AFTER COMPLETING THIS TASK CARD,
I WILL IDENTIFY WHAT SKILL (S) ARE CONTAINED ON DIFFERENT PAGES IN THE TEXTBOOK



I'M GOING TO TAKE THE FIRST STEP IN INDIVIDUALIZING MY CONTENT!

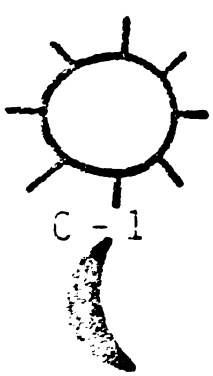
STEP 1 - GET TAPE PORTFOLIO C - 1. LISTEN TO THE TAPE.

C - 1

STEP 2 - SELECT A SUBJECT AREA THAT YOU WOULD LIKE TO INDIVIDUALIZE

STEP 3 - LOOK AT THE PAGE (S) IN THE TEXTBOOK THAT YOU HAVE SCHEDULED ON YOUR LESSON PLAN FOR NEXT WEEK.

STEP 4 - LOOK IN YOUR TEACHER'S GUIDE AND TABLE OF CONTENTS TO SEE WHAT SKILLS ARE TAUGHT ON THESE PAGES.

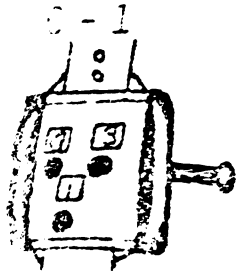


STEP 5 - FOR SAMPLES OF ACTIVITIES IN WHICH THE SKILLS ARE IDENTIFIED AS BEHAVIORS, SEE SHOW AND TELL C - 1.

C - 1

STEP 6 - IF YOU WOULD LIKE PRACTICE IN IDENTIFYING SKILLS, DO ACTIVITY SHEET C - 1.

C - 1



TO DETERMINE FOR YOURSELF IF YOU ARE MASTERING THE GOAL OF THIS TASK CARD: YOU MAY WISH TO SELECT FROM THE FOLLOWING PINPOINTS AND BEGIN COUNTING...

* THE NUMBER OF CORRECT STUDENT RESPONSES ON ACTIVITIES OR TESTS

* THE NUMBER OF TIMES I TELL CHILDREN WHICH SKILL THEY ARE LEARNING

YOU MAY WISH TO HAVE THE STUDENTS COUNT...

* THE NUMBER OF CORRECT RESPONSES ON ACTIVITIES OR TESTS

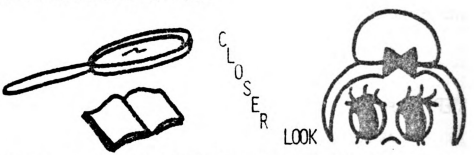
STEP 7 - ANALYZE THE PAGES AND LIST THE SKILL(S) TAUGHT ON EACH PAGE.

KNOW WHAT I DISCOVERED?
SOME PAGES TEACH MORE THAN ONE SKILL !

STEP 8 - INCLUDE THE SKILLS THAT YOU WILL BE TEACHING IN YOUR LESSON PLAN BOOK.

