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A comprehensive paradigm of teaching.

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A COMPREHENSIVE PARADIGM OF TEACHING

A Dissertation Presented
By
ROBERT LORIN BLODGET

Submitted to the Graduate School of the University of Massachusetts in partial fulfillment of the requirements for the degree of DOCTOR OF EDUCATION

August 1973

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A COMPREHENSIVE PARADIGM OF TEACHING

A Dissertation
by
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ABSTRACT

A Comprehensive Paradigm of Teaching

(August 1973)

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The paradigm of teaching is an attempt to set forth some general hypotheses, in the form of propositions, which represent the most accurate interpretation of the reality of teaching which can be currently derived from research, experience, and the current state of knowledge.

The paradigm is termed comprehensive because it represents an effort to address all relevant aspects of teaching. However, calling the paradigm comprehensive does not mean that the paradigm includes or explains all educational practices, techniques, or goals. The paradigm represents a stand on what teaching should be instead of what it is. The focus is on teaching—not on curriculum, its goals, planning, or design. In this regard, the paradigm is most useful in the context of the broader model of education upon which it is built.

The paradigm is based on the educational philosophy, theory of development, theory of learning, and theory of curriculum provided by the Anisa Model, a new comprehensive model of education.

An awareness of a need for a comprehensive paradigm of teaching grew out of a review of the literature which
indicated many views of teaching each of which represented only a portion of the total educational picture. Some educators believe teaching can be best understood as a set of behaviors. Others prefer to see teaching studied in terms of human interaction. Some authorities believe emphasis should be placed on identification of specific teaching skills while others, who view teaching as a decision making process, are trying to analyze what decisions need to be made, who should make them, and what information gathering procedures are required for providing the data needed for quality decisions. Meanwhile, out of all of these attempts a growing effort is developing to determine a number of basic teaching competencies.

Unfortunately, none of these orientations to the analysis of teaching is broad enough for a thorough study of teaching. A comprehensive view of teaching can only come from an overarching model of education which distinguishes between development, learning, curriculum and the act of teaching itself.

The work of Anisa has provided such a comprehensive model out of which the paradigm of teaching was developed. In the context of the Anisa Model, teaching can then be viewed as the operations involved in arranging environments and guiding the child's interactions with these environments in order to achieve the educational goals specified by the educational philosophy and theory of development as translated through the curriculum. The purpose of the paradigm of teaching,
therefore, is to set forth the elements and principles involved in arranging environments and guiding interaction.
In 1953 the American Educational Research Association's Committee on the Criteria of Teacher Effectiveness wrote:

...this committee has...the conviction that the present condition of research on teacher effectiveness holds little promise of yielding results commensurate with the needs of American Education. This condition has two significant characteristics: disorganization and lack of orientation to other behavioral sciences. By disorganization, we mean the condition in which, at present, research too often proceeds without explicit theoretical framework, in intellectual disarray, to the testing of myriads of arbitrary, unrationalized hypotheses (American Educational Research Association, Committee on the Criteria of Teacher Effectiveness, 1953, p. 657).

This indicates the need to base research on a clearly defined theoretical framework or paradigm. N.L. Gage (1963) defines paradigm as "...a systematic ordering of ideas about the phenomena of a field of inquiry (p. 102)." He explains:

Paradigms are models, patterns, or schemata...
Paradigms derive their usefulness from their generality. By definition, they apply to all specific instances of a whole class of events or processes. When one has chosen a paradigm for his research, he has made crucial decisions concerning the kinds of variables and relationships between variables that he will investigate...(Ibid. p. 95).

Because of the influence of these decisions on research, it becomes necessary to have a comprehensive paradigm which includes:

...(a) a statement of the variables comprising teaching behavior, (b) a formulation of the possible relations among these variables, and (c) hypotheses about the relations between the variables comprising teaching behavior and the variables descriptive of the psychological and social conditions within which teaching behavior occurs (Smith, 1963, p. 4)
Organizing such a paradigm (model) should serve several purposes.

1. Models facilitate learning by reducing complex situations to simple ones.
2. Models allow us to see relationships...to relate one fact to another. The marshaling and organization of data for predictive purposes dictate the establishment of relationships that will put the data into their proper perspective. This is necessary for prediction, which is the end purpose of models.
3. Models allow us to see things in a broader perspective. They confer the opportunity to step back and see the practicality—or the possible impracticality—of experiments.
4. Models are invaluable aids in problem-solving and thinking...models furnish dimension to this process (Anderson, et al, 1970).

Therefore, a paradigm can provide a framework on which research can be integrated and based. Investigation can be directed at specific hypotheses contained within the paradigm. Or, on the other hand, broader study can explore implications suggested by generalizations derived from the paradigm. All of these studies can be integrated into a meaningful whole if the research is congruent with the paradigm. And meanwhile, the paradigm provides a basis from which teachers and teacher training programs can fill in the gaps as yet to be explored by research.

Realizing the importance of these functions this dissertation attempts to present a comprehensive paradigm of teaching based upon a framework provided by the new comprehensive ANISA Model of Education (Jordan & Streets, 1972).
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INTRODUCTION

In the last few years there seems to be increased dissatisfaction with schools. Major questions about the quality of schools have been raised by such books as *Compulsory Mis Education* (Goodman, 1966), *Crises in the Classroom* (Silberman, 1970), *School is Dead* (Reimer, 1971), *De Schooling Society* (Illich, 1971), *How Children Fail* (Holt, 1964), *The Underachieving School* (Holt, 1969), *Death at an Early Age* (Kozol, 1967), *Our Children are Dying* (Hentoff, 1966), *The Way It Spozed to Be* (Herndron, 1968), and *Freedom and Beyond* (Holt, 1972).

In an article in the *National Observer* (1972) John Morton expressed some of these concerns and dilemmas as presented by John Holt in his latest book, *Freedom and Beyond* (1972).

Morton wrote:

The United States spends $40 billion a year on elementary and secondary schools, and billions more on higher education. Despite that, we do a poor job of educating our young--poor kids don't learn to read, high-school graduates and (increasingly) college graduates don't have useful job skills (Morton, 1972, p. 18).

Morton goes on to state:

Researchers cited by Holt have documented instances of children who emerged from a year's schooling knowing less than when they began. How is it that a child on his own in the first three or four years of his life can learn to speak a complex language, then go to school and fail at a vastly simpler task, learning to read?

There is much evidence, again cited by Holt, that at the heart of the failures of children in school are their relationships with their adult teachers (Ibid.)

These kinds of findings have led Holt to conclude that "De-schooling" society might be more beneficial than an effort to
reform schooling. However, to follow such a suggestion is to question the viability of institutional education.

To avoid such a conclusion, crucial questions about teaching must be answered. Unfortunately, this is difficult because, according to N.L. Gage, "...the development of theories of teaching has been neglected (1964, p.269)." He claims that

In comparison with learning, teaching goes almost unmentioned in the theoretical writings of psychologists. Many signs of this disregard can be observed. For example, Psychological Abstracts contain large sections on laboratory learning and school learning but only a small section on teaching, and that within the section on "Educational Personnel." The Annual Review of Psychology usually includes a chapter on learning but seldom more than a few paragraphs on teaching. Volumes have been devoted to theories of learning, but not a single book deals exclusively with theories of teaching. Textbooks of educational psychology give much more space to discussions of teaching and the learner than to methods of teaching and the teacher. A Comprehensive Dictionary of Psychological and Psychoanalytical Terms has three pages, containing 50 entries, concerned with learning but devotes only five lines to "Teaching"...(Ibid. p.269).

Gage believes that there are two reasons for the neglect of theories of teaching. First, "Some writers reject the notion of a science of teaching (Ibid. p. 270)." For example, Hightet wrote, "I believe that teaching is an art, not a science (Hightet, 1955)." Second, there is a "...presumed adequacy of learning theory (Gage, 1964, p.271)." In other words,

In training teachers, we often seem to rely on mere inference from theory of learning to the practice of teaching. Yet, what we know about learning is inadequate to tell us what we should do about teaching. This inadequacy is clearly evident in our educational psychology courses and textbooks. The irrepressible question of students in educational psychology courses is, "How should I teach?" While they may infer a partial answer
from a consideration of how pupils learn, they cannot get all of it in this way. Much of what teachers must know about teaching does not directly follow from a knowledge of the learning process. Their knowledge must be acquired explicitly rather than by inference (Ibid. p. 272-273).

In addition, "The need for theories of teaching stem also from the insufficiency in principle of theories of learning (Ibid. p. 271)."

Furthermore,

Our position is that practical applications have not been gleaned from theories of learning largely because theories of teaching have not been developed. The implications of learning theory need to be translated into implications for the behavior of teachers (Ibid. p. 271)

This view is supported by some findings of Robert R. Mackie and Paul R. Christensen that resulted from a study intended to enable the Navy to gain more practical application from research on learning. "...the investigation was concentrated on experimental studies of the learning process (1967)." Some of the conclusions were:

...there has been no systematic effort directed toward practical application of the findings from learning research. As a consequence, modern learning research is producing very little impact on educational technology or training practice.

Both academic and practically oriented psychologists agree that a very small percentage of findings from learning research is useful.

Learning theory has been particularly barren of useful predictions about human learning behavior in the educational or operational environment. A major reason for this appears to be that theory development has been nourished by laboratory experiments involving tasks that bear no known relationship to real-life learning requirements. ...learning specialists in many universities show little inclination to direct their own research, or that of their students, toward problems associated with educational or training operations.

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Many learning research studies simply are not translatable because the stimulus (or task) conditions employed by the researcher bear no determinable relationship to stimuli (or tasks) outside the laboratory. ...because learning researchers tend to invent tasks, rather than study natural ones, and because of the specificity of human response to these tasks, the prospects for being able to generalize become ever more ...many psychologists prefer to live on the conceptual level, to enjoy the security of unassailable theoretical research, to avoid the risks and discomfort of stating implications. (Mackie and Christensen, 1967).

So, it appears that educators cannot depend entirely upon theories of learning.

Theories of learning deal with what the learner does. But changes in education must depend in large part upon what the teacher does (Gage, 1964, p. 271).

Gage suggests that "To explain and control the teaching act requires a science and technology of teaching in its own right (Ibid. p. 273)." He concludes, "As a concept, teaching sorely needs analysis (Ibid.) This view is supported by a recent study by Britton and Leith investigating mathetics, a technology of teaching.

A course of mathetics was taught to 200 second year college of education students to try to assess if their subsequent performance on teaching practice was improved. A group of 60 first year college of Education students took part in a course of micro-teaching, the object being to see if any effects were made on their performance on first teaching practice. The study has highlighted the need for further investigation into the development of taxonomies of teaching analysis, and the assessment and evaluation of teaching performance (1971, p. 241).

This need for an analysis of teaching has been recently underscored by the failure of a six million dollar effort by big business, supported by the Office of Economic Opportunity, to utilize the latest technology of teaching. In an article entitled, "Big Business Flunks Teaching Test," Behavior Today states:
Office of Economic Opportunity has concluded that big business can't teach under-educated kids any better than teachers can. Both now have dismal records in compensatory ed...Reporting last week on OEO's $6 million trial ventures in "performance contracting," research chief Thomas Glennan Jr. said data show no significant gains in either control or experimental groups and no real difference between results of contract and traditional methods. Massive evaluations covered experiments at 18 sites where contractors had, in effect, wagered their profits against a guarantee to improve skills in individual students. Glennan said other experiments, involving incentives to teacher groups, suffered same results--no improvement in outcome...

Immediate impact: OEO is rethinking its role in breaking poverty cycles via education. It's back to the drawing boards," sighed OEO director Phillip Sanchez...Danger now, said one observer, is that "we may go back to blaming the kids" for underachievement and sink into acceptance of the status quo...Four of six OEO contractors have promptly gone out of performance contracting business... (Behavior Today, February 7, 1972).

Many studies could be quoted that question the effectiveness of current teaching. Silberman (1970) cites some research that indicated that whereas around 80% of the students entering school have adequate self concepts, around 60% of the students graduating from high school have poor self concepts. The National Union of Teachers has reported "...the inability of students (training for teaching) and newly qualified teachers to cope adequately in the classroom (1970)."

Thus, it's natural to assume that teaching requires further analysis. However, some people reject this view because, as pointed out by Gage, they believe teaching is an art and not a science. This view is supported either by a belief that teachers are "born and not made," or that only experience and time can really train teachers.
If it is accepted that some people are born teachers while others are not, it is difficult to explain why some teaching improves dramatically over time. The assumption provides no explanation of nor basis for improving teaching.

This, then, may lead one to conclude that only experience and time can train teachers. This assumption is untenable in view of the fact that some teachers who have been teaching for many years are ineffective while other relatively new teachers attain greater skill in a very short time. It seems that while some teachers may improve with experience, some may get worse.

What is it that makes for successful teaching? An analysis is needed to find out. Without an analysis, no technology of teaching can be developed. Without the analysis and resulting technology no new teacher can be expected to replicate the effectiveness of a successful teacher. As Montrose M. Wolf has pointed out, A.S. Neill's *Summerhill* is "...a great and inspiring book about working with kids, but it provides no technology. That is why attempts to replicate it have not been successful (Goodall, 1972, p.134)."

Without being able to replicate successful teaching schools will continue to fail. If the public believes that schools are failing they will refuse to support them. There will be pressure to either improve teaching or to "de-school."
Deschooling does not eliminate the need for assisting children in the learning process. Adults influence the learning process whether or not they realize it, or want to. Children will always seek help in learning from adults simply because adults are an available source of information. In addition, children need to be provided with certain experiences to help facilitate their growth. For example, the need guidance in how to interact effectively with other children. From properly directed interaction children can learn cooperation and develop a positive self concept. Without help, children's potential may be blocked by negative experiences rather than released.

Therefore, whether we decide to improve schools or to de-school, the problem of how to help someone learn will still remain.

It is with this problem in mind that this dissertation attempts to 1) review advancements in theory and knowledge about teaching, and 2) integrate the information into a comprehensive paradigm of teaching.

Part I reviews the literature concerned with teaching. There are many views as to how teaching can best be analyzed. Chapter I shows that some educators think teaching can be understood as a set of behaviors. These people reject the idea of using theory as a basis for research believing theory prejudices investigation. Chapter II presents the opposite view. Many educators feel that theory is the key factor in
an analysis of teaching. In chapter III and IV another view is presented that is not as concerned with theory or behavior as it is with specification of a systematic set of procedures. Chapter V focuses on the educational belief that prefers to see teaching analyzed in terms of human interaction. Chapter VI sets forth some current opinion that teaching can be analyzed as a set of competencies. Lastly, chapter VI also presents the thought of some educators that teaching is a decision making process.

Since each of these views fills a gap left by its competitors, none is adequate by itself. What is needed is an overarching framework within which all the views can be integrated. Therefore, Part II presents a comprehensive paradigm of teaching based upon a philosophy of education, theory of development, and theory of learning developed by ANISA, a new comprehensive model of education.
PART I. REVIEW OF THE LITERATURE
CHAPTER I.

STUDIES OF TEACHING BEHAVIOR

Work Prior to 1967

At one time, education probably fit the description that Elton Mayo gave for an unsuccessful science. To him, unsuccessful sciences do not seem to equip students with a single social skill that is usable in ordinary human situations...no continuous and direct contact with the social facts is contrived for the student. He learns from books, spending endless hours in libraries; he reconsiders ancient formulae, uncontrolled by the steady development of experimental skill, the equivalent of the clinic or indeed of the laboratory (Mayo, 1945, p.23).

In the last few years, though, there have been attempts to identify teaching and learning behaviors which could be used as a basis for developing a successful science of education. Donald M. Medley and Harold E. Mitzel, in Measuring Classroom Behavior (1963) point out, however, that in the attempt to be scientific, the dominant feature of classroom observation techniques has been the tendency to describe in quantitative terms whatever happened in the classroom whether or not the behaviors had anything to do with teaching effectiveness or psychological theory (1963, p.274).

Bruce T. Biddle, in Methods and Concepts of Classroom Research (1967) states,

Although a wide variety of classroom phenomena has in fact been investigated, it is difficult for both
the reviewer and the investigator to understand the relationships between their findings and those of others (Biddle, 1967, p.354).

Biddle adds,

Although the concepts utilized appear to cover an enormous conceptual territory, in actuality only three basic teacher characteristics appear to be dealt with (Ibid. p. 346-347).

He lists these as teacher action, manners, and characteristic roles.

Biddle concludes:

The proliferation of similar but not identical lists for categorizing teacher performance suggests that the investigators themselves do not know what to make of findings that are presented for these lists (Ibid. p348).

The Stanford Taxonomy

By 1967 there still was no adequate list of teaching behaviors or skills. It was at this time, though, that work began at the Stanford Center for Research and Development in Teaching which resulted in the prototype Taxonomy of Teaching Behaviors (Baral, Snow, Allen, 1968). This work was later expanded by the 1970-1972 Task Analysis System for Educational Personnel Development, a project of the University of Massachusetts School of Education. Since then, the Clinic for Improving University Teaching, also at the University of Massachusetts, has tried to integrate this work into a list of teaching skills.

The work at Stanford tried to adopt an item pool as "...a Universe of classroom behavior descriptors...from which signs or subsystems of categories can be extracted (Ibid. p.2-3)."
Gary Morrison (1972) summarized the developments of the Stanford work.

The item pool was not comprehensive, and it developed without an organizing structure which would have made it manageable.

The researchers attempted...to classify the item pool in terms of other existing category systems, such as those developed by B. Othanel Smith, M.O. Meux (1962), and M. Karl Openshaw, and Fredrick R. Cyphert (1966). They discovered, however, that none of the category systems used was broad enough to encompass the entire range of items in the Stanford taxonomy. Thus, even the attempts to organize the preliminary item pool were merely exploratory. Furthermore, the classification system could only loosely be called a taxonomy. The classes of behaviors and their labels were not determined with any degree of exactness.

The Stanford taxonomy terminated with a preliminary classification scheme which suggested a direction to be taken but stopped short of producing a functional or even a manageable system that might have proved useful to educational researchers (Morrison, 1972, p.10,11,12).

The University of Massachusetts
Task Analysis Project

In his writing, Morrison, who was director of the Task Analysis Project, also described how the Task Analysis Project grew out of the work done at Stanford.

The University of Massachusetts project did not begin as a pioneering study. Rather, it was an extension, an outgrowth, and a maturation of the Stanford Taxonomy of Teaching Behaviors. From the beginning the conception of the project and its usefulness was broader than the earlier study. Task analysis was adopted as a means by which observable teaching behaviors could be systematically identified, generated, and recorded, computerized, and stored for easy retrieval for multiple educational purposes. It was hoped that the system would be flexible enough to be of use in the determination of specific performance criteria for school personnel, in the design of training programs, and in the evaluation of personnel performance, as well as in the definition of new staffing functions, roles, and patterns, and in the establishment of selection criteria for people in new staffing roles. The system was intended to incorporate all rating and observation instruments and current categorization structures to fit the needs of any individual supervisor or educational
researcher (Ibid. p.14).

Morrison further explains that:

Task analysis, as a means of collecting objective observable behaviors, was adopted...to avoid theoretical positions, predetermined models, and broad generalizations of behaviors.

In the context of the University of Massachusetts project, task analysis presupposes the collection of only observable behaviors...avoiding process words like interviewing and counseling for the use of explicit action verbs to describe behavior (Ibid. p.16-17).

The Task Analysis project expanded the item pool to a list of around 50,000 items and then reduced it through editing to around 7,000 items.

As a result...a system now exists for programming alternative organizational systems using a common data base of teaching behaviors to meet the needs of educational personnel at all levels...it provides a data bank of teaching behaviors which can serve as an empirical base for objective and flexible observation and supervision systems. It has become the behavioral universe to which facet theory and design can be applied in order to open up new areas of educational research in the dimensionalization of teaching behavior (Ibid. p.21-22).

This conclusion led Morrison to propose that a facet system be developed for the dimensionalization of teaching behavior. To illustrate his idea, Morrison presented a sample facet system. But, he said, "A fully functional facet system is still in the future (Ibid. p.107). His sample facet system was only intended to be exploratory. The categories listed were not parallel, mutually exclusive, or of the same dimension. In addition, the categories were not broken down into specifics that would be helpful to a teacher. For example, Activities were listed as:
1) Administration (school governance)
2) Material resources (a-v, teaching machines, etc.)
3) Language development (alphabet, reading, story)
4) Math development
5) Arts, crafts
6) Recreation (play, sing, dance)
7) Group time
8) Snack, Lunch
9) Rest

(Ibid, appendix D)

As of yet, there is no usable facet system. Nevertheless, Morrison has effectively made the point that the Task Analysis item pool by itself is of no use without the behaviors being dimensionalized. A list of 7,000 behaviors can't help a teacher unless some relationships and meaning can be indicated for the behaviors.

In looking for meaning in research, Biddle asks what should be looked at: "...the intent of behavior, its objective characteristics, or its effects (Biddle, 1967, p. 344-345)."

As pointed out by Medely and Mitzel (1963), the tendency has been to look at objective characteristics. The Task Analysis project, for instance, looked only at behavioral characteristics. And, the result has been that meaningful relationships can't be drawn from the behaviors because neither intent nor effects were taken into account.

The Clinic to Improve University Teaching

The above developments led the Clinic to Improve University Teaching to pursue an approach of clustering behaviors around some skills originally listed and developed at Stanford and used in Micro-teaching (Allen, Ryan, 1969).
Currently, the clinic is working with a list of twenty-four skills. The skills are:

- planned repetition
- elaboration
- asking questions
- setting the stage for a lesson
- meeting student needs
- optional instruction
- charisma
- verbal fluency
- maturity and stability of interpretation
- creativity
- recognizing attending behavior
- pacing
- expression
- tutoring
- academic counseling
- inspiration
- level of challenge
- lecturing
- student participation
- verbal and non-verbal reinforcement
- logical organization
- examples
- precise statements
- levels of importance

(School of Education, University of Massachusetts, 1972, index)

Obviously, many serious questions can be raised about this list. For example, is this a complete list of teaching skills? What is the relationship among these skills? What behaviors make up these skills? Are these all skills? Are charisma, maturity and stability of interpretation and creativity the same type of things as repetition, pacing, asking questions? Does lecturing overlap any of these other categories? Would tutoring include several of the skills like 1) examples, 2) precise statements, 3) levels of importance, 4) logical organization, 5) verbal and non-verbal reinforcement?
In other words, this list, too, presents only an exploratory stage. The categories of skills are not mutually exclusive. The list is not complete or even extensive. For example, there is no mention of evaluation.

Basically, this list lacks a framework which would tie the skills together and give them meaning. A paradigm, or a sequence might provide some way to determine gaps and see broader relationships.
Attempts to analyze teaching in terms of overt behavior and skills have not yet provided a complete or satisfactory technology of teaching. Gage suggests that a theory of teaching is needed.

The demands of teacher education make theories of teaching especially important. In developing theories of teaching, a major step is analysis and specification (Gage, 1964, p. 284).

Gage believes that such an analysis could be based on:

(a) types of teacher activity
(b) types of educational objective
(c) components of the learning process, and
(d) families of learning theory

By teacher activities Gage means such things as:

...explaining activities, mental hygiene activities, demonstrating activities, guidance activities, order-maintaining activities, housekeeping activities, record-keeping activities, assignment-making activities, curriculum-planning activities, testing and evaluation activities,...(Ibid. p.275).

For educational objectives, Gage lists:

1) affective
2) psychomotor, and
3) cognitive objectives

By components of the learning process Gage means that for each component of the learning process there is a matching teaching component. For example, he lists "Motivation-producing, perception-directing, response-eliciting, and reinforcement-providing (Ibid. p. 276)."
By families of learning theory Gage refers to "conditioning theory," "identification theory," and "cognitive theory."

Learning Theory

One theory of learning, according to Gage, is "conditioning theory." Fraenkel refers to the theory as "Associationism."

Associationists assume that individuals are a collection of specific responses (R) to specific stimuli (S). "Stimuli are features of the environment which act on an organism to cause it to respond. Responses are reactions of an organism to stimulation (Biggs, 1964, p.9)." Every specific reaction that an individual makes is considered a response to a specific stimulus.

In this theory, learning is viewed as the forming of connections or associations between stimuli and responses (Fraenkel, 1973, p.146).

Krumboltz (1961) organized findings of the research exploring this theory into four headings:

(a) evoking the desired response
(b) reinforcing the desired response
(c) maintaining and improving the desired response, and
(d) eliminating the undesired response

(Gage, 1964, p.284)

Gagne (1971) builds upon this theory and constructs a hierarchy of learning. He lists eight levels of learning. The first is a conditioning form of learning as studied by Pavlov. The second is a contingency form of learning as outlined by Skinner. The third level is chaining. The fourth level is verbal chaining. After verbal chaining, links are formed between individual elements and concrete concepts are formed. Then, relationships are discovered between concrete concepts and abstract concepts are formed. Next, abstract concepts are grouped into principles.
Principles are then brought together to form even higher level principles when problems are solved.

This hierarchy is similar to one presented by Mosston (1972). He views learning as progressing from the level of dealing with facts (bits of information-smallest elements), to dealing with clusters of facts (first groupings of facts), to subconcepts (groupings of similar clusters), to concepts (subconcepts grouped by common aspect), to subject matter (categorized grouping of all known concepts), to future information and knowledge (as yet unknown). However, Mosston views this progression as representative of higher and higher cognitive operations rather than as just broadening levels of associations.

The major aspect that differentiates a cluster of facts from level one (facts) is the realization and identification of a relationship among the scattered facts. This intrinsically requires employment of cognitive operations other than memory (Mosston, 1972).

Mosston believes, for example, that:

To group clusters into a subconcept requires:
  a. comparing and contrasting
  b. analyzing
  c. drawing conclusions
  d. arranging and organizing
  e. reexamining for consistency

To state the subconcept requires:
  a. identifying similarities (an idea, principle, law, etc.
  b. understanding the kind of relationships
  c. structuring the subconcept
  d. checking its validity
  e. making linguistic decisions about how to state subconcept (Ibid.)
Fraenkel sees this type of thinking as different from associationist thinking. He refers to this kind of thinking as linked to what he calls "field psychology," which Gage calls Cognitive Theory.

Field theorists see learning not as the forming of connections between previously unrelated stimuli and responses, but as the discovery of meaning or insight within a given situation. These theorists assume that insight, intelligence, and other cognitive processes are the fundamental characteristics involved in the responses of human beings, evident in even the most simple perception of the environment. A fundamental characteristic of man is his capacity of perceive and to formulate relationships. The understanding of relationships is what guides man's actions.

The most productive kind of learning is that which helps students to perceive, develop, and validate generalizations (relationships) (Fraenkel, 1973, p. 147).

Gage (1964) pointed out that people with this view see teaching as "cognitive restructuring."

Studies of cognitive development and learning, such as those by Piaget, have long been available. But manifestations of a growing concern with the teacher's role in fostering such learning have only recently begun to appear (Gage, 1964, p. 282).


Kamii (1972) focuses on what she considers to be three important "Piagetian principles of learning" which represent his cognitive theory.
The first one is that learning takes place from inside the organism by an active process of "construction," rather than by a passive process of "absorption." The second principle is that if each cognitive structure is developmentally integrated with the previous structure, the developmental stages are longitudinally coherent, and the learning achieved in each stage is permanent. The third principle is that learning takes place within the general framework that Piaget calls "intelligence." (Kamil, 1972, p.111, 112).

Kamii explains these three principles in the following way:

Fundamental to Piaget's theory is the notion that knowledge is not passively received from the environment but actively constructed by the organism. Piaget rejects the S—O—R model because it assumes that the organism perceives and receives the stimulus from the outside in a passive way. As Piaget puts it, there is nothing stimulating about the stimulus itself, and stimuli as such do not stimulate the organism. It is the organism that acts on the stimulus, and not the other way around.

Piaget believes that no stage can be skipped if cognitive development is to have a solid foundation for future growth.

Each concept is thus rooted in the baby's sensory-motor intelligence and takes a long time to evolve into an adult form. Therefore, concepts can be taught neither in a month nor in a year or two. Any attempt to skip an intermediary stage or to cue out the "wrong" notions is likely to result in hindering later learning. When earlier concepts are shaky, they will not serve as the foundation that generates higher-order concepts. Therefore, rather than cueing out and suppressing "wrong" notions, the teacher must bring them out to the fore to be integrated with other notions.

When new concepts are integrated with previously acquired ones, the learning is solid and not likely to be forgotten. Each new stage then increases the probability that the next stage will be achieved (Ibid. p.112-114).

In addition to this, Kamii points out that the learning that takes place is influenced by the stage of development. A child who has reached the stage of concrete operations has a different framework to bring to bear on a task than a child in formal operations (Ibid, p. 114-115).
Fraenkel (1973) believes that there are many points which most learning theorists would agree are at least descriptive principles about learning. Some of these are:

Individuals learn by responding to and interacting with their environment.
Learning is essentially an active process whereby a change takes place in the ways in which individuals perceive and give meaning to their environment.
Since every individual in a group has a unique set of experiences, needs, and perceptions, a variety of responses to any given stimulus is likely. Therefore, provision for individual differences in learning is crucial.
The cultural environment in which an individual finds himself shapes to a considerable extent what he perceives and values.
A major factor in man's capacity to modify his behavior is his ability to perceive abstract relationships.
Learning is facilitated when an individual is motivated and interested in what is to be learned.
Practice is important for many kinds of school learning.
When a "dissonant" object or fact is inserted into any sequence of objects or facts, attention, curiosity, and interest often increase, thus affecting learning.
The breakdown of a task into its component parts is often necessary if maximal learning of the task is to be accomplished.
Transfer of learning is not automatic, but it is more likely to occur when an individual learns the underlying principles of a subject or problem and has practice in applying them in varied situations.
Reward is usually preferable to punishment as a means of controlling learning.
Meaningful materials and tasks are learned more readily than non-meaningful ones.
Providing students with information about what constitutes a "good" performance, along with knowledge of mistakes and successful results, aids learning.
A tolerance for failure can be developed best by providing a backlog of successful learning experiences to compensate for the failures a student experiences. (Fraenkel, 1973).

Teaching Theory

Gage has suggested that these theories and principles of learning can be combined with analysis of teaching activities to derive a theory of teaching. Such a theory could provide
a guideline for planning. For example, a teacher showing pupils how to write the letter "F" involves 1) the activity of demonstrating, 2) a psychomotor objective, 3) a response-eliciting component of the learning process, and 4) the identification-imitation (modeling) paradigm of the teaching process.

Gage's hope was that such a framework might provide a structure around which an analysis of teaching could be built. However, this model is still somewhat narrow. It does not mention goal setting or evaluation. Furthermore, it does not address the problems of sequence or rewards and punishment.

Jerome S. Bruner provides for some of these in his list of features that a theory of instruction should contain.

1. A theory of instruction should specify the experiences which most effectively implant in the individual a predisposition toward learning—learning in general or a particular type of learning...
2. Second, a theory of instruction must specify the ways in which a body of knowledge should be structured so that it can be most readily grasped by the learner...
3. Third, the theory of instruction should specify the most effective sequences in which to present the materials to be learned.
4. Finally, a theory of instruction should specify the nature of pacing of rewards and punishments in the process of learning and teaching...(Bruner, 1964,p.307,308).

However, this list still does not include goal setting or evaluation processes.

Goal setting and evaluation are important parts of the planning process. Certainly, a comprehensive theory of teaching needs to focus on this aspect of teaching.

John Dewey used an analogy in explaining the importance of planning. In his analogy he described people exploring new
territory wandering, stumbling into new discoveries, taking notes of their new findings, slowly beginning to organize a picture in their mind of the layout of the new territory. After exploring, they could then start to draw a map to aid future explorers.

The map orders individual experiences...the map, a summary, an arranged and orderly view of previous experiences, serves as a guide to future experience; it gives direction, it facilitates control, it economizes effort, preventing useless wandering, and pointing out the paths which lead most quickly and most certainly to a desired result. Through the map every new traveler may get for his own journey the benefits of the results of other explorations without the waste of energy and loss of time involved in their wanderings---wanderings which he himself would be obliged to repeat were it not for just the assistance of the objective and generalized record of their performances. That which we call a science or study puts the net past experience in the form which makes it most available for the future...Memory is less taxed because the facts are grouped together about some common principle instead of being connected solely with the varying incidents of their original discovery. Observation is assisted; we know what to look for and where to look. It is the difference between looking for a needle in a haystack, and searching for a given paper in a well-arranged cabinet. Reasoning is directed, because there is a certain general path or line laid out along which ideas naturally march, instead of moving from one chance association to another (Dewey, 1943, p. 19-20-21)

Tyler has said that educational planning should address four basic questions.

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained (Tyler, 1950, pp. 1-2).
Taba elaborates this basic list in saying that curriculum design should include:

(1) diagnosing educational needs; (2) formulating objectives; (3) selection of content; (4) organization of content; (5) selection of learning experiences; (6) organization of learning experiences; and (7) determining the ways and means of evaluating effectiveness of what is taught (Taba, 1962, p. 12).

These guidelines provided by Taba have become generally accepted and are being elaborated upon. By themselves, of course, they do not represent a theory of teaching. They represent a method of curriculum design.

A theory of teaching would need to integrate the suggestions of Taba, Tyler, Bruner, Gage, and others. It should have implications for planning, structuring, sequencing, pacing rewards, motivating, directing teaching activities toward psycho-motor, cognitive, and affective tasks, using complementary components of the learning process, choosing appropriate learning theory, and identifying important skills.

Currently, the systems approach, which has developed out of the involvement of psychologists in the research and development aspects of training for the military services and industry, attempts to integrate these different aspects of teaching around a framework similar to the one provided by Taba. This approach is summarized in the next two chapters.
CHAPTER III

SYSTEMS DEVELOPMENT

Instructional Systems Development is an organized set of procedures for establishing goals and objectives, developing plans for their implementation, and evaluating the extent of their actualization. Systems development received great impetus is the research and development work sponsored by the government. E.V. Saul has written:

Our experience indicates that government and government-sponsored agencies are the most productive of systematic research and application in this area (human learning and education): in the U.S. especial mention may be made of the U.S.A.F. Personnel and Training Research Center, Lackland Air Force Base, Texas; the Human Resources Research Office, Washington University, D.C. the U.S.N. Office of Naval Research, Washington, D.C. and the U.S. Naval Training Devices Center, Port Washington, Long Island (Saul, 1959, p.180-182).

In reviewing this work Robert Glaser noted:

The Human Resources Research Office is essentially the training research and development arm of the Chief of Army Research and Development and it has been in operation since 1951. In 1963 this organization employed one hundred psychologists (sixty-five Ph.D's) and consisted of a headquarters and seven major laboratories.

The Air Force Personnel and Training Research Center... in 1956...employed approximately 168 psychologists (one hundred Ph.D.'s) and consisted of a headquarters and nine major laboratories plus a network of field units (Glaser, 1964, p.159,161).

Glaser found several steps that the military research contributed to the designing of instructional systems.

A first step in designing an instructional system is the specification of its purposes and the objectives to be achieved. When the literature reflecting work in the military is examined, it is evident that a concern of experimental psychologists who have turned their attention to training research is the lack of explicit specification of behavior under consideration. Many reports express
a concern with the problem of and techniques for defining training objectives.

...A primary example of the analysis of instructional goals is the notions of task analysis developed in the military context by Miller (1953). Such procedures should provide information to assist the designer of a course of instruction in making design decisions (Glaser, 1964, p.154-155).

About this, Meredith P. Crawford has commented that "...perhaps the most important single contribution to the development of training through research has been the determination of methods for the formulation of objectives of instruction (Crawford, 1962, p.326)."

Glaser has pointed out:

The important implication for educational practice is the need for the development of techniques for the analysis of what the student needs to achieve. On the basis of the behavioral specification of the end results of the school environment, achievement tests can be constructed, teaching and research in instruction can proceed, and curricula can be designed (Glaser, 1964, p.156).

Furthermore,

In the military services and in industry, increasing attention has been paid to the determination of the best combination of instructional objectives, entering-behavior (aptitude, achievement, and background) requirements, and instructional procedures in order to achieve over-all organizational goals with maximum utility. ...Work in this context has prompted consideration of the relationships among aptitude measurement, training, and achievement...The classes of variables described are previous achievement, prerequisites for learning, learning sets, ability to make necessary discriminations, and motivation (Ibid. p.157-158).

Finally,

Major emphasis in military training programs has been placed on the construction of evaluative measures for assessing the outcomes of training...This effort has been stimulated by the need for an answer to the question, "Does training produce the goals that it is established to produce (Ibid. p.166)?"

Altogether, then, this training research has resulted in a
procedural sequence. Briefly, the steps are: 1) specification of purposes, 2) conducting a needs analysis, 3) task analysis, 4) specification of instructional objectives in behavioral terms, 5) measurement of entering behavior, 6) development of instruction, and 7) evaluation.

Many writers have elaborated on the various steps in this instructional development sequence (Paulson, Nelson, Twelker, Hamreus, 1969; Ammerman and Melching, 1966; Glaser, 1965; Mager, 1962; Smith, 1966; Gilbert, 1962; Gagne, 1964; Allan, 1973).

Goals and Objectives

The CORD National Research Training Manual (2nd ed. 1969) summarizes the basic steps in instructional systems development. The authors, Nelson and Paulson, state that the first step is to establish a philosophy and broad goals.

Careful definition of...philosophy establishes the parameters of the value system within which all aims and objectives of the educational program are to have relevance and typical values against which they will be evaluated (Nelson and Paulson, 1969, p.I-6).

Nelson and Paulson distinguish between goals and objectives in the following way:

Objectives, as compared to goals, are relatively explicit formulations of the ways in which students are expected to change within the education process (Ibid.).

Richard Allan (1972) refers to broad goals as "purposes." He suggests that establishment of a general purpose should be followed by a needs analysis. By this, he means research to discover what is needed to satisfy the accomplishment of the purpose. From the results of this research, it should be
possible to subdivide the goal into specific objectives.

Basically, the needs analysis should consider five areas.

...the broad categories to consider should include student characteristics, student interests, community characteristics, review of literature by subject matter experts, and opinions and experiences of participating teachers (Allan, Gorth, O'Reilly, 1972).

The needs analysis is followed by a task analysis.

The basic question that one asks when embarking upon a process of task analysis is: What does a student need to know and to be able to do in order to attain the final criterion level established for this instructional unit (Nelson and Paulson, 1969, p.I-25)?

Two further questions are:

1. What is relevant to the intended performance situation. That is, what are the skills and knowledge that are likely to be useful in anticipated situations.

2. What is critical to instruction? Here one needs to identify the skills and knowledges that are most likely to be needed; those for which instruction in the program is most necessary (Ibid. p.I-26).

Nelson and Paulson suggest:

...if one can observe a variety of unsuccessful performances...the various reasons for their being unsatisfactory may suggest a variety of behavioral components required for successful performance. By thus breaking down one complex behavior into a number of simpler behaviors, the planning and development of an instructional system may be enhanced considerably (Ibid. p. I-27).

In brief review, then, the Instructional Systems Development Sequence begins with a clarification of philosophy, statement of purpose or goal, and proceeds with an analysis of the educational needs specification of the components required for fulfillment of the needs.

Next, each of the components can be written down in specific behavioral form (behavioral objectives). Usually, a behavioral objective is written in such a way that it states a
condition, a behavior, and a standard (Mager, 1962; Allen, 1972; Nelson and Paulson, 1969). In other words, an attempt is made to specify the situation in which a student is to perform, the observable behavior that is to be demonstrated, and the criterion by which the performance will be judged. One method of writing behavioral objectives, by Gronlund (1970), is presented in the appendix. Gronlund emphasizes that behavioral objectives should focus on what the student is to be able to do rather than on what the teacher does.

Behavioral objectives can be derived from the task analysis. In studying the task analysis it is usually discovered that some objectives can be grouped in hierarchies. The most inclusive objective at the top of the hierarchy is called a "Terminal Objective," while the other objectives are called "enabling objectives" (Nelson and Paulson, 1969).

Once these objectives have been formulated, instruments can be made which test the students abilities to perform the behaviors to the standard stated, under the conditions listed. These kinds of tests are called criterion-referenced tests (Allan, Gorth, O'Reilly, 1972).

Development of the Instructional System

Once specific objectives have been stated it is necessary to establish methods for carrying them out and evaluating their attainment. This step is called development of instructional systems design. Paul Twelker (1969) has presented an "exhaustive check list" for designing an instructional system. Twelker's steps are as follows:
1. Identify learner characteristics. This maximizes the adaption of instruction to the learner's personal needs, and reduces the chance of the system simply becoming a slick "Madison Avenue" package.

2. Identify tentatively the general characteristics of the instructional system to be used to achieve the terminal objective(s). That is, attempt to look at the whole system and outline its characteristics.

3. Identify tentatively the relationship between, and general characteristics of, the way in which en route objectives in the instructional system will be taught. This lets the designer match his tentative overall specifications for the system with each objective in the system.

Then, for each en route competency,

4. Identify the type of learning function represented. Is it problem-solving or multiple discrimination or something else?

5. Identify the instructional strategies that provide general conditions of learning. If general principles govern learning of one type or another, they must be identified.

6. Specify the learner response(s). What is the learner supposed to do? What is the form of the response? What media are required?

7. Specify the stimulus situation. What is the occasion for the response, or what precedes the response in way of exposure to information or orientation? What form does it take? What media are required?

8. Specify feedback for each instructional event. How are you going to tell the learner that his response is correct? What will you tell him?

9. Specify the required or permissible context of instruction. In what environment does all this take place?

10. Specify the appropriate sequence for each instructional component to ensure optimal mediational effects from one component (i.e., response, stimulus, or feedback) to another. How responses, stimuli, and feedback are put together can't be ignored.

For each instructional sub-system and instructional system as a whole:

11. Specify the required or permissible context of instruction, considering the relationships and specifications previously identified. Now that the instructional conditions for each objective have been specified, take a new look at the tentative specifications listed from Step 2 and 3. Adjust accordingly.

12. Specify the appropriate sequence of all instructional units to ensure optimal mediational effects from one unit and one sub-system to another (Twelker, 1969, pp. II-28, 29, 30).