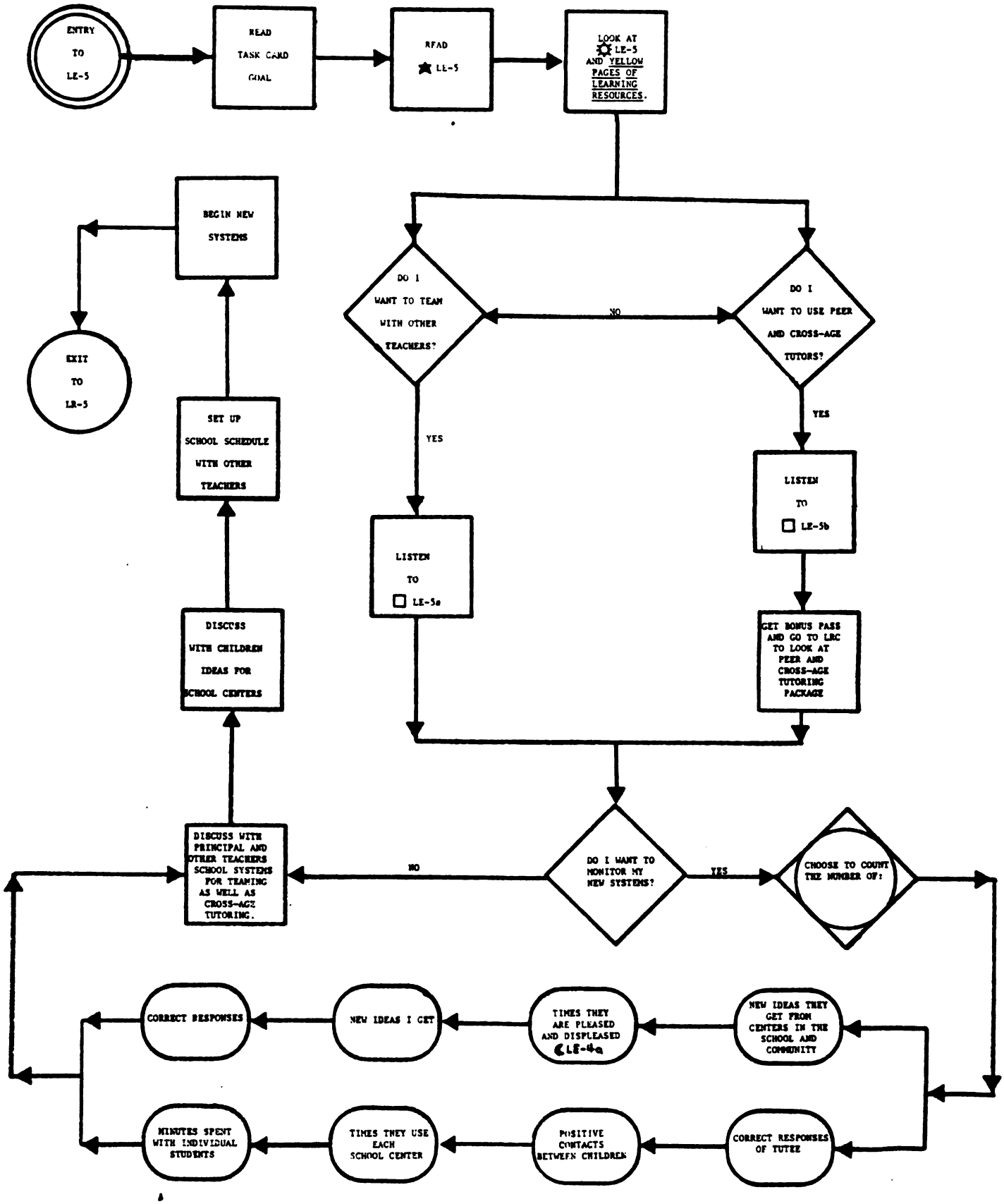
STEP 9 - WHEN YOU TEACH THE PAGES, LET THE CHILDREN KNOW WHAT SKILL THEY ARE LEARNING

IF YOU WOULD LIKE TO TAKE A



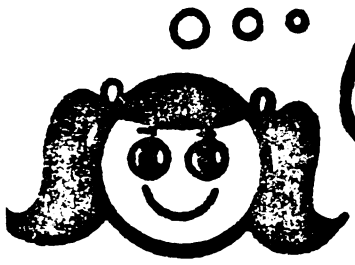
AT THE SKILLS IN YOUR TEXTBOOK, GO ON TO TASK CARD C - 2.

FOLLOW THE FLOW CHART. MARK OFF EACH BOX AS YOU COMPLETE THE SUGGESTED ACTIVITY.



STRAND CARD

LEARNING STYLE



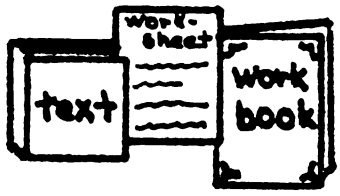
DEFINITION...

THE WAY IN WHICH A CHILD LEARNS

SELECT THE PICTURE THAT BEST DEPICTS THE WAY CHILDREN USE MATERIALS IN YOUR CLASSROOM, AND BEGIN WITH THE CORRESPONDING TASK CARD.