Chapter IV of this dissertation is devoted to elaborating each of the above steps in more detail.
Evaluation

After an instructional system has been designed and implemented, a teacher needs to be able to evaluate the whole program to determine what needs to be changed, modified, or retained.

Paulson (1969) defines evaluation as the examination of certain objects and events in the light of certain value standards for the collection of information for the purpose of making adaptive decisions (p. IV-1).

Michael Scriven claims that the goal of evaluation is to attempt

...to answer certain types of questions about certain entities. The entities are the various educational "instruments" (processes, personnel, procedures, programs, etc.) (Scriven, 1967, p.40).

Scriven points out that evaluation must include "...the measuring of performance against goals," and "...procedures for the evaluation of the goals (Ibid., p.52)."

Generally, evaluation has been classified into three kinds; diagnostic, formative, and summative.

Evaluation which takes place prior to beginning a unit of instruction is called diagnostic evaluation or often simply diagnosis. Such pre-instructional evaluation can help teachers obtain information as to what kinds of attitudes, skills, and knowledge students already possess that will encourage, limit, or prevent teacher and student efforts to achieve desired objectives.

Diagnostic evaluation can also occur during a unit of instruction. The use of diagnostic tools during instruction can help teachers determine the degree to which certain non-instructional factors, such as attitudes toward the teacher, personal habits, relationships with parents, or peer rivalry are affecting student progress toward attaining desired objectives (Fraenkel, 1973, pp.54,55).
Diagnostic evaluation is considered different from formative evaluation, which is defined as follows:

Formative evaluation is evaluation that also is conducted during (rather than before or after) a unit of instruction, but with a different purpose in mind. The purpose of formative evaluation is to help teachers determine how well students are progressing toward attaining desired objectives, and provide teachers and learners with specific feedback as to the degree to which students have mastered certain skills or knowledge studied or presented up to this point, and if they are not understanding the materials, to pinpoint exactly where in a unit they are having difficulty.

Diagnostic evaluation is most helpful in obtaining insight into rather general skills, attitudes, and characteristics of students, such as how students feel about activities which occur in the classroom, or inter-student perceptions and power relationships. Formative evaluation, on the other hand, is designed specifically for a particular unit of instruction and is intended to locate exactly where in the unit the student is experiencing difficulty (Ibid. pp.56, 57).

Summative evaluation, on the other hand, occurs

...at the end of a unit of instruction in order to determine how much and how well students have learned and to what extent desired objectives have been attained (Ibid.).

Therefore,

Assessment of student attitude, progress, and achievement needs to occur before, during and after instruction, using a variety of evaluative devices and procedures (Ibid.).

This means, according to Stake (1967), information concerning "Antecedent, "Transaction," and "Outcome" conditions is required.

Antecedent conditions are:

...all the responses that are carried to the educational situation by the student and teacher participants and which may have an effect on the outcomes (Payette and Cox, 1969, p.209).
Transaction conditions are the attitudes, feelings, and values connected with

...planned interactions among persons in the educational setting for the purpose of achieving educational outcomes (Ibid. p.216).

And, Outcome conditions are

Any modification in the response of participants that can be linked empirically or logically to the educational process (Ibid. p.210).

In using the instructional systems design, outcome conditions can be measured by giving the criterion-referenced-tests. However, as just pointed out, more information than this is needed. The teacher also needs information about entering behavior and social emotional climate. Furthermore, appropriateness of goals needs to be evaluated. A teacher needs to know what to eliminate and what to add, how effective the materials and presentations were, why certain students did not learn, what items they had difficulty with, how complete the needs and task analyses were, whether the test items actually tested the objectives, whether learning steps were too small or large, whether students like the program, if the program is attention getting, what the quality of interaction is, if there has been a change in attitude about the topic, whether the instruction spurs growth, whether the environment is nourishing, and if the pacing is appropriate so that each student is progressing as fast as he should.

This means information must be collected on individual students, the group as a whole, the instructional plans and goals, and the materials, media, and presentations.
In looking at an individual's learning, a teacher must discover:

what has a student learned?
what does a student already know?
how much does the student retain? (Gorth, Allan, O'Reilly, 1972)

These questions are necessary to know:

1) where in the instructional sequence to start the student...
2) whether to move on to learn future objectives or whether review or more depth is required on the objective just taught; or
3) whether forgetting is taking place over time which may necessitate reviews on an objective long after it has been taught (Ibid.)

In gathering information about groups teachers need to know:

1) Are problems of group integration and group functioning minimized?
2) Are group members provided with enough opportunities to interact and communicate in, and are they estab¬lishing satisfactory, fully functioning classroom organization?
3) Are class members involved in solving problems of particular concern to them and given opportunities to increase feelings of security, confidence, and self¬esteem by using their interpersonal skills to improve working conditions?
4) Can the group cope positively with confusion, tension, and pressure by recognizing it and reducing it?
5) Is there a high degree of trust and confidence in the classroom group so that individuals feel comfortable functioning in it? (Bany and Johnson, 1970, p.409-410).

In order to determine these things a teacher must know how to get the information. Data gathering will involve measurement, testing, and observation.

Measurement is the process of using a test, scale, or instrument to obtain a relatively objective and quantified indication of a person's standing on a characteristic represented by the device employed.

A test may be viewed as a collection of tasks, better known as items or questions, each of which is a sample of some domain or behavior.
Observation differs from testing as a measurement procedure in that customarily the teacher or another professional person...focuses his attention upon certain segments of student behavior and systematically records his perceptions or impressions (Wilson, Robeck, Michael, 1971, pp.456, 466, 467).

Therefore, a test is a tool for gathering information through measurement. Measurement is the placing of a value relationship on the information. Observation is another kind of tool (besides testing) for gathering information.

Different kinds of testing and measurement have been developed to get at different kinds of information. Two kinds of testing are 1) norm-referenced testing and 2) criterion-referenced testing. Criterion-referenced tests are:

...tests which contain only items related directly to previously stated behavioral objectives...which are used to measure whether students can or cannot accomplish the behavior stated in the objectives (Allan and Gorth, 1972)

Norm-referenced tests are:

...tests which are not necessarily related to behavioral objectives (and which are)...constructed to show the standing of an individual in relation to others in the group of those being tested (Ibid.)

CAM (Comprehensive Achievement Monitoring) is one criterion-referenced testing evaluation system that has been developed (Ibid.)

It is called a "comprehensive" achievement monitoring system because the information provided on each student in the class, and on the entire class as an entity, is far more extensive than the information provided by the usual types of teacher made classroom tests (Ibid.).

The CAM system collects data on all behavioral objectives every two, three, or four weeks in order

...to provide the teacher with detailed information on how well his/her course is going (what percentage of the students are able to answer test items on each course
objective) and how well each student is doing (which objectives can each individual student master).

This is like giving a final exam every two or three weeks. The reason for this is to see (1) which objectives are already known before they are taught, (2) how well objectives just taught were learned, and (3) how well objectives taught earlier in the course are remembered. Also, it is possible to begin plotting trends in the data.

CAM is more than just the theory presented, however. The statistical foundations have been carefully worked out so that data provided by CAM is adequate for making decisions. Computer programs are available to take all the data received from student answer sheets and do all of the mathematical calculations necessary to make this data meaningful to students, teachers, and administrators. Also, forms have been developed so that the data are clear to students (they receive a student report) and teachers/administrators (they receive a teacher report and class summary) (Ibid.).

Another form of testing is Mastery testing which uses a pre-test before instruction and a post-test after instruction to check the change that has taken place during the time of instruction.

Metfessel and Michael (1967) have listed over 80 different criterion measures that can be used in evaluating different characteristics of objectives of a program. This list is presented in the appendix.

All tests should possess a number of basic characteristics. Validity, Reliability, and Objectivity are the most important.

The usual definition of a valid test is that it measures what it is supposed to measure.

A reliable test is consistent—that is, if it is repeated, students score roughly the same as they did the first time they took the test.
Objectivity refers to the absence of subjective judgements. It is very difficult to attain, and is probably never attained completely (Fraenkel, 1973, pp. 280, 281, 284).

There are a few important rules of test-making. Some are:

1) Be clear as to the purpose of your test.
2) Plan...the proportion of different kinds of questions you will ask.
3) If your purpose is...diagnosing a basic skill...prepare at least ten questions...on each skill you are assessing.
4) If your purpose is...diagnosing individual strengths and weaknesses in a particular skill...prepare at least ten questions on each aspect of the skill that students must master in order to attain the skill as a whole.
5) If your purpose is primarily one of determining how well your class has mastered a particular set of objectives, you should develop a test that parallels work in class.
6) If your purpose is primarily one of ranking students in the order of their achievement, your questions should focus on the "critical" points of learning.

....write your items in language that students can easily understand.
Be sure that there can be only one interpretation to your question.
State the question in enough detail so that students understand what is expected of them (Ibid. pp.284,285, 286,291,294).

The differences and similarities between objective and essay tests and the conditions under which each should be used are summarized by Ebel (1969) and can be found in the appendix of this dissertation. The appendix also contains some sample instruments which can be used for measuring "entering behavior."

Evaluation, then, is

...a process of examining certain objects and events in the light of specified value standards for the purpose of making adaptive decisions (Paulson, 1970, p.1).

Such assessment "...needs to occur before, during, and after instruction, using a variety of evaluative tools (Fraenkel, 1973, p.58)." And, such tools need to be checked for validity, reliability, and objectivity.
As can be seen, therefore, evaluation is a very important aspect of the instructional systems design. In review, the systems sequence is composed of: 1) purpose, 2) needs and task analysis, 3) behavioral objectives and criterion-referenced tests, 4) assessment of entering-behavior, 5) designing instructional environments, and 6) validating tests and evaluating total program.
CHAPTER IV

INSTRUCTIONAL SYSTEMS DESIGN

Designing an instructional system requires an "objective analysis," which aids the specification of the instructional sequence, and a specification of the instructional conditions (Twelker, 1969). Twelker has outlined the steps which serve these functions.

The first major task, according to Twelker, is to analyze objectives to determine an instructional sequence.

A primary purpose of objective analysis is to discover what competencies that a learner is to acquire during a given course of instruction are independent from one another and what competencies are dependent upon one another (Twelker, 1969, p.II-4).

Gagne (1965) discussed a few studies which also indicate the importance of objective analysis.

The results showed that the learning of "higher-level" principles was dependent on the mastery of prerequisite "lower-level" principles in a highly predictable fashion. For example, of the 72 students who performed correctly on principle IIa, only one did not perform principle IIIa correctly on the test. Of the 18 students who did Principle IIa incorrectly, all 18 did principles IIIa incorrectly. The prediction that learning IIa depends on knowing IIIa was borne out, therefore, with a frequency of 99 percent. For all the other possible comparisons,...the frequency of correspondence between predictions and findings ranged from 95 to 100 percent. The learning of organized knowledge, according to these results, appears to be predictable from the pattern of prerequisite principles that make up the hierarchy of knowledge to be acquired (Gagne, 1965, p.152).
Twelker believes the basic steps involved in objective analysis are:

Step 1 Identify terminal objective
Step 2 Identify learner entry level.
Step 3 Starting at the terminal objective, ask the question, "What kind of capability would an individual have to possess to accomplish this objective?"
Step 4 Repeat procedure for each competency that is determined.
Step 5 As prerequisite competencies are determined, begin to arrange in hierarchical fashion.
Step 6 Continually check efforts to assess relevance of competencies thus determined and to weed out competencies that are inappropriately stated, too detailed for the entry level of the learner, etc., asking the question, "do I really need this competency?" (Twelker, 1969, pp.II-19-20).

Once objectives have been determined, instructional conditions need to be specified for achieving the objectives. The main variables to be considered in specifying instructional conditions are: 1) characteristics of the learner and the system, 2) learning function, strategy, and response, 3) stimulus situation, feedback, and context, and 4) sequence (Twelker, 1969). Twelker outlines twelve steps for specifying instructional conditions which can be sequenced under the headings given for the above variables.

Characteristics of the Learner and the system

Twelker's first step in specifying instructional conditions deals with the variable "learner characteristic."

(1) Identify learner characteristics. This maximizes the adaption of instruction to the learner's personal needs, and reduces the chance of the system simply becoming a slick "Madison Avenue" package (Ibid. p.II-28).
The importance of this step is based on the assumption that students have different styles of learning and would benefit if the instructional system were adapted in some way to match, provide for, or at least take into account, each individual learning style.

...in their review of the studies dealing with aptitude measures, Tallmadge and Shearer (1967) concluded that no particular method or combination of methods have been shown to be most effective in instructing the students at various ability levels. Many of the results were conflicting, others were ambiguous or inconclusive, and those that seemed to be reliable did not fit into any recognizable pattern.

From a follow-up study, Tallmadge et al., (1968) obtained further data to substantiate the notion that a large number of variables exist that not only influence effectiveness but also interact with individual differences and each other in such complex ways that a thorough understanding of all of the interrelationships is impossible to achieve in any given study. However, their results strongly support the existence of learning styles and suggest that multi-track instruction based on learning styles is feasible. Incidentally, the individual differences which interacted with subject matter and instructional methods were all shown to be non-cognitive in nature (Ibid., p. II-34).

This led Twelker to conclude:

...the instructor or designer of instructional systems is practically on his own in regard to the wedding of individual differences with instructional requirements. Indeed, the way open to the instructor for matching students with common attributes to appropriate curricula or units of instruction are very gross in nature. Tallmadge, et al., (1968) suggest several ways:

(1) Classify students on the basis of administered aptitude and interest tests. Assign students to courses (or instructional systems) which differ in terms of intellectual demand and difficulty level.

(2) Classify students in regard to differential aptitude patterns and interest data. Assign students to courses (or instructional systems) encompassing the appropriate subject matter content.

(3) Classify students according to their learning style. Assign them to courses or instructional systems employing appropriate instructional methods (Twelker, 1969, p. II-34).
Hunt believes that individual differences can be accounted for in terms of four basic accessibility channels. These channels are: 1) cognitive, 2) motivational, 3) values, and 4) sensory (Hunt, 1971).

Hunt also sees students as progressing from a self centered unorganized phase, to learning ground rules, to learning how one is distinct from general standards, to relating on more empathetic understanding, to integrating a relationship of self and others.

He believes the optimum environment for students on level one is a clear consistent, well organized environment so that cultural expectation can be assimilated. If the environment is ambiguous or inconsistent and emphasizes autonomy, then there will be a mis-match and development will be restricted. Meanwhile, students on level two need an environment that permits a discovery approach. This leads Hunt to think that perhaps homogeneous grouping according to developmental stages might be beneficial (Hunt, 1971).

Of course, learner characteristics could also be classified according to other paradigms of development like Kohlberg's or Piaget's.

For moral development Kohlberg postulates six stages of moral judgement.

Level I-Premoral
Stage 1-Punishment and obedience orientation.
   (obey rules to avoid punishment.)
Stage 2-Naive instrumental hedonism
   (Conform to obtain rewards, have favors returned, and so on.)
Level II-Morality of Conventional Role-Conformity
Stage 3-"Good-boy" morality of maintaining good
relations, approval of others.
(Conform to avoid disapproval, dislike
by others.)
Stage 4-Authority maintaining morality.
(Conform to avoid censure by legitimate
authorities and resultant guilt.)
Level III-Morality of Self-Accepted Moral Principles
Stage 5-Morality of contract, of individual rights,
and of democratically accepted law.
(Conform to maintain the respect of the
impartial spectator judging in terms of
community welfare.)
Stage 6-Morality of individual principles of
conscience. (Conform to avoid self-
condemnation.) (Kohlberg, 1964, p.400).

Piaget presents several stages of cognitive development.
These are: 1) sensory motor stage, 2) preoperational stage,
3) stage of concrete operations, and 4) formal operations.

In the sensory motor stage

Children...encounter objects through random physical
movement, without thought. (Dyrli, 1972, p.6).

The muscular reflexes by constant exercise, become modified
and the child's physical movements in space get coordinated.
He acquires notions of objects and their permanency...

In the preoperational stage the child approaches problems through
trial and error.

...the child does not use logical operations in his
thinking. ...the child is perceptually oriented, i.e. he
makes judgements on the basis of how things look to him...
He is aware of only one variable or property since it
stands out visually. He lacks the ability to coordinate
variables...The development of logical process, though not
stagnant, is very slow... (Ibid. p.8)

In the stage of concrete operations

...the child...begins to think logically, but this thought
is concrete rather than abstract. In other words, while he
can now perform simple logical operations, the child can do
more advanced thinking if given physical objects to
manipulate than he can if he is expected to do the same
problems symbolically (Dryli, 1972, p.12).
Finally, in the stage of formal operations

The individual in the stage of formal operations learns to manipulate symbols and deal with ideas verbally without the necessity for always working directly with the physical objects. In other words, he becomes able to think in increasingly abstract terms.

The individual in this stage also learns to hypothesize before doing something. He can suggest for example "What might happen if I put an ice cube in a glass of cooking oil," and can then perform the operations necessary to either prove or disprove his suppositions (Ibid. p.23).

Another way to characterize students is by the degree of structure they require. Mosston (1972) believes that teaching style should be adapted according to how ready students are emotionally to make the different kinds of decisions required in learning. (see appendix).

As can be seen, there are a multiplicity of learner characteristics that could be identified. Which characteristics need to be identified will depend upon the purpose at hand. The teacher should first clarify a purpose and then identify those characteristics relevant to the accomplishment of the aim.

Of course, once the learner characteristics have been identified, the next question is what implications do they have for setting up the instructional system.

(2) Identify tentatively the general characteristics of the instructional system to be used to achieve the terminal objective(s). That is, attempt to look at the whole system and outline its characteristics (Twelker, 1969. p.II-28).

For example, if students can be categorized according to a characteristic should they be grouped? Grouping would be an important characteristic of the instructional system. The effect of such a decision will have great influence. The consequences should be projected carefully. For instance,
Behavior, attitudes, beliefs, and values of the individual are all firmly grounded in the groups to which he belongs. How aggressive or cooperative a person is, how much self respect and self confidence he has, how energetic and productive his work is, what he aspires to, what he believes to be true and good, whom he loves or hates, and what beliefs and prejudices he holds—all these characteristics are highly determined by the individuals group memberships. In a real sense, they are properties of groups and of the relationships between people. Whether they change or resist, change will, therefore, be greatly influenced by the nature of these groups. Attempts to change them must be concerned with the dynamics of groups (Cartwright, 1971, p.209).

Bany and Johnson point out that ability grouping can cause negative, resistent, apathetic reactions in a low group. The group will lack unity, be anxious, dependent, and easily distracted. Average groups may resist the teacher because they are dissatisfied. And, high groups must retain their status and will therefore react negatively to individuals they feel aren't as adequate. The high group will resist the teacher's attempt to establish standards. Because they are cohesive, they will establish their own norms (Bany and Johnson, 1970,p.60).

Thelen believes students can be grouped according to certain learner characteristics while avoiding the problems that often arise with grouping. He suggests letting students observe different teachers and pick the one whose natural style fits their taste. He thinks that students would naturally select the instructional style most appropriate to their own particular learning style. Thelen calls this grouping by "teachability." He believes this match between learning style and instructional style can also be predicted by an assessment battery (see appendix). This system supposedly allows a teacher to select an instructional style on the basis of how comfortable
he, the teacher, is with it rather than on the basis of learner characteristics. This assumes teachers will select differing styles so that students will have a range of choices.

Often, because this approach is not feasible, teachers are left having to determine what the most appropriate instructional style would be for the different specific conditions they confront. There is a wide range of choices for the teacher to choose from. For example:

...from the analysis of the instructional problem and the thinking about the proposed solutions to the problem, he might want to investigate the use of a simulation exercise or programmed instruction or some type of independent study or the audio-tutorial approach (Twelker, 1969, p.II-36).

However,

Unfortunately, there exists no manual or set of guidelines that would allow an individual designer to choose between one or another type of instructional system (Ibid. p.II-37).

Hudgins (1971) supports this statement.

There have been many research investigations conducted into the nature and operation of instructional materials, especially since the advent of educational films and radio in the 1930's, followed by educational television a generation later. Unfortunately, most of that research has been highly empirical in the sense that studies have been individual rather than part of an overall research program, and frequently the questions asked by the researcher have been highly specific to a given film, etc., thus negating any generalized use. Only rarely have investigations of instructional media been guided by an overarching theory or conceptual structure about the nature of communication, teaching, or learning (Hudgins, 1971, p.176,177).

This indicates that, at best, this review will be a patchwork of theories and findings.

One set of findings indicates the importance of considering the degree and nature of human interactions inherent in an instructional system under review.
First of all, for example, teaching machines can't provide for everything.

...instructional objectives that involve the attainment of factual knowledge are amenable to automated instruction while objectives which involve patterns of behavior occurring at unpredictable intervals and reflecting 'mediational' processes will be more readily attained through human instruction (Twelker, 1969, p.II-38).

Secondly, children need a certain amount of human interaction for its own sake.

...investigators have reported interesting examples of the importance of the human instructor in an instructional system. Silber (1968) reports that in an experiment where children were isolated from each other and from the teacher in a dimly lit room and instruction was presented by a computerized system, the children would reach out to touch the experimenter as he walked about the room (Ibid., p.II-40).

Educators constructing such instructional programs need to account for the human factors found to be so important in the Hawthorne studies.

In 1924 efficiency experts at the Hawthorne, Illinois, plant of the Western Electric Company designed a research program to study the effects of illumination on productivity. At first, nothing about this program seemed exceptional enough to arouse any unusual interest. After all, efficiency experts had long been trying to find the ideal mix of physical conditions, working hours, and working methods which stimulate workers to produce at maximum capacity. Yet, by the time these studies were completed (over a decade later), there was little doubt that the work at Hawthorne would stand the test of time as one of the most exciting and important research projects ever done in an industrial setting. For it was at Western Electric's Hawthorne plant that the Human Relations Movement began to gather momentum, and one of its early advocates, Elton Mayo...gained recognition.

Mayo and his team started their experiments with a group of girls who assembled telephone relays,...For over a year and a half during this experiment, Mayo's researchers improved the working conditions of the girls by implementing such innovations as scheduled rest periods, company lunches, and shorter work weeks. Baffled by the results, the researchers suddenly decided to take everything away from the girls, returning the working conditions to the exact
way they had been at the beginning of the experiment. This radical change was expected to have a tremendous negative psychological impact on the girls and reduce their output. Instead, their output jumped to a new all-time high. Why?

The answers to this question were not found in the production aspects of the experiment (i.e., changes in plan and physical working conditions), but in the human aspects. As a result of the attention lavished upon them by experimenters, the girls were made to feel they were an important part of the company. They no longer viewed themselves as isolated individuals, working together only in the sense that they were physically close to each other. Instead they become participating members of a congenial, cohesive work group. The relationships that developed elicited feelings of affiliation, competence, and achievement. These needs, which had long gone unsatisfied at work, were now being fulfilled. The girls worked harder and more effectively than they had worked previously (Ibid., p.44).

Obviously, the same human aspects studied at the Hawthorne plant are important in the classroom also. Bany and Johnson (1970) state that when interaction is restricted open and natural development of the classroom group is inhibited. In such cases, when something interrupts class work there will be a lot of interaction to make up for lost time. Also, some groups will unite and resist teacher efforts to prevent talking. Furthermore, since disruption allows for interaction, the group may allow individuals to misbehave. A class group will resort to multiple mechanisms to maintain itself (Bany and Johnson, 1970, p.61).

In creating an instructional system it should be kept in mind that in effectively functioning classroom systems the forces determining individual behavior are not solely dependent upon the teacher or any single individual for motivation (Ibid. p. 59).

Bany and Johnson also point out that Team Teaching may cause problems of adjustment to multiple group membership because
not only curriculum organization may be different, but also, grouping practices employed by the teacher. Thus, with subject matter specialists and different groupings, it is difficult for children to identify with any particular grouping. Yet, it is in their first organized work groups that children conform their perceptions of their own worth and identity in comparison with others. The more closely knit the group the less likely there will be interactional conflict and continued necessity of redefinition of individual performance. Loosely knit groupings impede communications, present unclear situations, give few cues to test perceptions by, fail to provide stable ties with social world of work, and provide little means for knowing the evaluation placed on behavior by others in the same setting (Ibid.).

Therefore, the influences affecting children are not only from teacher-pupil interactions, but also result from interactions between pupils and classroom group organization (Ibid.) The result is that if children find it necessary to devote time to developing unity, they will lose time from instructional tasks (Ibid. p.62).

Certainly, then, in planning an instructional system, it is important to plan for management of interaction. Classroom management is coordinating and integrating activities of the classroom system and minimizing difficulties arising from interaction patterns in classroom organization. It is not doing something to individuals which will develop self discipline in each child. Instead, it is stabilizing work conditions. It does not mean coercion, appeal, or persuasion. It means
creating highly satisfactory conditions in the classroom system so that group needs are met (Ibid. p.63).

The processes, or managerial patterns of activities, include (1) developing unified cooperative system of relationships, (2) establishing standards and coordinating work procedures, (3) improving conditions in the system and solving operational problems by using problem solving techniques, and, (4) changing group properties which limit individual and group performance. As can be seen, these practices use skill rather than power to handle problems (Ibid.).

The following findings are helpful for establishing effective instructional groups and systems.

1. In organizing small groups, those containing up to seven members usually have everyone participating while having eight or more usually has someone who doesn't participate (Henry, 1960, p.198).

2. Possible socio-psychological relationships among class members are:

1) problem-solving and work relationships,
2) authority relationships for decision making,
3) social influences or power relations,
4) social acceptance relationships,
5) sex relationships,
6) informal, private, or friendship relationships (Ibid.)

3. Four major types of conflict can arise from personality conflicts, role conflicts, differences in role expectations and personality-dispositions, and differences in values and expectations. This indicates that if a teacher perceives his role differently then the students perceive his role there will be trouble (Ibid.). Therefore, in planning an instructional system, perceptions and expectations need to be taken into account.
4. To sustain motivation and learning:

1) most energy of students and teachers should be channeled into problem solving and work,
2) decision-making must develop from need to have well directed group work,
3) social acceptance must relate to problem solving in a way that supports members in work and problem solving participation,
4) social influence should be used to release direct problem solving and goals, and
5) friendships can develop to share perceptions and feelings about problem solving and work (Ibid. p.113, 114).

5. A supportive and interdependent environment should be strived for. Shared problem solving, acceptance, empathy, and good listening help create a supportive climate while advice giving, censoring, defence, persuasion, controlling, and punishing contribute to a defensive atmosphere (Ibid. p. 122-123).

6. The barriers to goal attainment are:

1) imposition of goals from external source,
2) improper manner of goal setting,
3) overabstraction in goal setting,
4) guilt of students over unacceptability of the "real goal" of the room (such as working to relieve boredom etc.). (Ibid. p.128)

Ideally, goals should be integrated and unified. A group should be working toward a task which maintains group morale and satisfies individual needs (Ibid.).

7. A growing group begins by being dependent, uncritical, and accepting of teacher remarks. As growth starts, the group may resist information from the teacher as part of a counter-dependence move. Time will also begin to be taken to work on group process problems instead of task (Ibid. p.131).

8. Social structure can be viewed by looking at 1) structure of authority, 2) structure of goal orientation, 3) structure of social access (Ibid. p.191).
9. Two important judgments a teacher must make are

1) What is the clarity with which students perceive learning goals, and 2) What is the existing level of dependence (Ibid. p. 212).

1) When goals are ambiguous, direct influence will establish more desirable attitudes and superior patterns of work.
2) When goals are ambiguous, indirect influence by teacher increases independence by decentralizing authority structure and/or freeing social access.
3) When goals are clear and attractive, direct influence will tend to increase dependence and indirect influence will tend to decrease dependence, but only to the extent that the students cannot see the relationships between teacher comments and the clear goals.
4) When goals are clear and unattractive, direct teacher influence is necessary to sustain work by restricting social access and centralizing authority, through a system of rewards and punishments, producing high dependency (Ibid. p.207).

So, teacher behavior can be

1) indirect or 2) direct, while learning goals can be 1) clear or 2) ambiguous, creating pupil responses that are either 1) dependent or 2) independent (Flanders, 1971, p. 185).

In addition to the above, in looking over a potential instructional system to determine characteristics, it may be helpful to think of four broad categories of principles of learning.

A teacher should look at the principles of learning 1) affecting motivation, 2) affecting rate and degree of learning; 3) affecting retention, and 4) affecting transfer of learning to any appropriate situation (Allen, 1971, p.151).

Furthermore, a teacher should consider three general teaching traits:

1) support v.s. demand (degree of support offered by the teacher-v.s. amount of demand for independent learner performance, 2) predictability v.s. ambiguity, 3) small steps v.s. large steps (Ibid. p. 153).

Also, it might be helpful to keep in mind that
To involve the students in the formulation of management rules and procedures is a goal; to establish rules immediately is a requirement. As teachers read the recommendations of various authorities, it is well for them to remember that it is authoritarian to be told not to be authoritarian (Ibid. p. 182).

In addition to considering grouping and classroom interaction, while planning the overall instructional design of a system, O'Reilly, Gorth, and Allan (1972) state that other important aspects of instructional development to consider are: 1) student management, 2) course content, 3) who chooses course content, and 4) instructional technique (O'Reilly et al, 1972).

**Student Management** - This relates to how and where decisions are made on guiding students through the course content. Are the students managed as a large group (entire class), a small group (2-10 students) or as individuals? Do students all proceed at the same pace, or are they self paced? Do they have a choice of which objectives they learn next? These are all management decisions...

**Course Content** - The information to be learned by the students upon course completion is known as the course content. This course content is usually delineated by teacher outlines, lesson plans or behavioral type objectives. Most developers of instruction are now turning to behavioral objectives as the clearest indication of what students will learn in a course of instruction.

**Who Chooses Course Content** - The decision maker who has control over what course content is to be learned has traditionally been the teacher in consortium with the textbook author and administration. Many newer instructional models are allowing students to choose their own content.

**Instructional Technique** - The instructional technique comprises the method or mode used to impart the course content to students. Alternatives consist of lectures, tapes, slides, simulations, programmed instructional materials, field trips, individual or group projects and many more (Ibid. book 1400, pp. 5-6).

A student management model may be "group-paced," "regrouped," or "individualized." In a group paced model
"The students are guided through the course content together as a group (Ibid.)." In a regrouping model, "Students are still guided through the instruction in groups. However, instead of one group there may be many groups (Ibid.)." In an individualized model, "The students are guided through the course content based on their individual success and abilities (Ibid.)."

The first major dimension of student management is "Who Makes Decisions About Management?" Usually, the teacher is the decision maker deciding to review, move on, determine the criteria for success, etc. However, personnel specialists like librarians, and reading specialists can also make decisions. Furthermore, decisions may be made by group consensus or individual students may be the decision makers. Sometimes, the instructional materials developer becomes the decision maker by dictating sequence and follow-up activities in different media (Ibid.).

A second major dimension of student management focuses on "About whom are the decisions made." Decisions can be made not only about the entire group of students and individual students, but also students may decide that "the teacher is moving at too rapid a pace and should slow down or the presentation is unclear and should be made in some other manner (Ibid.)."

Another dimension is pacing. Pacing can be based either on the calendar or on learning rates.

As these things are being considered, the teacher needs
also to decide how many options, and what kinds of decisions, about subject matter the instructional system is going to permit students to be involved in.

The two options to be considered are linear or branched. In a linear sequence the group, or individual student, has limited options. If the objective is accomplished, then, the next objective in a preset sequence is tackled. If the objective is not accomplished, then the objective missed is reviewed. In a branching situation more options are available. If an objective is accomplished, the student(s) have a choice of which objectives to try next. These options could range from a limited choice of two objectives to any objective in the course. Similar branching options could also be built in if the objective is missed (Ibid.).

This involves a question of structure. A central characteristic of any instructional system that cannot be ignored is the degree to which learning activity is controlled. The power of decision making may be placed in the hands of students, may be inherent in the materials, or may be held by the teacher. One of the central distinguishing characteristics of open education is that students are given a wide latitude for decision making. Montessori provides structure through the arrangement environment. Various other models of teaching provide different methods for structuring (see Appendix).

Research indicates some guidelines for the handling of structuring in a classroom. First of all, the teacher is a leader responsible for seeing that appropriate structuring takes place. The Bureau of Research at Ohio State University describes this leader behavior along two dimensions: Initiating Structure and Consideration (Halpin, 1959, p. 4). William J. Reddin, in his "Tri-Dimensional Management Style Theory" describes initiation structure as task behavior and considera-
tion as relationships behavior (Hersey, Blanchard, 1972, p. 81). Paul Hersey and Ken Blanchard define these two dimensions as follows:

Task Behavior - The extent to which a leader is likely to organize and define the roles of the members of his group (followers), to explain what activities each is to do and when, where, and how tasks are to be accomplished; characterized by endeavoring to establish well-defined patterns or organization, channels of communication, and ways of getting jobs accomplished.

Relationships Behavior - The extent to which a leader is likely to maintain personal relationships between himself and the members of his group (followers) by opening up channels of communication, delegating responsibility, giving subordinates an opportunity to use their potential; characterized by socio-emotional support, friendship, and mutual trust (Ibid. p. 82-83).

Hersey and Blanchard (1972) summarize the findings of the work at Ohio State in this way:

In studying leader behavior the Ohio State staff found that Initiating Structure and Consideration were separate and distinct dimensions. High on one dimension does not necessitate being low on the other. The behavior of a leader could be described as any mix of both dimensions (Ibid. p. 74).

This means that four quadrants can be used to show various combinations of these two dimensions as illustrated below.
Blanchard has suggested that, in general, a traditional school's instructional approach can be characterized as falling into the lower right hand quadrant. He said that any school that wants students to sit in rows, be quiet, and do as they are told, will fall into the high in structure and low in consideration quadrant. On the other hand, an alternative school which feels that it is important for students to select their own goals and methods for learning while teachers perform a supportive and reinforcing role will fall into the opposite category of high consideration and low structure (which is the upper left quadrant in the illustration).

Actually, both research and logic point to the conclusion that there are times when both of the above leadership styles are appropriate and times when neither style is appropriate. For example, in a study done in an industrial setting in Nigeria the results indicated that supervisors using high considerations and low structure got low production while high producing sections were directed by a high structure and low consideration style (Hersey, 1965). However, from studies in the United States, Rensis Likert concluded that the ideal productive leader behavior in industry is employee-centered (Likert, 1961, p. 9.) Obviously, these two findings conflict. Thus, Blanchard concludes,

A single normative leadership style does not take into consideration cultural differences, particularly customs and traditions as well as the level of education and the standard of living (Blanchard, 1972, p. 79).
Of course, it's only logical that no single leadership style is appropriate for all situations. For example, in an emergency, like a fire, people can't sit around discussing how to proceed (high consideration and low structure). On the other hand, in an university setting, professors might rebel if told exactly how to teach (high structure and low consideration). The professors would probably prefer to be left on their own (low structure and low consideration).

With this in mind, Reddin states that a useful theoretical model "...must allow that a variety of styles may be effective or ineffective depending on the situation (Reddin, 1967, p. 13).

Consequently, it might be best to try adaptive leader behavior.

The manager must be much like the musician who changes his techniques and approaches to obtain the shadings of total performance desired (Koontz and O'Donnell, 1959).

The more a manager adapts his style of leader behavior to meet the particular situation and the needs of his followers, the more effective he will tend to be in reaching personal and organizational goals (Hersey, 1967, p. 15).

This means that teachers should be flexible and adapt their teaching style and the instructional system to meet the needs of the individual learners. Such flexibility requires learning to discriminate between environments, learning to discriminate between behaviors, between persons, being able to radiate different environments, being able to move students from one environment developmentally to another, and being
able to give appropriate types of feedback that will be effective for each type of person (Hunt, 1971, p. 54).

Mosston (1972) see appendix) has analyzed the basic teaching styles (alternative ways of structuring instruction). He lists the basic styles as 1) command, 2) task, 3) reciprocal, 4) individual program, teacher design, 5) guided discovery, 6) problem solving, and 7) individual program, student design.

In the command style the teacher makes all the decisions. He makes the planning (pre-impact) decisions, the implementation (impact) decisions, and the evaluation (post-impact) decisions. The student simply does what is prescribed.

In the task style the teacher makes all the planning and evaluation decisions while the student makes time and place decisions (where and how long to work).

In the reciprocal style, planning and implementation is like the task style. This style is different in the evaluation stage, however. After the teacher sets the criteria for evaluation the students actually do the evaluating.

In the individual program - teacher's design, the teacher makes the planning decisions while the student makes the implementation and evaluation decisions adhering, however, to the teacher's content decisions.

In guided discovery the student makes some content decisions during implementation.
The teacher guides the student through small, sequential discoveries until the student discovers the focus, the goal, that the teacher has selected: The student is presented with a sequence of questions (or clues) so meticulously arranged that the student always discovers the correct response until the target is reached. This represents convergent thinking (Mosston, 1972).

The sequence of discoveries by the student are the subject matter details which represent the content decisions the student makes during implementation.

The problem solving style differs from guided discovery in that problem solving calls for divergent thinking. The teacher still makes decisions about what problems are to be tackled but the students are called upon to make decisions about alternatives in solutions. The process is open ended. Problems can produce new realizations, new insights, new solutions, new ideas, new knowledge--

...all done by individual students who have learned to make decision independent of the teacher's preconceived solutions and decisions (Ibid.).

Finally, in the individual program - student design, the student makes all decisions in a condition of independence. He designs the problems and asks all the questions.

Mosston believes both teachers and students need to become flexible in the use of all these styles. He believes a natural progression is from command to individual student designed program. This means that Mosston has identified the specific styles that would represent movement through Blanchard's four quadrants. Certainly, each of these styles would be an important characteristic to consider in designing an instructional system.
In review, this first part of the chapter on instructional systems design has focused on characteristics of the learner and the system. Since there are many learner characteristics upon which a teacher could focus, it is best to center on a purpose and the characteristics directly relevant to its attainment. About the relationship between learner characteristics and the characteristics of the instructional system Twelker has said,

There are not any empirical data that lend themselves to the formulation of an unified theory regarding interaction training methods and learner characteristics (Twelker, 1969, p. 11-35).

However, questions arise about grouping, group process, teaching style and structure. Theory and some research indicate that teachers need to be careful about grouping. The human aspects of a system need to be considered carefully. There are various models of teaching which can be grouped as to a general style which provide a certain level of teacher structure vs. student structure. Ideally, the style and structure of an instructional system should match the maturity of the students. Both the teacher and the students should learn how to work effectively using all the styles.

Once the general relationship between learner characteristics and the general system have been established, the teacher can then:

(3) Identify tentatively the relationship between, and general characteristics of, the way in which enroute objectives in the instructional system will be taught. This lets the designer match his tentative overall specifications for the system with each objective in the system (Twelker, 1969, p. 11-28).
Twelker presents a simplified example to illustrate what he means.

Let's suppose that a designer, upon review of his terminal objectives, decides to incorporate four general characteristics into his instructional system. (We could name many more, but these will do for now.) They are:

1. Learners will be responding actively during instruction.
2. Immediate feedback will be given through peers, and not the teacher.
3. Learners will receive a positive effective experience through interacting with each other.
4. Due to cost, media will not be used.

(Any similarity between this list of characteristics of the system and a simulation game are definitely not coincidental).

Now in Step Three, the designer takes a look at each enabling objective to determine the "fit" between the manner in which it might be best taught and the previously specified list of characteristics. This analysis might show, for instance, that one particular objective cannot be taught adequately in a simulation game. Perhaps media might be required. In this way, Step Three serves as a check against faults in characteristics specified in Step Two.

Another point should be made. The relationship between objectives and the components of the instructional system should be examined. For example, in an instructional simulation system, at least five general phases of instruction may be identified:

1. Pre-simulation system activities
2. Briefing
3. Conduct of the simulation exercise itself
4. Debriefing
5. Follow-up activities

In this case, the simulation designer should ask himself where a particular objective best fits in terms of these five phases (Ibid. p. 11-43-44).

Now, having analyzed the characteristics of the learner and the system and examined the match between the overall system and each of its separate parts, the teacher is ready to specify learning function, strategy and response.
Learning Function, Strategy, and Response

(4) Identify the type of learning function represented. Is it problem-solving or multiple discrimination or something else (Ibid. p. 11-30)?

For identifying type of learning function it would be helpful to have a taxonomy such that

...each objective could be classified into a category which is homogeneous with respect to the conditions fostering learning of that type,...(Ibid. p. 11-45-46).

Twelker indicates that "Several attempts have been made in specifying this learning taxonomy (e.g., Cotterman, 1959; Gagne, 1965; Miller, 1963; Altman, 1966) (Ibid.). He suggests a taxonomy adapted from Altman (1966).

Briefly, the taxonomy is as follows:

(1) Chaining or rote sequencing
(2) Discriminating or identifying
(3) Coding
(4) Classifying
(5) Discrete estimating
(6) Continuous estimating
(7) Logical manipulation
(8) Rule-using
(9) Decision-making
(10) Problem-solving
(Ibid.)

There are a variety of models and taxonomies that could be used for identifying learning function. One fairly simple model is the S.P.C.P. Model. This model suggests that learning begins with

...sensations, the products of stimulation of the sense organs, that is, any responses registered by the senses. The more the learner uses and combines his senses, the more the sensations are improved. Sensations are the "stuff" from which perceptions or impressions of experience with objects, events, qualities, or relationships are formed. That is, perceptions result from a
synthesis of separate sensory elements. It is important to note that many factors influence a learner's perceptions. Sometimes he perceives only what he has learned to perceive or only when his observations fit into a meaningful pattern. The perceptions of others might also influence his. As the learner gathers more perceptions, he begins to form concepts or abstractions of particular impressions organized into categories. When the learner is able to organize or chain relationships among concepts, he can formulate principles or generalizations (Weigand, 1972, p.142).

Therefore, the model presents the following learning sequence.

Sensations -- Perceptions -- Concepts -- Principles

It predicts that

If the learner has been deprived of sufficient stimuli, that is, if his interaction with the learning environment has been limited so that he has experienced few sensations, his perceptions will be restricted and probably inaccurate. This, in turn, will have detrimental effects on his concept and principle formation. (Ibid.)