1.

ALL CHILDREN USE...

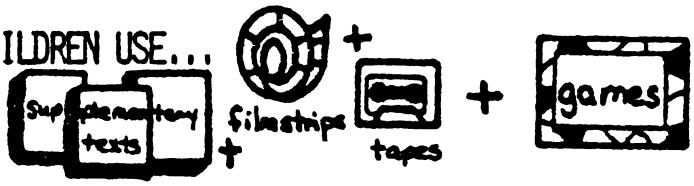


IN ONE OR MORE CONTENT AREAS

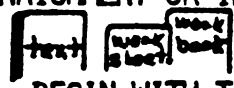
BEGIN WITH TASK CARD 1

2.

ALL CHILDREN USE...



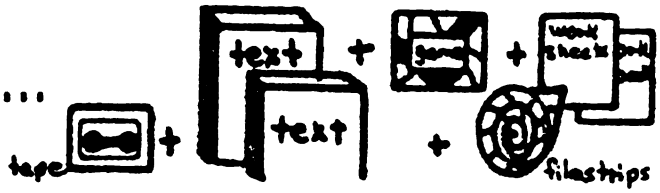
AS ENRICHMENT OR IN CONJUNCTION WITH



BEGIN WITH TASK CARD 2

3.

GROUPS USE...

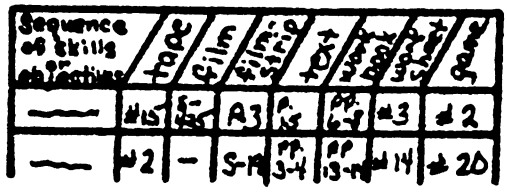


IN ONE OR MORE CONTENT AREAS

BEGIN WITH TASK CARD 3

4.

ONE GROUP USES...

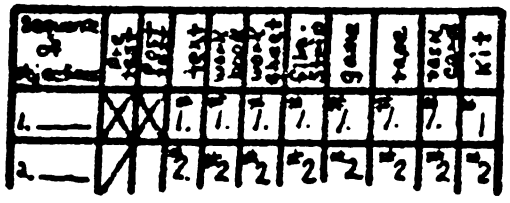


IN ONE OR MORE CONTENT AREAS

BEGIN WITH TASK CARD 4

5.

EACH CHILD USES...



IN ONE OR MORE CONTENT AREAS

GOAL...

CHILDREN MAY CHOOSE DIFFERENT MATERIALS

APPENDIX F

PHOTOGRAPHS

TEACHER RESOURCE CENTER

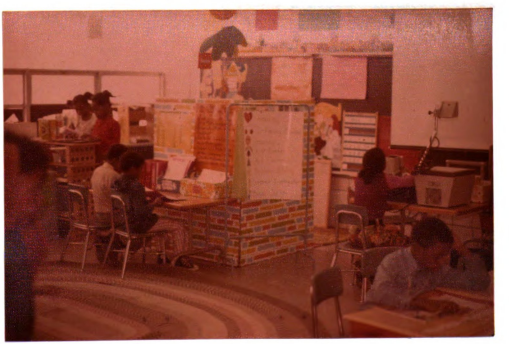
TEACHERS DEVELOPING INSTRUCTIONAL
MATERIALS FOR THEIR ROOMS

IN-SERVICE TRAINING

LARGE GROUP SESSION

PROBLEM SOLVING CENTER

TRADITIONAL CLASSROOM



EXPERIMENTAL CLASSROOM

SEGMENTS OF THE EXPERIMENTAL CLASSROOM

RECREATIONAL READING CENTER

TEACHER HELPING AN INDIVIDUAL CHILD

MANIPULATIVE GAMES CENTER

PROBLEM SOLVING CENTER

LARGE GROUP INSTRUCTION

CHILDREN WORKING INDEPENDENTLY
AT A LISTENING CENTER

B I B L I O G R A P H Y

BIBLIOGRAPHY

Bechtol, William. Individualizing Instruction and Keeping Your Sanity. Chicago: Follett Publishing Company, 1973.

Bishop, Loyd K. Individualizing Educational Systems. New York: Harper and Row Publishers, 1971.