Another classification system has been developed by Bloom and his associates (1956 & 1964). Their taxonomy is divided into three domains - cognitive, affective, and psychomotor, with each domain including several classes of behavior that suggest how information might be used. Here is a list of these categories in the cognitive domain, along with a definition of the thought processes involved in each.

Knowledge: Knowledge simply involves the recalling of specific items of information.

Comprehension: Comprehension involves more than knowledge.

For example, a person who comprehends something cannot only recall it, but can paraphrase it, review it, define it, or discuss it to some extent.

Application: The person who can use this thought process can do everything in categories (1) and (2) above. He can also demonstrate his ability to take information of an abstract nature and use it in concrete situations. It is this ability to apply information to new problems that makes the process unique.

Analysis: The essential ingredients of analysis include the breaking down of a communication into its
constituent parts, and revealing the relationships of those parts.

**Synthesis**: Synthesis is a word used to describe the process of pulling together many disorganized elements or parts so as to form a whole. It is the arranging, combining, and relating parts that makes this process unique.

**Evaluation**: Judgments about the value of materials or methods are evaluative judgments. This thought process requires many of the abilities of categories 1 through 5, as well as some abilities unique to category 6 (Fraenkel, 1973, p. 30).

For the affective domain the processes are:

1. Receiving. Receiving refers to the student's willingness to attend to particular phenomena or stimuli...

2. Responding. Responding refers to active participation on the part of the student. At this level he not only attends to a particular phenomenon but also reacts to it in some way...

3. Valuing. Valuing is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior...

4. Organization. Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system.

5. Characterization by a Value or Value Complex. At this level of the affective domain, the individual has a value system that has controlled his behavior for a sufficiently long time for him to have developed a characteristic "life style." Thus the behavior is pervasive, consistent, and predictable (Ibid. pp. 34, 35).

As of yet, a taxonomy for the psychomotor domain has not been developed by Bloom. Simpson (1966) and Harrow (1972) have attempted to create a taxonomy of the psychomotor domain. However, these taxonomies have not gained wide acceptance.
The ANISA model is based on the identification of basic learning processes in the psychomotor, perceptual, cognitive, affective, and volitional domains. A listing of these processes can be found in the appendix.

Another approach to classifying types of learning is presented by Gagne (1971). These are listed as follows:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Solving a novel problem to achieve a goal by applying one or more rules</td>
</tr>
<tr>
<td>Rule Using (Principle Formation)</td>
<td>Relating two or more concepts; performing an action based on a rule or chain of concepts</td>
</tr>
<tr>
<td>Classifying (Concept Formation)</td>
<td>Responding to things or events in terms of some common abstract properties to form a class; ability to generalize</td>
</tr>
<tr>
<td>Multiple Discrimination</td>
<td>Recognizing physical differences among stimuli and making different responses accordingly to them</td>
</tr>
<tr>
<td>Verbal Chaining</td>
<td>Combining words to form verbal responses</td>
</tr>
<tr>
<td>Motor Chaining</td>
<td>Demonstrating a series of related actions; learning motor skills</td>
</tr>
<tr>
<td>Stimulus - Response Learning</td>
<td>Giving a certain specific response to a specified stimulus (Weigand, 1972, p. 156).</td>
</tr>
</tbody>
</table>

As can be seen, there are many classification systems which can be used for identifying types of learning. A system should be selected which 1) suggests a developmental
sequence, and 2) is specific enough in description to enable observers to clearly identify the type of learning.

Once the type of learning has been identified the next step is to:

(5) Identify the instructional strategies that provide general conditions of learning. If general principles govern learning of one type or another, they must be identified (Ibid. p. II-30).

Generally, this means that once a teacher has identified the type of learning represented by each objective, he needs to identify the instructional strategy to be used by the teacher to help the learning take place. (Ibid., II-50). Gagne, in his book, The Conditions of Learning (1965) explains:

The requirements for instruction of principles whether practiced by a teacher, a film, or a textbook

Step One: Inform the learner about the form of the performance to be expected when learning is completed.

Step Two: Question the learner in a way that requires the reinstatement (recall) of the previously learned concepts that make up the principle.

Step Three: Use verbal statements (cues) that will lead the learner to put the principle together as a chain of concepts in the proper order.

Step Four: By means of a question, ask the learner to "demonstrate" one or more concrete instances in the principle.

Step Five: (Optional, but useful for later instruction) By suitable question require the learner to make a verbal statement of the principle (Gagne, 1965, p. 149).

Various teaching models have been developed which present strategies for providing conditions for learning. These are summarized in the appendix.

The next step listed by Twelker is:
(6) Specify the learner response(s). What is the learner supposed to do? What is the form of the response? What media are required? (Twelker, 1969, p. II-30)

In specifying learner responses a teacher must note (1) content, and (2) operation. Obviously, content refers to what information is to be learned. In addition to the content of a response a designer should state the form of the response. Twelker suggests that if a practice of knowledge is desired, the designer is free to use any of the following forms:

- **Overt** (An observable response)
  - Button pushing,
  - Verbal response, etc.
- **Selective**
  - Making a multiple-choice response on an answer sheet
- **Covert** (An unobservable response)
  - Mental response
- **Motor**
  - Pushing a button.
- **Vocal**
  - Saying or writing

(Ibid., p. II-54)

On the other hand, if practice of performance (application) is desired, a designer must also consider:

1. A real-life response to real-life stimuli (doing the task in the operational setting);
2. An enacted response (doing the task in a non-real life setting);
3. An iconic response (drawing what would be done in a real-life setting);
4. An analogue response (giving a non-corresponding response in a non-real life setting); or
5. A symbolic response (saying, writing, or choosing among given alternatives what would be done in non-real life setting) (Ibid., p. II-54-55).

In addition, the designer should consider what strategy might be used in the operation. For example,
A designer might be called upon to specify whether learner responses should be interspersed at the end of sub-units of a film, obtained only at the end of the film, or required at the end of some predetermined sub-unit based either on natural units or units stated in terms of the amount of demonstration material which could be assimilated and translated immediately into adequate or perfect performance (Ibid., p. II-58 drawn from Weiss, Maccoby and Sheffield, 1961).

Lastly, the designer needs to consider hardware requirements or what Twelker calls "Machine requirements." Does the student response involve any hardware of any kind? Obviously, this must be considered. This actually leads into Twelker's next step.

**Stimulus Situation, Feedback, and Context**

(7) Specify the stimulus situation. What is the occasion for the response, or what precedes the response in way of exposure to information or orientation? What form does it take? What media are required? (Ibid. p. II-30)

Once again, Twelker focuses on the two factors of 1) content, and 2) operation. Under content he points out that "...the stimulus situation represents various types of instructional messages or acts presented to the learner (Ibid., p. II-60)." He indicates that several functions may be served by these instructional messages. The functions are:

1) Orient the learner to the behavior desired (sensitize the task);
2) Shape behavior;
3) Assess whether the learning has occured (Ibid.)

There are at least six functions that are served by sensitization to the task:
1) Student interest is increased:
2) Student acceptance and commitment to the task is increased:
3) The student is oriented to policies, rules, procedures, purposes, and learning resources;
4) A topic is introduced, its importance is indicated, and an overview of the scope is presented;
5) Directions on procedures for use in subsequent learning activities are given;
6) Recall or prerequisite competencies are stimulated. (Ibid., p. II-61)

Also, there are several purposes served by instructional shaping.

1) Knowledge is presented;
2) Information about skills, e.g., the process of arriving at a solution to a problem, the process of forming a psychomotor skill, etc., is provided;
3) The learner is guided to subsequent steps in the performance of any response;
4) Closure to or a solution to a problem is provided;
5) Information required to solve a problem or make responses is provided;
6) A review or summary of information is provided;
7) Practice on a task is provided. (Ibid.)

The last function is assessment. "Assessment gives the instructor an opportunity to monitor the learner's progress. (Ibid., p II-62)"

Next, there are specific strategies and tactics that can be used to accomplish the various functions mentioned. Two strategies Twelker lists are (1) exposure to information; and (2) precipitation of performance (Ibid.). Exposure to information may be through 1) exposition or 2) illustration and demonstration. Exposition may include a) description, b) conceptualization, c) explanation, and d) evaluation, according to Twelker. Six descriptive techniques may be
used. 1) Analogy, 2) contrast, 3) example, 4) diagram or chart, 5) definition, 6) negation (Poletti, 1948). The second general strategy mentioned above was precipitation of performance. The two general tactics used are 1) inquiry, and 2) demand. Norris M. Sanders has derived seven types of questions that can be asked from the Taxonomy of Educational Objectives edited by Benjamin S. Bloom (1956). The types of questions Sanders lists are:

1) Memory, 2) Translation, 3) Interpretation, 4) Application, 5) Analysis, 6) Synthesis, and 7) Evaluation. (Sanders, 1966, p. 3)

Actually, Twelker's two tactics of inquiry or demand are probably close to Flander's categorization of direct and indirect methods. Twelker's demand seems to be the same as what Flanders means by direct. Twelker suggests that demand can be expressed four ways.

a) Demand for performance with suggestion, e.g., "I think it would be a good idea to finish the exercise on page 10."
b) Straightforward demand for performance accompanied by a cushion, e.g., "It may seem like hard work, but I'd like for you to complete the exercise on page 10."
c) Straightforward demand for performance, accompanied by an explanation, e.g., "If it hadn't been for the fact that we didn't get yesterday's work done, the assignment wouldn't be given. However, for tomorrow, complete the exercise on page 10."

The second important factor in specifying the stimulus situation is "operation." Twelker sees four things as important here:
1) the form of each message; (concrete, iconic, analogue, symbolic)  
2) anticipation of interactions between learners and/or teachers required;  
3) strategy used in terms of learning principles;  
4) machine requirements. (Ibid., p. II-65)

The form of each message is important. Edling (1966) suggests that "all senses can be employed to provide cues to the learner" with three-dimensional stimuli or concrete representations. Bruner (1966) says that iconic representation "depends upon visual or other sensory organizations and upon the use of summarizing images."

Iconic representation is principally governed by principles of perceptual organization and by the economical transformations in perceptual organization that Attneave has described — techniques for filling in, completing, extrapolating (Bruner, 1966, p. 11)."

The range of iconic representations has been indicated by Jack Edling (1966, p. 39. His list of representation ranges from "Motion pictures, with illusions of 3-d in color" to "Representational cartoon (minus color)." One of the other types of stimulus representation, analogue representation, requires "...that a learner have associations with the visual stimulus and the object it represents if the visual stimuli is to be associated with the object (Edling, 1966, p. 40)." Actually, analogue representation might be considered one kind of symbolic representation. Many times information is not understood because of the symbolic representation. Words and numbers are symbols. Sometimes lectures fail because the "jargon" is not understood. Many math teachers forget they are teaching another symbol system. This is
often times why a course in statistics is difficult.

In more concrete terms, a teacher needs to choose whether to use a movie, film strip, audio tape, reading material, simulation game, group discussion, lab experiment, demonstration, some form of lecture, or multi-arts experience. Each choice is appropriate for different needs. Each medium requires special skills in its proper use.

Hudgins (1971) summarizes what he believes to be two important ways of approaching the problem: "Reception Learning," and "Discovery Learning." Basically reception learning means that information is organized and presented to students. Discovery learning means students explore more direct experience to gather information for themselves. Traditional textbooks used to present information for themselves. Traditional textbooks used to present information in a very organized way so that everything important was presented for the students to learn. All the student had to do was remember what he read. Some newer textbooks, like Discovering American History by Kownslar and Frizzle (1967) present primary and secondary sources. Students read the original sources and draw their own conclusions. Hudgins says, "There appear to be excellent reasons for believing that sometimes one, sometimes the other kind of learning is better suited to the needs of learners (Hudgins, 1971, p. 44)"

Often, the tremendous variety of stimuli that a teacher
can use for direct experience in a classroom is not realized. Multi-arts experiences present stimuli that help children grow in many ways.

Multi-arts experiences provide children with opportunities to explore. Also, they aid in psychomotor, perceptual, cognitive and affective growth. The child is also helped to develop creatively through multi-arts experiences. They help a child to learn about himself and give him opportunities to express himself.

The Experimental Arts Program at Southern Methodist University has found that the multi-arts can help children with many different kinds of problems. Children who usually stutter don't stutter when they are talking through puppets. Puppets, therefore, have become a useful aid in helping children who were severe discipline problems who became involved in making monster costumes. When they were finished, they put on the costumes and acted like monsters. From this followed a discussion of what it was like and how it felt to be a monster. They talked about how people reacted to monsters and how monsters were treated. The conversation came around to the idea that each of these boys was a monster in his own way. Parents were brought in to discuss the effect of these monsters (boys) at home. The boys were relieved and fascinated by the insights they gained from the exchange of information precipitated by making costumes. The costumes provided a stimulus and means for getting at a very important
problem. Gestalt Art experiences have helped older children develop awareness through personal insights achieved by projective kinds of techniques.

In review, there is much more than textbooks and films that can be used for stimuli.

Next is presented a discussion of Twelker's eighth step.

(8) Specify feedback for each instructional event. How are you going to tell the learner that his response is correct? What will you tell him? (Twelker, 1969, p. II-30)

The content of feedback may be of four types:

1) information presented to the learner about the appropriateness of his response;
2) information presented to the learner that is primarily intended for an effective response from the learner;
3) information about the actual correct response;
4) information about the rationale or reasons for the correct response; (Ibid., p II-71).

This information may be presented via 1) signal (non-verbal expression, gesture, etc.), 2) word (verbal), 3) objects (M&M's). Generally, some important techniques suggested by Bany and Johnson are:

1) Appraisals should be honest and positive.
2) The whole classroom group should also be examined for good points.
3) Favorable assessments should be communicated directly to the group.
4) Statements of facts regarding behavior are better than expressions of teacher feelings.
5) Favorable evaluations should relate to behavioral characteristics and not personal attributes.
6) Avoid qualifying statements like "You did well today." This implies they didn't do well some other time. (Bany and Johnson, 1970)

The teacher needs to consider a) the form of the feedback message, b) the interactions between learners and/or...
teachers required, and c) the strategy used in terms of principles of instruction. These considerations simply raise the point that the teacher can't always be around to give feedback, and the learner better learn to gather information from his environment so he can correct himself. (Bruner, 1966, p. 70). The student may also get information from learner-learner interaction. Flander's view of indirect teaching may actually suggest a way to direct a learner to other environmental factors besides the teacher.

In considering strategy the question of when, how, what type, and in what quantity feedback should be given arises. If feedback is viewed as being similar to, or at least a kind of reinforcement, then, some answers may be suggested by "Behavior Modification" theory (Millenson, 1967). Feedback can be thought of as a type of reinforcement if White's theory of "competence motivation" is accepted. White believes that the central motive in the growth of children is not food, thirst, physical, or other kinds of drive reduction, but effective interaction with the environment. (White, 1959, p. 318). Since effective interaction (competence) is sought, and can only be achieved through utilization of feedback, it could be considered that feedback would be desired (reinforcing) by the child. If this is the case, reinforcement theory then speaks to the question of quantity and timing of feedback. First of all, there are various kinds of
schedules of reinforcement that can be used: 1) every response can be reinforced, 2) reinforcement can be at fixed time intervals, 3) reinforcement can be at random intervals, 4) reinforcement can be scheduled at variable time intervals, or 5) the schedule can have a uniform probability of reinforcement.

In effect:

A schedule is a set of rules specifying: (1) when to establish a reinforcement contingency; (2) how long to keep it in force; and (3) what probability of reinforcement value to assign to it (Millenson, 1967, p.149)

If a student is reinforced (or given feedback) for every response he becomes very dependent upon that reinforcement. If it is stopped he stops responding. If the student is reinforced only at fixed time intervals he doesn't respond in between intervals. For example, students who are only tested and given grades once a semester may loaf until just before the test and then cram like crazy. Reinforcement as a random-interval produces a stable and uniform overall response rate. A probability schedule generates extremely high response rates (Brandauer, 1958). In addition:

Intermittent reinforcement, when compared to continuous reinforcement, leads to a substantial increase in the resistance to extinction of the selected response. Thus, reinforcement schedules provide an important technique for increasing behavioral persistence (Millenson, 1967, p.151).

In this way, intermittent reinforcement facilitates the development of perseverance. It makes a student less dependent upon continuous reinforcement from the teacher. Also, "Schedules of reinforcement are very obviously procedures that manipulate rates of response...schedules affect such
behavioral properties as topography of response, magnitude of response, the sequential order of responding, and so forth (Ibid., p. 153). Responding was found to be

...extremely stereotyped under continuous reinforcement, somewhat more variable during uniform probability contingencies, and maximally variable in extinction (Millenson, Hurwitz, and Nixon, 1963).

The data appear to support the generalization that variability of behavior appears to increase progressively under the conditions of continuous reinforcement, intermittent schedule, and extinction, in that order (Millenson, 1967, p. 154).

In general, therefore, effective scheduling would include, 1) starting with immediate reinforcement of every response, 2) shifting to intermittent reinforcement, 3) slowly increasing the average length of time between intermittent reinforcements until reaching a point approximating the natural random reinforcement of the environment.

As indicated above, behavior modification theory gives some information about the timing of reinforcements. It also gives information about the type of feedback that will be effective. Reinforcements can be either primary (unconditioned) or secondary, (conditioned). Much of the feedback in the classroom will be secondary. This means that it is learned. So, the instructor must find out if the student has learned enough for the feedback to be reinforcing. For example, some students are not sensitive to social cues such as smiling or praising. Therefore, a teacher praising a
student will not be reinforcing to that student. Some students have not learned that their behavior affects consequences. Therefore, natural consequences will not be effective feedback to change their behavior. Sometimes students cannot discriminate out relevant stimuli from the environment, so presenting the environment, or a representation of the environment (i.e., a video tape replay) will not be effective feedback.

Obviously, the kind of feedback that will be effective is dependent on the student and the situation. As Flanders has pointed out, clarity of goals is important in determining whether to use indirect or direct feedback. Rudolph Dreikurs suggests using natural consequences as much as possible if appropriate.

Robert W. White sees competence motivation as another variable to consider. A student's feeling of competence will affect the kind of feedback he needs.

Whether a child's sense of competence is strong or weak depends on his successes and failures in the past. If his successes overshadow his failures, then his feeling of competence will tend to be high. He will have a positive outlook toward life, seeing almost every new situation as an interesting challenge that he can overcome. If, however, his failures carry the day, his outlook will be more negative and expectancy for satisfying various needs may become low. Since expectancy tends to influence motives, people with low feelings of competence will not often be motivated to seek new challenges or take risks. These people would rather let their environment control them than attempt to change it (Blanchard, Hersey, 1972, p. 34).

The competence motive reveals itself as a desire for task mastery and growth.
Achievement motivation may be another variable to consider. According to David C. McClelland, some people have an intense need to achieve.

...achievement-motivated person is...more concerned with personal achievement than with the rewards of success... He gets a bigger "kick" out of winning or solving a difficult problem than he gets from any money or praise he receives.

A desire by people with a high need for achievement to seek situations in which they get concrete feedback on how well they are doing is closely related to this concern for personal accomplishment...the nature of the feedback is important to achievement-motivated people. They respond favorably to information about their work. They are not interested in comments about their personal characteristics, such as how cooperative or helpful they are. Affiliation-motivated people might want "social" or attitudinal feedback. Achievement-motivated people might want task-relevant feedback. They want to know the score. (Ibid., p. 36).

Much can be said about feedback and reinforcement. Two more points need to be emphasized. First, it is important to move students off artificial, external feedback and shift to natural environmental forms of feedback and reinforcement. Much research has indicated that external (contrived) feedback and reinforcement leave a person dependent upon that kind of feedback. If it is taken away, the person quits.

Secondly, content of the feedback must be carefully considered. Too much negative information becomes punishing rather than reinforcing. Also, the values inherent in feedback need to be checked. These two factors taken together can influence results. For example, trainers of seals have used reinforcement schedules to train their seals to do a trick. Consequently, the seal could do one trick until he was trained
to do another. However, by changing the feedback content of the reinforcement the trainers were able to get the seal to make up his own tricks and become highly creative. Instead of reinforcing the seal for doing the trick taught him, the trainers refused to toss the seal a fish until he performed a different trick. The behavior reinforced was "doing something different." Soon the seal had run the full repertoire of what seals normally can be expected to do and invented tricks his trainers never dreamed of, or thought possible.

After consideration of feedback, Twelker suggests:

(9) Specify the required or permissible context of instruction. In what environment does all this take place?

In specifying the context of instruction, Twelker suggests examining 1) Organization and physical characteristics of the learning space, 2) Hardware, and 3) Number of learners, 4) Learner grouping (Twelker, 1969, p. II-78-80) To this needs to be added, social and psychological climate.

In arranging learning space, Twelker suggests notation of

a) Space available per learner...
b) Type of furniture...
c) Air conditioning – includes heat, cooling, humidifying and dehumidifying, air purifying, etc.
d) Ventilation
e) Lighting
f) Proximity to other locations that are deemed desirable and necessary to support instruction (Ibid., p. II-79).

Under hardware Twelker refers to materials, devices, and systems that store or transmit instructional messages.
As noted, Twelker also suggests looking at the number of learners. As mentioned earlier, small groups are effective up to about seven members. Also, individualized instruction allows students to pursue their own interests at their own pace, but must be interspersed with group interaction. Adolf Hitler, a very effective controller of groups and individuals, refused to work with medium sized groups of from fifteen to forty members. He claimed that it isn't possible to relate to them as individuals, and yet, they aren't big enough to behave like a group (Hitler, 1944).

It seems that people tend to behave one way as individuals and another in large groups. In small groups it is possible to interact with the members as individuals. However, in medium sized groups, members are still individuals psychologically, but can't be treated as such, while in large groups the members feel they are part of a group and can be treated accordingly. This theory suggests that films and lectures be given to groups as large as can still receive the information, while discussions should be limited to groups of no
more than seven.

Another factor mentioned by Twelker about context is consideration of learner grouping. This has already been discussed to some extent. However, further discussion is needed. Grouping is often used to provide for differing learner characteristics. The pros and cons of grouping have been argued for many years. Evidence of research has always seemed inconclusive. In the light of the inconsistent and inconclusive research in the history of this topic, one of the closing comments of a careful study conducted by Borg becomes representational of the problem of trying to draw conclusions on this issue.

The personality data for slow pupils were characterized by a complete lack of consistent differences favoring either treatment. The lack of significant differences on aggression, depression, and inferiority feelings found in the projective phase of the personality study leads us to question some of the dire consequences that have been predicted by critics of ability grouping (Borg, 1965, p. 92).

Another slightly more recent study was summarized as follows:

At least until such times as procedures for more completely individualized instruction become incorporated into school policy and teacher preparation, schools will continue to rely on various kinds of grouping in their attempt to differentiate instruction. It is, therefore, essential to recognize that no matter how precise the selection of pupils becomes or how varied and flexible the student deployment may be, grouping arrangements, by themselves, serve little purpose. Real differences in academic growth result from what is taught and learned in the classroom. It is, therefore, on the differentiation and appropriate selection of content and method of teaching that the emphasis must be placed. Grouping procedures can then
become effective servants of the curriculum (Goldberg, Passow, and Justman, 1966, p. 169)

In analysis studies on grouping by Atkinson and O'Connor (1963) Bryce B. Hudgins (1971) states that the results are "highly tenuous and not easy to accept, since we would expect similar trends to occur in the absence of special treatments (Hudgins, 1971, p. 223). These results bring to mind some comments by Andrew Weil.

He says:

I want to stress the criterion of "usefulness" in evaluating concepts. The aim of scientific inquiry is not to reveal absolute truth but to discover more useful ways of thinking about phenomena. Our ways of thinking... leave us unable to describe, predict, or control the phenomena... Insoluble problems of this sort always indicate erroneous, useless concepts. I believe we can literally think our way out... by changing the concepts... the outmoded ways of thinking... (Weil, 1972, p. 53).

Perhaps the concept of grouping as a solution for meeting individual differences is not useful. Today, schools are moving toward open flexibility. Alternative schools like the Wilson Campus School in Mankato, Minnesota, have ungrouped students from Kindergarten to the twelfth grade. Joseph Schulze, the director, claims that the present non-graded program was initiated by the administration refusing to schedule students into classes, to give teachers assignments, or to accept grades. Kids decide what they want to do and make out a contract with a teacher. Teachers still offer instruction, but they get whoever decides they would like to come. Attendance is not compulsory. If no one comes,
the teacher adapts. This school obviously is not grouping anyone – even by age. Of course, this is only one example of one approach to individualized instruction. The important point here is that individualized instruction is another way to meet individual differences.

However, it mustn't be forgotten that students still need to belong to groups. In schools like the one mentioned using individualized instruction, groups may be formed by interest, common need, or because of similar goals. In these cases, the groups are flexible. If students choose to work with people of different ages, they can. If, as Piaget and Kohlberg suggest, some students can be influenced to progress to a higher developmental level through exposure to people on the higher level, they are free to be influenced. Certainly, if some students seek structure while others seek exploration, as Hunt suggests, it is still possible for these students to get separated out. The benefit of individualized instruction is that students can be identified at different times according to different needs. Some needs can be focused for some students, while different needs are focused for others. Therefore, some may be grouped for interest, others because they require structure.

Yates, under the sponsorship of UNESCO (1966) edited a volume of reports on grouping in education. He commented that grouping in schools seems to reflect the values and aims of the community. In effect, the school is a replica of the society.
In general, we would expect that the school system oriented to adaptive changes in society would have: the greatest variety of pupils, the greatest overlap in the use of facilities, and the largest number of functions carried out interdependently. The school whose aim is to maintain the status quo would show the greatest isolation between groups, the least sharing of facilities, and the minimum of contrast among members of different groups (Yates, 1966, p. 94).

It seems that grouping must take the aims and values of the society in account. Individualized instruction as described above might be disastrous in certain cultural settings.

Another contextual factor is the social-emotional climate. Thought should be given to developing cooperation and positive self identity.

In order to foster growth, a human environment should promote cooperation and concern for others. Sue Theroux (1973) summarizes the factors that support the development of cooperation as 1) Trust, 1959; Benton, 1969), 2) obedience to norms of social behavior, 3) Communication (Ibid.) 4) previous common experience (Harrison, 1965), 5) Shared goals (Sherif, 1953) 6) Shared rewards (Nelson, 1969), 7) Necessity of mutual assistance (Ibid.).

In addition, the following list of helpful environmental factors can be derived from Bany and Johnson (1970).

1. The feeling that the group is a good group is more influential in determining unity and cooperation than members liking each other.

2. Unity increases if communication and interaction are encouraged.

3. Acceptance of common goals increases unity and cooperation.
4. Everyone must feel equally an important part or of equal status for a group to be attractive. Cliques and high and low groups make groups unattractive for this reason.

5. It is important to consciously begin to develop unity on the first day.

6. Teacher must provide leadership in focusing and clarifying in problem solving otherwise a group may split into factions or members may become dissatisfied. Leadership style affects morale. Autocratic dictating lowers morale and so does non-structured-no assistance leadership.

7. Small flexible groupings enhance status of individuals.

8. Friendly, supportive relationships are more important to most students than individual achievement.

9. Children only wish to belong to a group if it is attractive. This means that it is possible to have children in a group who do not wish to belong or care whether they are accepted by other members of the group or not.

10. There is more unity and task motivation when the group as a whole receives favorable evaluations than if individual members receive comment on individual performance.

11. It is possible to have low morale even though each child is highly motivated, has abilities needed to achieve, and possesses a healthy attitude. (For example, in competition, each child may wish to be first and this weakens both unity and cooperation.)

Debilitators

1. Unity will decrease if a hierarchy is established. Teachers should be careful with individualized instruction to make sure students don't attain different levels of status. Ability groupings, students teaching students, could cause some students to have a higher status and others to have a lower status.

2. Competitive practices may decrease unity and cooperation.
3. Unity will decrease if there is too little communication and interaction.

4. Unity will decrease if individuals disagree on how to solve problems.

5. A decrease in unity can be caused by some unattractive individuals in groups.

6. Non-cooperation and non-support of individual effort results in poor group morale.

7. Anxiety caused by disapproval, demands that are too great, or poor teacher methods, cause a lowering of morale.

8. In a crisis, if no solution can be found, morale decreases; if a solution is found, morale increases. (Bany and Johnson, 1970)

In considering factors that influence self identity, the human environment mentioned above will be very important. Basically, self identity is influenced by opinions and attitudes of others, and by success or failure experiences. Teacher attitudes are very influential in the development of self image. Rosenthal and Jacobson (1966) investigated the effects of teacher expectancies on learning. Children selected at random from a sample group were purported to be intellectually blooming when they weren't different from comparable students in the sample. Teachers were led to believe that the children would show tremendous gains in the next few months. Eight months later these same children showed gains in I.Q. while the rest of the "non-bloomers" didn't. Rosenthal and Jacobson concluded that the children who gained felt different expectations from their teachers.
In the business setting, Likert (1961) found that a subordinate usually responds well to a superior's high expectations and confidence. Blanchard and Hersey summarize it in this way.

High expectations result in high performance, which reinforces the high expectations and produces even higher productivity. It almost becomes a spiral effect...
This spiraling effect can also occur in a downward direction. Low expectations result in low performance, which reinforces the low expectations and produces even lower productivity. It becomes a spiral effect like a whirlpool... (Blanchard, Hersey, 1972, p. 150-151).

Of course, a student's expectations are influenced not only by the expectations of others, but by the sum of his past experience. This indicates the need for success. When a child first comes to school,

...in his mind, a child is what his mother and father think he is. He is smart, clever, generous, dull, or awkward as they relate to him what they feel. He is pleased with himself, confident in coping with new tasks, anxious to take the initiative to learn anew each day, if his parents have reflected these feelings and expectations to him.

In the first few years of school, identity is still based primarily on the sense of mutuality between child and adult. Teachers are parent figures to the child...The child's so-called self, his identity, is inextricably bound up in his imagery about who his teachers think he is and what they think he is fitted for. (McNassor, 1965, p. 19).

However, the child's identity base is widened in school.

He is now a worker...There are jobs to be done, skills to be mastered independently, so what he is now will no longer amount to just being himself... (Ibid.)

Erik H. Erikson refers to this as the stage of "Industry vs. Inferiority." This is when:
I am what I learn. The child now wants to be shown how to get busy with something and how to be busy with others...he now learns to win recognition by producing things. To bring a productive situation to completion is an aim which gradually supersedes the whims and wishes of his idiosyncratic drives and personal disappointments...The danger at this stage is the development of a sense of inadequacy and inferiority (Erikson, 1959, 50-101).

It is clear then that classroom planning for successes in learning and teacher attitudes toward the child's potentialities to learn are matters of urgency in identity formation in childhood. A child who is not working at least half of the time toward skill mastery and the manipulation of concepts in the study materials must be viewed as in critical danger...he is paying a frightful price in self-depreciation (McNassor, 1965, p. 20).

So, a positive self identity can be formed through positive attitudes on the part of adults, and through success experiences. Below are listed some helpful attitudes and beliefs.

1. Look at a child as a changing, growing, maturing person who need not be and will not be tomorrow what he is today.

2. Exploit the child's urge to learn by prizing his learning as it is found, whether it be found in small drops or large pools.


4. Look carefully at the differences between boys and girls related to achievement and acceptance in the early grades.

5. Provide many opportunities for all children to express their ideas and feelings.

6. Use tests to diagnose each child's achievement...rather than to label children or data to be filed.

7. Stress strengths on which to build.

8. Search for ways to uncap the spring of creativity in the silent child, the fearful child, the withdrawing child.
Recognize that a little extra love and attention can often be enough to "save a child."

Avoid ridicule, sarcasm, and other weapons with which adults can diminish the child in his own eyes and those of his peers.

Face the fact that all children have problems some time, while some children live with the same problem every day all day. (Fertschneider, 1965, p. 90).

Kelly adds:

1. Human beings are the most important things in the world.
2. Children are people.
3. Each person is unique.
4. When any human being is lost or diminished, everybody loses.
5. Our children are all right when we get them.
6. Every human being can change and change for the better as long as he lives.
7. No one of any age does anything with determination and verve without being involved in it.
8. How a person feels is more important than what he knows.
9. Freedom is a requirement for humanness.
10. All forms of exclusion and segregation represent the evil use of power and are evil.
11. All forms of rejection are evil.
12. Our task is to build better people. (Kelley, 1965, p. 7-14)

In speaking of successes, there is, of course, success in human relationships, and success on tasks. Obviously, establishing cooperation and concern for others in the classroom is important for establishing success in human relationships. In order for there to be success on tasks, the tasks
first of all have to be meaningful to the student. If a student isn't involved, motivated, or interested, then accomplishment of the task won't mean anything to him. Joel Levine (1972) stated that "The generation of personal meanings is the process of the education of the self." Arthur Jersild has written that..."the crucial test in the search for meaning in education is the personal implication of what we learn and teach... ...helping the learner to relate himself to what he is learning in a meaningful way (Jersild, 1955)."

Another important factor in helping a child attain success experiences is to guide him to tasks for which he has mastered the prerequisites. Also, the intellectual leap required of him should be small enough that he can manage it. The task should be of fairly short duration and offer immediate concrete feedback so that the student's accomplishment is obvious. As the student progresses, tasks can be made more challenging by requiring more time. Children enjoy working on concrete visible projects which they can share with other students. At least some of the time students should be able to demonstrate their skill to others and get recognition - but only when they are ready.

All of this means that the teacher needs to be careful in selecting materials and projects. There needs to be a great diversity of materials on many different levels. Here individualized instruction using the principles of programmed instruction can be helpful.
The first principle of programmed instruction is that the instructional task be based around behavioral objectives. In this way both the student and the instructor have a concrete basis for determining what is expected and what the results are. A second principle suggests that instruction be validated. This means that it be established that the materials accomplish their instructional purpose for the type of student and level intended for 90% of the students. Other principles are that students should be actively involved, receive immediate knowledge of results, and be able to work at their own pace. This indicates that the instruction should be student centered.

Unfortunately, many people have formed negative connotations about programmed instruction because of some of the first poorly written linear programs. Today, programmed instruction may include films, simulation games, projects, discussions, readings, lectures and a variety of interactions based around the principles listed above. It is interesting to note, however, that many so-called "slow students," who have not had many success experiences, enjoy working on the step by step paper and pencil linear programs because they are able to be successful.

Basically, programmed instruction (PI) may be defined as, "a planned sequence of experiences leading to proficiency..." (Espich, Williams, 1967, p. V). Its advantages are:

1. Speed.
2. Flexibility. Training can start anywhere, anytime, and continue 24 hours a day.
3. Consistent results.
4. Enhanced role for teachers. Programmed instruction
can free the teacher from the chores of routine instruction, exercise setting, and marking. Thus the teacher can spend more of his time giving individual guidance and special help (Rowntree, 1966, p. 4-5).

Generally, there are nine learning principles which good programs follow to promote success.

1. The student must be motivated to pay attention.
2. He must be led to the learning goal through a sequence of small steps.
3. The teaching must adapt itself to the needs of the individual student.
4. The sequence of instruction must challenge the student.
5. The student must be given immediate and continuous knowledge of results.
6. The student must be an active participant rather than an active reader.
7. He must be led to discover principles for himself rather than simply be told of them.
8. Meaning must be stressed more than manipulation.
9. Practice must be used chiefly to promote overlearning. (Ibid., p. 48-49).

The role of the teacher in programmed instruction becomes slightly different than in traditional programs. Of course, the teacher's role is still similar in many ways.

1. Administrator (manager of the learning environment). The teacher has to provide enough materials, see that work is corrected, diagnose, provide alternatives, prescribe follow up activities, and do the bookkeeping.

2. Presentor. The teacher must introduce materials, circulate to answer questions, direct follow up discussion, lead in the creation and stimulation of ideas, and may work one to one. Materials generally present information, but there is more to education than information.

3. Student-teacher relationships. Because the teacher is no longer the central disperser of information he is now free to help individuals. He is free to humanize instruction. He isn't forced to work with groups unless he chooses to. He is freed from routine.
4. Teacher-test relationship. The teacher has criterion tests to use. These are diagnostic tools. They help guide instruction.

5. Testing. The teacher is testing the materials and program instead of the students.

Basically, there are four approaches or kinds of programmed instruction.

1. Linear programming was developed by B. F. Skinner. This was the first programming and is what most people think of when they think of programmed instruction. It uses small steps, requires immediate answers for each step, has a lot of repetition, and requires everyone to go through the same presentation. It takes time and is generally boring.

2. Discrimination frame also takes everyone along the same path but it requires covert thought. It gives larger amounts of information and checks thinking with multiple choice questions. Sometimes it uses a "Gate" technique of giving pre-tests before sections so that they can be skipped over if already understood. This type of program is less boring and moves much faster.

3. Branching was developed by Norman Crowder around 1954 when he was asked to investigate the training of aircraft maintenance men. It presents large steps, right and wrong answer pages, remedial referral, and a scrambled test. Basically, then, it provides for multi-tracked instruction.

4. Adjunct programming refers students to other materials. This is the cheapest and easiest method of programming. It gives directions to read other materials, therefore, uses conventional materials, and then provides questions on the conventional material.

The current techniques listed above attempt to apply the principles originally listed. Probably the two most basic ideas behind programmed instruction are, 1) active
involvement, and 2) reinforcement. The student first needs to focus on a goal to attain, and then needs to become actively involved in its attainment. Direct feedback provides reinforcement for the learner and a feeling of success. "There's nothing very rewarding even about success, when that success seems to depend entirely on the actions of other people (Rowntree, 1966, p. 39.)" Programmed instruction must be challenging and the learner must receive immediate knowledge of results.

In the words of Froebel:

To have found one-fourth of the answer by his own effort is of more value and importance to the child than it is to half-hear and half-understand it in the words of another (Ibid., p. 43).

Sequence

In step ten, Twelker states:

(10) Specify the appropriate sequence for each instructional component to ensure optimal mediational effects from one component (i.e., response, stimulus, or feedback) to another. How responses, stimuli, and feedback are put together can't be ignored (Twelker, 1969, p. II-30).

In considering sequence, Richard Allan suggests six possible sequences that might be appropriate.

1) Order of steps inherent in a task
2) Logical, chronological
3) Psychological
4) Whole-part-whole
5) Simple to complex
6) Random
In teaching a person how to water-ski, for example, an instructor might tell the student to 1) squat down in the water, 2) place the ski rope between his legs, 3) straighten arms, 4) lean back keeping skis parallel and tips out of the water, 5) bend legs and be prepared to hold position while pushing against the water, 6) let the boat pull you up, 7) once up, straighten back, keep arms straight, legs slightly bent. This sequence of instruction is in the order of steps to be taken in the task (1).

A chronological sequence might be taken for U. S. History.

In teaching music appreciation to junior high students a psychological sequence might be used by beginning with "rock" music and then relating different elements and styles to their precedents in the historical development of music.

Meanwhile, the music teacher might teach dance using a whole-part-whole sequence. First, the teacher would show the students the new dance and then break it down into its component parts, and when the students have mastered the various parts they would put the whole dance together. Drama teachers often use this sequence by having students read and discuss the whole play, then rehearse each scene, and then put the whole thing together.

Reading might use a simple to complex sequencing.

Random sequencing might be illustrated by random exploration and trial and error. Some people suggest that creative writing in high school should be taught using an
approach which has a random sequence inherent in it. The suggestion is that the students should just be asked to write every day without the writing even being corrected or read by the teacher. When the student finally writes something that he likes, then, he takes it to the teacher. The teacher reads it and points out whatever strengths there are and has the student place it in a folder. In using this approach, whatever the students learn is not going to be in any particular sequence.

After specifying characteristics of the learner and the system, learning function, strategy, and response, stimulus situation, feedback, and context, and sequence, Twelker suggests:

For each instructional sub-system and instructional system as a whole,
(11) Specify the required or permissible context of instruction, considering the relationships and specifications previously identified. Now that the instructional conditions for each objective have been specified, take a new look at the tentative specifications listed from steps 2 and 3. Adjust accordingly (Twelker, 1969, p. II 30-31).

This step is one of looking over the whole instructional system that has been planned and searching for discrepancies.

(12) Specify the appropriate sequence of all instructional units to ensure optimal mediational effects from one unit and one sub-system to another. Once this is done, sit back and relax. If you have done your job well, your blueprints can now be used by someone else or yourself to build an instructional system (Ibid.).

This completes the designing of an instructional system. It has involved planning for learner characteristics, characteristics of the instructional system, the relationships...
between characteristics, learning function, instructional strategies, learner response(s), stimulus situation, feedback, context, and sequence.
CHAPTER V

FACILITATION OF HUMAN INTERACTION

According to Flanders (1971):

Good teachers are good because they view teaching as primarily a human process involving human relationships and human meanings...(Flanders, 1971, p. 172).

Certainly, everything a teacher accomplishes is based upon his ability to facilitate and maintain effective human interaction and direct it toward goals.

Bany and Johnson (1970) define facilitation as the managing process of organizing and coordinating the willing efforts of children to achieve their own and educational objectives. Facilitation consists of

...those patterns of teacher activities which assist the group in working out shared objectives, in building internal group unity, and in gaining cooperation for meeting organizational needs and objectives (Bany & Johnson, 1970).

Facilitation depends upon an ability to 1) create the conditions for work, 2) establish behavior standards and discipline, 3) promote effective communication, 4) handle conflict and direct change, and 5) counsel individuals.

Creating Conditions for Work

One of the teacher's first tasks in the classroom is to create the conditions which will enable students to work. Students need: 1) physical materials and tools, 2) freedom
from tension and fatigue, 3) adequate time, 4) social conditions and work organization, 5) emotional security and freedom from threat, and 6) good morale with a sense of positive direction, mutual support, sense of contribution, progress, and challenge. This will require, among other things, consistency, empathy, respect, concreteness, and leadership in resolving conflict, restoring morale, and helping meet and adapt to changes in the environment. If conflict can be handled constructively the process of resolving the conflict can strengthen group cohesiveness and cooperation. Morale must be maintained or otherwise the group compensates. This necessitates direction and action on the part of the teacher.