Duane, James E. Individualized Instruction: Programs and Materials. New Jersey: Educational Technology Publication, 1973.

Dunn, Rita, and Dunn, Kenneth. Practical Approaches to Individualizing Instruction. New York: Parker Publishing Company, Inc., 1972.

Eckstrom, Ruth B. Experimental Studies of Homogeneous Grouping: A Review of the Literature. Princeton, New Jersey, 1959.

Esbensen, Thorwald. Working With Individualized Instruction. Palo Alto, California: Fearon Publishers, 1972.

Fitzsimmons, John R. Individualizing Instruction for Individualized Learning. New York: Bess House, Hofstra University, 1972.

Gibbons, Maurice. Individualizing Instruction. New York: Teachers College Press, 1971.

Individualization in Schools. A publication of the National School Public Relations Association, 1971.

Kaplan, Sandra, Kaplan, Nina, Madsen, Jo Ann B., and Taylor, Betty K. Change for Children: Ideas and Activities for Individualized Learning. California: Goodyear Publishing Company Inc., 1973.

Lembo, John M. Learning and Teaching in Today's Schools. Columbus, Ohio: Charles E. Merrill Publishing Company, 1972.

Mohan, Madan and Hull, Ronald E. Individualizing Instruction and Learning. Chicago: Nelson Hall Company, 1974.

Moulds, Catherine. Chips Fell in the Valley. Berrien Springs, Michigan: Andrews University Press, 1963.

Mussen, P. H. Carmichael's Manual of Child Psychology. Palo Alto, California: Annual Review, 1972.

Perrone, Vito. Open Education: Promise and Problems. Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1972.

Ripple, Richard and Rockcastle, Verne. Piaget Rediscovered. New York: Cornell University, 1964.

Rogers, Carl R. Freedom To Learn. Columbus, Ohio: Charles E. Merrill Publishing Company, 1969.

Shiman, David A.; Culver, Carmen M.; and Lieberman, Ann. Teachers on Individualization: The Way to Do It. New York: McGraw-Hill Book Company, 1974.

Smith, Lee L. Jack Out of the Box. West Nyack, New York: Parker Publishing Company, 1974.

Stahl, Dona Kofod and Anzalone, Patricia Murphy. Individualized Teaching in Elementary Schools. West Nyack, New York: Parker Publishing Company, 1970.

Talbert, Gene E. and Fra e, Larry E. Individualized Instruction. Columbus, Ohio: Charles Merrill Publishing Company, 1972.

Terman, Lewis A. The Measurement of Intelligence. Boston: Houghton Mifflin Company, 1916.

The Project on the Instructional Program of the Public Schools, National Education Association. The Principals Look at the Schools. Washington, D.C.: The Association, 1962.

Thomas, George and Crescimbeni, Joseph. Individualizing Instruction in the Elementary School. New York: Random House Publishing Company, 1967.

Thorndike, Robert L. and Hagen, Elizabeth. Examiner's Manual Cognitive Abilities Test. Boston: Houghton Mifflin Company, 1971.

Tiegs, Ernest W. and Clark, Willis W. Examiner's Manual: California Achievement Tests. USA: CTB/Mc-Graw Hill Publishing Company, 1970.

Van Dalen, Deobold B. Understanding Educational Research. New York: McGraw-Hill Book Company, Inc., 1966.

White, Ellen G. Education. Mountain View, California: Pacific Press Publishing Association, 1903.

Articles

Blake, Howard E. and McPherson, Ann. "Individualized Instruction: Where are We." Educational Technology, December 1969.

Combs, Arthur. "Fostering Self-Direction." Educational Leadership. February 1966.

Jackson, Phillip. "Trends Toward Individualization," Instructor, January 1975.

Martin, Lyn S. and Pavan, Barbara N. "Current Research on Open Space, Nongrading, Verticle Grouping and Team Teaching." Phi Delta Kappan, January 1976.

Riegle, Jack D. "Open Concept Education: A Human Enterprise." NASSP Bulletin, January 1973.

Yanda, R. M. and Kagan, J. "The Effects of Teacher Tempo on the Child." Child Development, 1968.