Student leaders must be utilized effectively also. However, if the teacher tries to assign leaders and give them power, he will isolate them from the group. Natural student leaders have influence because of their ability to represent and meet the needs of their peers. (Ibid.).

The key factor in the creation of all these conditions is the establishment of an emotionally sound climate. Educational settings can have basically four types of climates in terms of the emotional factor: climates of affection, rejection, inconsistency, and over-protection. In a relationship of affection a child:

...learns that he can depend upon others for support
and help. Such a child gains a certainty of his own worth and thus is freed from his own anxiety. He is able to express affection for others and to work to progress toward growth and maturity. In short, his interactions with others confirm and reinforce his conception of his own value, thereby providing himself with a firm feeling of security (Perkins, 1969, p. 112).

In an atmosphere of rejection the child feels uncertain of his own worth and:

...consequently, feels threatened, anxious, and in constant conflict. Burdened by these emotions, he cannot make optimum progress in learning and development and often behaves aggressively. Thus, the child who tries intentionally to hurt others or himself or behave in other ways which are sure to result in punishment is really grasping for crumbs of attention as a substitute for the affection or acceptance he has been unable to secure. Such a child is emotionally crippled: he has simply not learned that he can gain love and acceptance by socially acceptable behavior. (Ibid.)

In a relationship of inconsistency:

On some days the parent (or teacher) may be over-indulgent, generous, and affectionate toward the child: at other times, for no apparent reason, the parent (or teacher) may be critical, punishing, hostile, or rejecting. This inconsistency deprives the child of adequate perceptual cues to the behavior desired of him. Not knowing for sure how this parent (or teacher) will respond to his behavior in any given situation, he becomes anxious and immobile. Although he is loved and valued at times, the overall inconsistency of the treatment he receives from his parents creates within the child an uncertainty and a fear of taking changes - qualities that are inimical to learning and the development of a well-integrated personality (Ibid. pp. 112-113).

Another harmful relationship is produced by over-protection which consists of:

...establishing no firm or realistic limits for their behavior or acceding to their every whim. As a result, they become overdependent and self-centered and gain a distorted perception of their own importance (Ibid. p. 113)
Certainly, then, it is important for a teacher to strive to establish a relationship of affection rather than of rejection, inconsistency, or overindulgence. It is only when the proper emotional tone for work is provided that a teacher can begin to help a class group institute behavior standards and discipline.

Establishing Behavior Standards and Discipline

When a teacher establishes relationships based on behavior standards and discipline can be established. Discipline implies a standard of behavior. Bany and Johnson (1970) define a standard as "...a commonly accepted understanding of what is appropriate behavior in certain specified situations (Bany & Johnson, 1970, p. 177)." Standards are not restrictions on freedom of behavior, but guidelines as to appropriate behavior. The intent of standards is to allow each child the most possible freedom of action for himself without infringing on the rights of others. They provide for an economy of operation and reduce problems. As viewed by Bany and Johnson standards are not a list of prescribed ways of behaving which are punishable if not followed. Instead, they are desirable ways of behaving toward which to work (Ibid.).

In cases of extremely emotionally troubled children, the teacher should take steps to assist the class groups to tolerate and accept the individuals who behave in extraordinary ways. The teacher must enable groups to tolerate
differences, as well as assist the disturbed child to understand his behavior and the consequences. (Ibid. p. 67)

In addition, it should be realized that when children work together face to face, problems are bound to come up no matter how good the group or appropriate the environment. (Ibid., p. 71).

However, the teacher can't ignore a discipline problem. First, a teacher must question whether the problem is an individual or group problem. If the individual gets support from the group, it is a group problem. If the individual gets no support from the group, then there are several questions that can be asked: 1) whose norms is the student deviating from - teacher's or group's? 2) does the deviate perceive the group norm accurately? 3) does he wish to conform but the tolerable behavior desired is too narrow for his skill? 4) are the norms ambiguous so that the person doesn't perceive them accurately? 5) is the individual achieving his goal in the most effective way? (Henry, 1960, p. 160).

Some general principles that help minimize discipline problems are as follows:

1. Construct a clear, functional set of rules that your students understand.
2. Focus more on students who are behaving themselves than on those who break the rules.
3. Arrange your program so that any student can earn
approval and privileges if he learns and behaves.

4. When reprimands are necessary, make them clear and firm.

5. When punishment is necessary, be sure it is restitution rather than retribution.

6. Plan carefully so that transitions are smooth and expected.

7. Use enough variety in your teaching to keep attention and motivation optimal.

8. See that lessons progress fast enough to keep students alert and interested.

9. Establish different procedures for handling routine matters.

10. Keep track of disciplinary progress that your class makes so that you have a feeling of accomplishment too. (Allen, 1971, p. 195).

It is important to realize that there is actually little leeway for children to make decisions about establishing policies. However, there is call for establishing a common agreement on how to carry out policies and achieve objectives (Bany & Johnson, 1970, p. 179). The management task is not to establish standards, but to reach decisions as to the best ways of meeting prescribed conditions (Ibid. p. 189).

Below is a seven step group-decision process for determining how to reach behavioral goals (standards).

1. Statement of policy or desired conduct for a specific situation under consideration.

2. A clarification of situation which includes a clear exposition of factors involved.

3. A request for some plan of action which will enable members of the class to meet required conduct.
4. Statement and exploration of boundary condition (what cannot be done and what is desirable)

5. Examination of all suggestions on how to meet conditions in the situation.

6. Action commitment on part of class members who must carry out the plan.

7. Daily progress examination which determines effectiveness of plan and which compares plan against actual course of event. (Ibid., p. 189).

If the students have trouble reaching an agreement, the teacher should lead them in:

1) listing points of agreement
2) listing points of disagreement
3) clarifying points of view (perhaps paraphrase)
4) asking for an agreement on testing out several plans of action to see what works
5) withdraw problem (Ibid., p. 242)

Most important to class group goal attainment is the teacher's skill in helping group members make an accurate analysis of the tasks required and problems involved.

...if positive work oriented behavior is desired...it is important for the group to have a goal that requires well defined tasks.

Before an action is taken by a group, the teacher must help it determine whether the goal is operational (Ibid., p. 269)

When members have satisfying relations and opportunity to interact, release tensions, form friendships, gain prestige and recognition, formal and informal structures, students will be more likely to work to achieve task goals (Ibid., p. 276).

Class groups respond more readily to the opportunity to plan and work together and share experiences than they do to a system of individual rewards. Also, the group will be higher in task motivation when the group as a whole receives favorable evaluations than if individual members receive comment on individual performance (Ibid., p. 269).
The class group also needs to be guided in evaluation procedures. The central question should be, "Is there progress in the desired direction?" "Perception of progress towards goals is more important than actual progress (Ibid., p. 276)."

Providing objective data that a goal is reasonable will produce maximum commitment. If the overall goal is tentative, then the initial psychological situation is less demanding upon the group because the students are not asked to buy the goal, but instead to participate in defining the goal. As the class proceeds and the goal becomes well-defined, fact-finding can provide objective data for establishing a realistic goal (Henry, 1969, p. 222).

Conway (1973) has said that effective goal setting should include:

1. Directing attention toward the future

2. Looking at alternative courses of action

3. Projecting consequences of action
   a. Eliminating negative consequences for greater long run aim
   b. Projecting and evaluating feasibility of alternatives

4. Determining priorities of alternatives

5. Integrating alternatives into a coherent plan of action

6. Committing oneself to the plan of action
   a. Having a sense of faith in the rightness of choice
   b. Having confidence
   c. Temporarily giving up other possibilities
In competent goal setting, 1) conflicting alternatives are resolved, 2) Quality of goals are important
   a. toward potential at a maximum rate
   b. provide novelty and challenge
   c. not toward destruction
   d. biological, spiritual, psychological needs are taken into account.

In this goal setting process, it is important for the teacher to make honest and favorable appraisals of the group as a whole to the group without singling out individuals.

In addition, the teacher needs to assess group expectancies toward teacher behavior, procedures and school work. A teacher will be most effective if he matches student expectations. An expectation is an understanding of a role and a goal (Blanchard and Hersey, 1972). Thus, a teacher needs to begin by filling the teaching role as students see it and matching their goals (a teacher may wish to change student expectations, but must begin where the students are).

The teacher should let the students know that the work will be hard, but assure them that they will be able to do it. Also, if possible, the teacher should try to establish that the class situation will be highly satisfying. Opportunities should be provided for members to interact so they can assess reactions of other members. Feelings should be channeled into positive actions. Opportunities should be granted for contribution and to express opinions. (Bany and Johnson, 1970).
When groups are told that they are good groups and assured that members will get along well, if frequent favorable group appraisals are made, unity increases, and cooperation develops quickly (Ibid.).

Students will cooperate and make an effort to maintain group standards if they have good feelings about the group. Such feeling is demonstrated by unity.

The job of establishing unity may be seen as consisting of seven tasks:

1. To create a positive group identity
2. To enhance members liking for each other by having friendly supportive relationships.
3. To make each member feel that he belongs and is a worthwhile member and has something to contribute.
4. To help establish common goals.
5. To establish standards.
6. To establish that personal needs, gains, and prestige can be fulfilled by functioning with the group.
7. To provide skillful leadership in problem solving in handling conflict, changing inappropriate behavior, and in changing or adapting to conditions. (Ibid.)

Promoting Effective Communication

Unity and willingness to conform to group standards will be influenced by the amount and quality of communication. Thus, the promotion of effective communication in the classroom is important. The teacher needs to be able to recognize interaction patterns. Sometimes, in group meetings, individuals have "hidden agendas" that are not part of the recognized formal agenda before the group. Basically, in a group discussion, an individual's purpose may be to 1) persuade and win, 2) unload feelings, or 3) solve a problem and clarify opposing points of view. A person's behavior may also represent effective, ineffective, and maintenance interaction patterns.
Effective opinion giver opinion giver ineffective aggressor aggressor maintenance harmonizer harmonizer
topics jumper topics jumper
topic jumper dominator tension reliever
topic jumper dominator tension reliever
dominator blocker process observer
blocker recognition seeker process observer
recognition seeker self seeker recognition seeker
self seeker self confessor special interest peddler
self confessor special interest peddler special interest peddler
playboy special interest peddler
special interest peddler special interest peddler

The role of leader

1) get discussion going
2) mediating arguments
3) keeping discussion on topic
4) keep group from bogging down
5) recognizing and utilizing all members of the group
6) sees that a permissive open atmosphere is maintained
7) makes periodic summaries

The role of Recorder

1) Record major contributions in the group, formal
actions, cleavage of opinions, points mentioned
but not discussed which should be followed up.
2) Report to group

The role of observer

1) tries to provide objective, detached overview
2) summarizes
3) checks leader
4) identifies roles of individuals
   (Hoover, 1971, p. 106, 107)

In general, discussions are more effective if people
are supportive, willing to suspend judgment, able to ex-
change feedback to check out both verbal and non-verbal
communication, and follow up on ideas while sticking to the
point (Schmuck and Schmuck, 1971) (see Appendix).

In discussion it is helpful to be able to identify the
kinds of issues that arise because they involve different kinds of approaches for resolution. The differing kinds of issues are:

1) Public policy issue is a question involving a choice or a decision for action by citizens or officials in affairs that concern a government or community.

2) Definitional issues revolve around the way important words or phrases are used in a discussion. Definitional disputes are sometimes only labeling problems. More common and more difficult to resolve are definitional disputes in which people disagree over the nature or quality of a thing or an action being named (Ibid., p. 34)

4) Factual issues are disagreements about the descriptions or explanations of events (Ibid., p. 36).

5) Legal issue. A "law" is a rule defining a class of permissible or unpermissible conduct based on some governmental authority. The first issue in a legal question, therefore, is whether or not a particular action can be classified as falling under an existing law (Ibid., p. 38).

6) Disagreements over frame-of-reference. People often look at problems from different perspectives, from a different set of values or beliefs (Ibid.).

In moral-value issues a person needs to look out for value-laden "loaded" words. These words tend to raise strong personal feelings. Value statements can be supported by reference to authority or by reference to a predicted valied consequence. It is important to clarify conflicting values.

The most common strategy for resolving definitional disputes is:

1) Deciding which examples should and should not be classified under a controversial label
2) Selecting general criteria for a definition (Ibid., p. 34-35).
Two ways to move discussion along by agreeing on definitions are:

1) Stipulation. People can simply agree to use a word consistently in a specific way.
2) Use of an authoritative source. Discussants can use a dictionary or other authoritative source to find support for the particular use of a word. (Ibid).

Factual claims can be supported by:

1) showing that it is "common knowledge" or "common sense" (logic)
2) personal observation (examples)
3) reference to an authoritative source (and statistics)
4) showing that a factual claim is consistent with a number of other well-established claims (Ibid., p. 36-37)

It is always important, however, to question the quality of the authority. Is the quoted authority an expert in the field? Is he stating an opinion? Does he have a bias? Do other authorities disagree? Etc.

A teacher needs skill in recognizing these various components in order to effectively guide a discussion, ask appropriate questions, keep the discussion from bogging down, and help issues get resolved and clarified.

Generally, some things to look for in a discussion are:

**Helpful**
- definition given or asked
- evidence or example given or asked
- analogy given
- inconsistency challenged
- relevance questioned
- issue stated (factual, definitional, etc.)
- summary given or asked
- stipulation made
- concession made

**Destructive**
- claim repeated
- irrelevant statement
- insensitive statement
- issue changed abruptly
- unclear statement
- no evidence given
- inaccurate facts
- personal attack
- loaded words
- other propaganda devices or emotionalism

(Ibid., p. 46).
Another factor in communication which the teacher should watch is verbal interaction. Verbal communication is a significant stable measure. People who talk tend to be powerful, liked, and informed. People who talk are more involved and have a stake in the conversation. A group directs more communication to the deviate than the conformist. Talking exposes interaction of ideas and provides data. It is interesting to note that aggressive behavior and conflict also communicate some important positive information. Under frustration, a unified and organized group will enter more conflict and disruption than less open and unified groups. Aggression may result from the blockage of a highly motivated person’s striving for a goal. So, aggression may indicate high motivation. It also may indicate degree of organization, since organized groups show more directly aggressive reactions than indirect. Also, groups working together in decision making will tend to show negative emotional expressions before positive ones, but this is necessary exploration to find shared values and points of difference and therefore serves a useful purpose. It is important to realize that conflict can be an integrative process when it opens, or causes to open channels of communication. (Bany and Johnson, 1970, 369-370).

Besides watching for kinds of interaction indicated by
communication, the teacher should check the pattern of communication. Is it teacher to pupil? What is the level of depth of the communication? Is it on a cognitive level (exchange of ideas) or an affective level (expression of emotions and feelings)? The teacher can also check goal behavior by watching the communication. Are students talking about a task goal, group maintenance goal, or individual goals (like someone trying to be recognized as humorous, intelligent, etc.).

All in all, group member roles in communication can be categorized under five rubrics:

1) initiating ideas or actions
2) regulating and controlling actions
3) giving information about ideas or attitudes
4) supporting ideas or group members engaged in them
5) evaluating ideas or activities (Gibb, 1960, p. 131).

The tasks that must be accomplished by the problem-solving or learning group may be classified into the following five sub-divisions: Problem-formation, idea getting, idea testing, choosing among ideas, and planning action (Ibid., p. 130).

Unfortunately, many people let a discussion just ramble because they are not aware that a discussion can be any different. Often, decisions are made by 1) plop, 2) authority, 3) minority, 4) majority voting, 5) consensus, or 6) unanimous decisions. The last two are the most preferable.

In summary, communication is an important indicator of the effectiveness of group function. A teacher should watch
the kinds of interactions indicated by communication, and the patterns and levels of communication that develop. Aggressive behavior and conflict may indicate that the group is motivated, involved, and organized. Knowing this, the teacher's task is then to direct the behavior into appropriate channels.

Handling Conflict and Directing Change

Sometimes, open conflict occurs between individuals who are members of the group. The question for the teacher is to determine whether the conflict involves the whole group or not. If the group supports the conflict, then the whole group should be involved in handling of the conflict. Bany and Johnson summarize the steps in the process of resolving conflict.

1. Set guidelines for discussion.

   (a) Everyone may speak, but only one person may speak at a time.

2. Clarify what happened.

   (a) Ask what happened or what caused the conflict to occur. (Rephrase or restate if the statement is not clear. Put the word or phrase on the board.)

   (b) Keep to the facts. Get agreement that this is what happened, and not how each person feels about the situation or why the situation occurred.

   (c) Ask individuals in the group if they agree to what happened. By the time agreement is reached as to what occurred, the emotional tone in the group should be somewhat lowered.
3. Explore differences in points of view.

(a) (Why people feel as they do or how they view situation). Put phrases or statements on the board. The teacher does not comment except to keep the group on the topic. If someone states, "I think we should...", the teacher responds, "Why do you feel as you do?" Put nothing down if it is not on the point. Wait for answers, but stay with the question. Persons of all ages tend to give solutions.

(b) Line up the points of agreement and disagreement. (They need not be sentences or phrases - just one word on the board). There will be many points of agreement, as feelings are involved. State the areas of agreement and disagreement clearly.

(c) Get everyone to agree where they agree and disagree.

4. Identify the cause or causes of the conflict.

(a) Teacher states the real cause of the conflict or states that the problem seems to be (1)______, (2)______, (3)______.

(b) What does the class think?

(c) Does everyone agree this is the cause of conflict? Source of disagreement?

5. Achieving agreement and resolving the conflict.

(a) We agree that this is the problem - (or these are the causes of conflicts).

(b) "Could it be that this....had anything to do with the conflict?" "Or this...?" "What do you think?" (Teacher diagnoses as long as it is not threatening.) (At this point the children may all be so friendly that all that is needed is a restatement of the clarification of all trouble and a positive appraisal of the group performance in resolving the conflict. Use no remarks containing ifs, buts, or except for a few!)

(a) Can we prevent the incident from recurring? Or, what can be done? - (not how).

(b) Ask for suggestions, ideas - a plan, not punishment.

(c) Will the suggestions work? Examine them.

(d) Get agreement on a plan of action - a trial plan to see if the plan will work.

(e) Redefine or restate the plan of action. "We do this, etc., and we see if it will work." Emphasize the trial aspect.

7. Appraisal.

(a) Make positive appraisal of group efforts. (Bany and Johnson, 1970, p. 393-395).

One of the important things to keep in mind is that when individuals get into conflict, if the group encourages, enjoys, or gets involved, then it is a group problem. But, if the group ignores, is disinterested, or wants the conflict to stop, then it is the individual's problem and should be handled as such. Avoid moralizing in either case. Keep in mind that children do not know why they behave as they do when a class is reacting, so don't ask why (Ibid.).

Often "removing the cause of inappropriate behavior is not enough to change behavior (Ibid., p. 277)."

...it is possible for teachers to inherit a class which has developed an inappropriate behavior pattern, the cause of which no longer exists. Usually the patterns of behavior that become an established way of reacting can be classified as antagonistic, hostile, aggressive, apathetic, or indifferent (Ibid.)

Teachers cannot hope to change an established way of
acting by use of fear, force, threat, appeal, or persuasion. When such practices are used and appear to be effective, it means only that the surface behavior has changed (Ibid., p. 278).

Generally, children know what is sanctioned and what is not. They may want change, but will conform to their perception of the group's expectation. (Ibid., p. 279). The teacher must somehow assist the students in developing a shared perception of a need for change. The process evolves around:

1. Presenting the need for change.
2. Clarifying the nature of the change.
3. Creating a desire for change.
4. Exploring alternative behavior.
5. Establishing a line of action.
6. Making a decision to act, which is perceived by group members as a consensus and a commitment to act. (Ibid., p. 280).

Edith Bennet (1955) assessed four variables in efforts to create change. The variables were: group discussion, group decision, group commitment, and the degree of consensus. She found that group discussion by itself was no more effective than a lecture. Making a commitment was not an important factor either. However, the process of making a decision, and the degree of perceived consensus increased the likelihood of the class executing an action desired.

Bany and Johnson have outlined several "basic propositions stemming from research that have implications for creating change."

1. Unity, cohesiveness, and satisfaction with the group is an important factor influencing the willingness of a group to change its behavior.
2. In attempts to change a certain specific type of behavior, the more relevant the new type of behavior is to the attractiveness of the group, the greater will be the influence in the group to change.

(a) This means that the change the teacher desires must be made attractive to the group...

(b) If the group members feel their class is considered "inferior" or "not so good" by the teacher, then children in these low-rated groups lose some (or much) of their self-confidence and personal esteem.

(c) Down-graded groups (groups which have not had positive appraisals) or those groups which perceive themselves as such, contain disappointed and frustrated children. These children often reject behavior patterns which conform to what the teacher and school desire.

3. Change in an established pattern of behavior cannot be brought about by trying to influence popular group leaders.

(a) Considerable evidence has been accumulated through research showing the tremendous pressures which groups can exert upon members to conform to the group's standard way of behaving.

(b) The price of deviation in most groups is rejection or even expulsion. If the child really wants to belong and be accepted, he cannot withstand this type of pressure. He will "go along" with the group even though he suffers teacher disapproval.

(c) Evidence has been obtained that shows that popular boys exhibit greater resistance against influence directed against the existing group's way of behaving than do less popular boys.

(d) Individually powerful children, when introduced into earlier formed groups, are unable to abolish or run counter to group standards or ways of behaving that have already been established.
(e) Evidence indicates that once a group establishes its own pattern for behaving in a particular situation, status individuals or popular or powerful individuals will be more conforming to this pattern. Therefore, methods which attempt to change group behavior through popular persons are completely ineffective.

4. The patterns of control used daily with the children in the classroom are an important factor relating to success in creating change.

(a) If authoritarian practices have been the general rule, then a switch to participative practices will be suspected by the group.

(b) If communication in the class has been severely curtailed, or if a status hierarchy has been imposed and maintained in the group, any planned change in behavior will be extremely difficult to execute.

(c) If pupil leaders have been appointed to maintain controls, group cooperation undoubtedly is low and change in behavior will be difficult to achieve (Ibid., p. 282-283).

After a change has been initiated there is a tendency for groups to slip back into previous ways of behaving unless favorable appraisals are made of group effort. It helps if the class group is provided opportunity to evaluate the new behavior.

1. The group is asked to consider whether the decision to change behavior succeeded.

2. In terms of the total effect, was the change effective? Were the desired results achieved? In what ways might the change be improved? Are the results satisfactory?

3. Are further changes desirable? What changes are needed? Any new changes must be clearly stated in terms of actual behavior and must be understood by all.
4. Does everyone agree to the new changes?

5. If some improvements are desired, the class agrees to try to improve its plan of action and the improved plan is given a trial (Ibid., p. 305).

It is important that the evaluation session is not a fault-finding session. Instead, it should be for the purpose of stating obstacles or difficulties. Positive behavior should also be noted.

When group members collectively act to change conditions, they are demonstrating goal seeking behavior. Group goals are as binding on members as group norms.

An approach being used to change both individual and group behavior is behavior modification. This approach involves stating objectives in precise positive behavioral terms. The teacher makes a note of how often these behaviors occur (gathering base-line data). Then the teacher makes reinforcement a positive consequence, contingent upon the desired behavior and extinguishes undesirable behavior by withholding reinforcement. The positive reinforcements come immediately after the correct behavior. A secondary reinforcer (social comment, praise, etc.) may be paired with a primary or already learned secondary reinforcer. A record is kept of behavior so that information is available in case modification is necessary. When the desired behavior seems established, the student is placed on an intermittent reinforcement schedule with gradually increasing intervals between reinforcements until the student is on a schedule equivalent to that provided by that natural environment and
conscious reinforcement by the teacher is stopped (Goodall, 1972, p. 132).

It is claimed that a technology has developed that enables teachers to control behavior with precise techniques. The Western Massachusetts Learning Problems Laboratory has developed inservice training for teachers in these techniques. Also, Managing Behavior by Hall, Wolf's handbook on Teaching-Family Model; Precision-Teaching, by Meacham and Norris; the Consulting Teacher Model by McKenzie; and the Behavior-Analysis Model by Bushell, all present the technology of behavior modification. It should be noted that behavior modification is often used for more than modification of social behavior.

Two major efforts, the Head Start and Follow-Through planned variation studies, are under way to compare behavioral and other especially designed approaches to compensatory education. The results, highly tentative so far, indicate that the two behavioral approaches - Don Bushell's behavior-analysis plan and the E-B program designed and run by Siegfried Engelmann and Wesley C. Becker at the University of Oregon - outstrip all the others in improving the academic performance of preschool and first-grade children. This outcome is no surprise; the behavioral programs are designed specifically to achieve this goal, and their highly structured, no-nonsense format led Follow-Through evaluators at the Stanford Research Institute to nickname them "pricklies." Still, even with less tangible objectives, such as positive shifts in attitudes toward school and learning, these two approaches seem to be about as effective as humanist programs - the "goo-ies" - that talk more about the growing awareness of the whole child than about test scores. (Ibid., p. 136).
Several techniques have been developed for changing social behavior. These include: 1) the use of a token economy, 2) earned time, 3) status levels, and 4) a place for "time out". Such techniques are used in the following way.

Students may be presented with a list of desired behaviors stated in positive terms. Students are told that each time they behave in the way indicated, they will be given a token which can be traded in for things that they want. The students may be asked to generate a list of things that they like to do. These become the things for which they can trade tokens. Class begins with a strict authoritarian structure. Students are told where to sit and what to do. They are not allowed to talk. If they misbehave they may lose tokens. As soon as the student finishes the work and it is corrected, the student may trade the tokens in for desired activities. The student is now considered to be on status level one. He may keep track of the number of tokens earned. He also keeps track of "checks that he gets when tokens are taken away. When he has earned a pre-stated number of tokens and has gone a certain period without any "checks", the student may request to be moved to status level two. This grants him some privileges and responsibilities. For example, the student may now choose to sit next to a friend. Later, he may qualify to move to status level three which has further privileges and responsibilities. The student may now be allowed to work on projects in small groups
or with friends. This means that the students have the responsibility to behave appropriately when allowed to be on their own interacting together. On this level, the student may be allowed to continue working after the regular assignment is finished and save his earned time to take later. This means the student may choose to take a full class period off to spend his saved up earned time and trade his tokens in on activities. In effect, this means a student is choosing to work much longer in order to get a reinforcement. The student is now on an intermittent schedule. Next, the student is taken off the schedule altogether by being placed on status level four. The status levels provide a mechanism for moving the student from consistent reinforcement through degrees of intermittent reinforcement to natural reinforcement - a point of being off the program. The tokens provide a way to give students immediate reinforcement. If a student misbehaves, tokens are easily taken away. If the student misbehaves again, he can be sent to "time out" (a place where he is by himself) for five minutes. Basically, students trade tokens for "earned time" during which they can engage in activities they have chosen.

There has been movement toward behavioral approaches because they are simple and they work. The instructional systems development model is behavioral in that it focuses on behavioral objectives. A good program guarantees that 90%
of the students will achieve the stated objectives. Objections to behavioral approaches are that they are mechanistic and not humanistic, and that they are too superficial and don't deal with what happens inside. Supposedly, behaviorists have not concerned themselves with researching the areas about which the humanists are concerned. The "Articles of the Association of the American Association for Humanistic Psychology" lists these concerns as: "love, creativity, self, growth, organism, basic need-gratification, self-actualization, higher values, being, becoming, spontaneity, play, humor, affection, naturalness, warmth, ego-transcendence, objectivity, autonomy, responsibility, mean, fairness, transcendental experience, peak experience, courage, and related concepts."

However, the behaviorists and the humanists might not really be so far apart. Having studied the work of both and talked to the leaders of each, Kenneth Goodall concludes "...the implicit assumptions of the post-Skinnerians have a strangely humanist ring.

For many applied-behavior analysts, as for humanist heroes like Thomas Szasz and R. D. Laing, mental illness is a myth. Labeling persons as schizophrenic or retarded is useless and often harmful. The illness, or medical model, which perpetuates the myth and the labels, is no longer valid. Neither are the tools - I.Q. tests, attitude scales, questionnaires - that facilitate the pigeonholing process.

If a person exhibits "deviant" behavior, the failure is in the social and physical environment that determines his behavior, not in the individual: changing
the environment will change the behavior. If "treatment" is necessary, the best place to do it is in the home or school, not in some artificial or perhaps permanent place of confinement. And the best persons to provide the treatment are parents, teachers, friends—not medicine men. Therapy, even with large groups, must concentrate on the individual or it will not be effective; and its concern is with the here and now, not with some past trauma or some statistical prediction about future performance. But therapy itself should take a back seat to prevention, which is far better and less expensive. Above all, the process of changing human lives must be evaluated continually; and it must be accountable to its consumers, the persons who are affected by it and the persons who pay for it...the new breed of Skinnerians has a lot in common with many of the younger radical and humanist professionals who are challenging the traditionalists in psychiatry, psychology, education, counseling, social work, rehabilitation, and correction.

I suspect that if it weren't for their own curtains of mutually exclusive jargons and mutually reinforcing labels, the humanists and the behaviorists might be surprised at how near they are to being bedfellows (Goodall, 1972, p. 60, 62).

Counseling

Another approach to handling behavior problems, conflict, and trying to promote change is counseling. Empathy, respect, and concreteness are basic to the counseling relationship. Dewayne Kurpius describes empathy and respect and concreteness as follows:

Empathy - Listening to another person in a manner in which we put ourselves into the frame of reference of another so that the other person's thinking, feeling, and behaving are completely understood, even to the point of being predictable.

Respect - Respect is present when the helper does not judge the helpee but accepts his present functioning as a part of that person at the time. As the interaction continues, the helper will indicate understanding,
acceptance, and warmth which is observable and reinforcing to the helpee (Kurpius, 1971, p. 256).

Concreteness is the ability to "facilitate a direct expression of all personally relevant feelings and experiences in concrete and specific terms (Ibid., p. 282).

Robert R. Carkhuff has presented a scale for measurement of empathetic understanding in interpersonal processes (1969, p. 174-175). Carkhuff sees a continuum of levels in degree of empathy from a level one where the expressions of the helper either do not attend or detract significantly away from the expressions of the helpee to a level five where the helper's responses add significantly to the expressions of the helpee through expressing levels even deeper than the helpee and fully being with him in moments of deepest levels of self-exploration.

Kurpius presents several suggestions to help a teacher move toward level five. He first suggests reflection of content.

A simple style of merely repeating almost verbatim the words the student has just used. It may be useful for the student to hear the words that he has used so that he has a better understanding of how they sound (Kurpis, 1971, p. 267).

Next, he suggests use of reflection of feeling.

Oftentimes the student will make a response to the teacher in which the words describe a very cognitive kind of statement while the feeling of the student is at a much deeper level. This technique is used to tell the student that you really do understand how he feels about what he is saying even though he is not verbalizing it (Ibid.)
It helps to notice non-verbal communication and check out what it means by asking the helper to extend his limits of understanding by:

1. Listening for more intent and feeling in the helpee's statements.

2. Moderately interpreting or asking the helpee a question to help each other better understand the true message. A sample response which the helper might make is: "Could it be that you fear teaching in front of a class of 30 students while being observed by your supervisor?" With an introduction of "could it be," the helpee can agree that you are following accurately or suggest that you had not heard the total message. In the latter case, the helper merely responds with, "Would you help me better understand what you are saying?" (Ibid., p. 280).

...the final stage of understanding and helping concentrates upon problem solving. Sometimes the problem identification, selection of alternatives, and decision making are quite clear and relatively easy to make. Other times, however, the helpee is not ready to act upon the problem. In this case, the helper should not proceed in advance of his helpee, but meet him at his level of self understanding and functioning (Ibid., p. 270).

Carkhuff also presents a scale for measurement for the communication of respect in interpersonal processes. This scale proceeds from level one of negative regard to level five of communication of deepest respect for the helpee's worth and potentials (Carkhuff, 1969, p. 178-179). Also, Carkhuff sees it as necessary to move through three stages of respect.

...in early stages the emphasis upon unconditionality or unconditional positive regard enables both the helper and the helpee to experience the helpee as fully
as possible. The essential communication, which often is implicit, is, "With me you are free to be whoever you are." This is not to say, however, that there are no limits set. There are limits, but they primarily involve those behaviors that are harmful or potentially harmful to the helpee or others. In this sense, the terms unconditionality or unconditional positive regard are misnomers, for no one is totally unconditional in relation to another. While the communication of warmth may be a modality for communicating respect, translated functionally, unconditionality merely involves the suspension of all potentially psychonoxious feelings, attitudes, and judgments on the part of the helper - that is, those that might have a restrictive or destructive effect upon the expressions and behaviors of the helpee. Such a communication establishes the basis for a secure relationship within which the helpee can experience and experiment with himself. Furthermore, it provides the basis for the helper as well as for the helpee to come to know the helpee well enough to discern those aspects of the helpee that are deserving of positive regard, the second stage of respect (Ibid., p. 276).

Next, the second stage of respect is described.

As the helper comes to know the helpee, then, he comes to experience aspects of the helpee to which he can respond positively. If he cannot do so, there is no basis for continuing further, since there is no hope that the helpee will come to have respect for his own capacities for making appropriate discriminations and acting with responsibility in relevant areas. The modalities for communicating positive regard involve the communication of accurate or attempted empathic understanding and, to a lesser degree, the genuinely positive responses of the helper to the helpee. In particular, the degree to which the helpee will reflect the degree to which he communicates respect in its second stage. At a minimum the communication, "You are worthy of my effort to understand" establishes a basis for the helpee's experience of his own self-worth. At a maximum a depth of understanding on the part of the helper communicates his readiness and desire to be able to know the helpee more fully. In a sense we might view the respect dimension in more traditional behavioristic terms. We need first to know who this person is before we can respond positively to some or all of his assets. However, since not all of
his characteristics are functional and thus deserving of positive reinforcement, we must also deal with those that are nonfunctional and even self-destructive. This consideration leads readily to the third stage of respect (Ibid., p. 278).

And so, next is the third stage of respect.

As we come to know the helpee fully we determine that there are many aspects of his behavior that we want to reinforce positively and many that at a minimum we want to extinguish and at a maximum to reinforce negatively or punish. In a very real sense, Stage 2 has already initiated an extinction process by the selective reinforcement of some behaviors and the absence of reinforcement for others. In this context, Stage 3 is more critical in rehabilitation treatment processes than it is in socioeducational processes. The last stage of respect, then, emphasizes a conditionality respect. That is, "Given your developmental stage, I will respect you only if you function at your highest level." The central message of this stage involves not accepting an individual at less than he can be....At the highest levels, this has implications for full and creative productivity, and, indeed, self-actualization. The helper's conditionality is not predicated upon "doing things as I do them" but rather upon "finding your own way, employing me as a model for someone who strives to be fully himself not only in the moment but in life" (Ibid., p. 280).

Next, the teacher needs another significant element in communicating with others. This third element is concreteness. Carkhuff's scale for measurement of personally relevant concreteness of expression in interpersonal processes extends from discussions with only vague, anonymous generalities, abstract and highly intellectual ideas to a discussion with direct and completely specific feelings, experiences, situations, and events. Concreteness can also be thought of as moving through three stages.

During the initial stage,...the helper employes his resources to influence the helpee to discuss fluently,
directly, and completely specific feelings and experiences regardless of their emotional content. Again, the helper influences the helpee through the critical sources of learning. He may employ specificity in his own communications, whether basically reflective or interrogative, so that he enables the helpee not only to have the facilitative experience of having the specifics of this problem understood but also the experience of being encouraged to make his own relevant discriminations and communications. In addition, the helper provides the helpee a role model for a person who can deal concretely with problem areas, his own as well as those of others. Finally, the helper may didactically teach the helpee to communicate concretely in both his questions and his directions. In summary, then, during Stage I, the helper's concreteness serves several critical functions: ... it insures that the helper's response does not become too far removed emotionally (Ibid., p. 285.)

Stage 2 of Concreteness is something quite different, for, having enabled the helpee to deal with the specifics of his problem areas, it now becomes imperative for the helper to decrease his emphasis on this dimension in an attempt to achieve a fuller, freer exploration on the part of the helpee. Thus, in the intermediary phase the helper may not only allow but also actively encourage the helpee to explore himself in more abstract, less specific ways. In particular, in dealing with material that is not readily available to the helpee's awareness, it would seem most effective to facilitate a more vague and general course of exploration. Suffice it to say that this is the form that less conscious or unconscious processes take and it is simply not effective to attempt to impose concreteness on what is not concrete. The modalities of the second stage involve nonspecific probing and free associations on the part of both the helper and the helpee. Although not always apparently immediate in relevance, the second stage enables the helpee to break the bonds of rigid cosmologies, restricted thinking, and blunted emotionality. Such a course enables both the helper and the helpee to return once again to the relevant areas with a new and fresh perspective necessary to discern and design a constructive course of action during the last stage (Ibid., p. 286).

During the final stage the dimension of concreteness once again takes on a critical function of the helping
process. Whereas it initially served responsibly as a necessary supplement to understanding all specific and relevant aspects of the helpee's problem area, now it functions actively to consider all specific and relevant aspects of educative or remedial action. Concreteness is, at this point, the key to a consideration of potential preferred modes of treatment. It involves a consideration of alternative courses of action, including in particular the details of the advantages and disadvantages of each. At this point, its modalities include both questions and answers on the part of both the helper and the helpee. It may also include, among many other possibilities, representational balance sheets, topological portrayals, and specific homework assignments. The second stage, having provided new and fresh perspectives, lays the base for breakthroughs in the development of modes of problem resolution. On the one hand, it becomes apparent to the helpee that he has many more degrees of freedom available to him than he once thought he had. On the other hand, in conjunction with a depth of self-understanding, the helpee's improved discriminations allow him to discern the subtle cues that determine the course of action most suitable for him. It should be underscored that many would-be helpers attempt to move to this stage prematurely (Ibid., p. 287-288).

Specific techniques and approaches for counseling students have been developed by others that follow the same general outline. Rudolph Dreikurs elaborates by presenting cues to look for, an Adlerian frame of reference to which to refer, and key phrases to use. Dreikurs suggests considering a child's placement in the family and the child's success in attaining effective recognition. He suggests that when a child can't get the recognition he needs through positive means, the child turns to more negative and destructive means. The teacher's job is to help a child find more effective ways of satisfying his needs. According to Dreikurs, a problem can usually be classified as striving for
1) attention, 2) power, 3) revenge, or 4) withdrawal. As the child is less successful in obtaining his needs he may move down the list from attention. Supposedly, if the child is not successful he gives up and withdraws.

There are two approaches to be taken to help the child. One is to provide him with as many positive opportunities to obtain recognition as possible while not reacting to attention getting devices, power struggles, etc. Secondly, the teacher can confront the child more directly. For example, if the child is always disrupting class in trying to get attention, the teacher might say, "John, it appears to me that you need a lot of attention. How much attention do you need during a class period? I want to be sure to give it to you. How much is enough? Five times, six, ten?" Of course, the teacher has taken the child aside so this conversation is not in front of the whole class. The teacher gets the student to agree on a specific number of times he should get attention. Then in class each time the child tries for attention, the teacher numbers it. "That's one., etc.

Another approach outlined by Dreikurs is to counsel the student. In the counseling approach, the teacher asks the student what the problem is. The teacher tries to get the conversation very specific by getting a "critical incident." From the "critical incident" the teacher tries to get the student to see that he is trying to get attention, if that is the problem, by asking him questions. If the
student doesn't come up with a solution on his own, the teacher may suggest "Could it be..." If the student gives a "recognition reflex" (a smile) the teacher knows that both he and the student now are aware of the cause of the problem. The teacher, then, tries to get the student to realize that his technique for getting attention is not as successful as it could be. He then asks, "What are you going to do differently?" The idea is to get the student to focus on a specific plan of action to behave differently. The teacher then sets a time to talk to the student again to see how things are going and evaluate the suggested change. The emphasis is to try to use an indirect approach to help the child see the reason for his own behavior and find a more effective method of satisfying his needs.

Dreikurs feels that the best method is through the use of "natural consequences", if possible. It is important for the child to become aware of the consequences of his actions. In this way, Dreikurs develops a partial technology for dealing with individual problems. (Dreikurs, 1968)

Another useful framework for counseling is transactional analysis developed by Eric Berne. Here, the basic idea is that people play "games" to get "strokes," or collect "stamps." An example of a "game" might be "gossip" where everyone talks about Bertha collecting "stamps" for each juicy tidbit they can think up. Another "game" played
by a wife might be, "You don't love me anymore," or "scapegoat," or "If it wasn't for you, I wouldn't be stuck at home."

In playing "games" people may take one of three roles: adult, child, or parent. The child and parent roles are really recordings from the past played back and don't represent real direct communication. If a person takes on a "parent" role, he forces the other person into a "child" role. A child role often gets a parental response. Authoritarian moralizing would be a parental response while an emotional reaction represents what is meant by a child response. The ideal is to move to adult-to-adult conversations without "game" playing. In adult-to-adult communication, people talk openly and directly about how they feel and discuss matters with honesty, empathy, and respect. (Berne, 1964).

Transactional Analysis has been applied directly to the problems in schools among students, parents, teachers, and administrators. According to Ernst, the basic games in schools are:

**Trouble-Maker Games**

1/ Disruptor Variety
1. Uproar
2. Chip on the Shoulder
3. Stupid
4. Clown
5. Schlemiel
6. Make Me
2 / Delinquent Variety
7. Let's Find
8. Cops and Robbers
9. Want Out

Put-Down Games
4 / Discount Variety
10. Sweetheart
11. Blemish

5 / Complainer Variety
12. Why Does It Always Happen To Me
13. Indigence
14. Why Don't You - Yes, But...
15. Late Paper
16. Wooden Leg

Tempter Games
6 / Kissy Variety
17. Disciple
18. Lil Ol Me

7 / Trap-Baiter Variety
19. Let's You and Him Fight
20. Miss Muffet
21. Let 'Em Have It
22. High and Proud
23. Do Me Something
24. Stocking
25. Rapo

Teacher Games
8 / Close-to-Student Variety
26. Buddy
27. Self-Expression
28. Critique
29. You're Uncommonly Perceptive

9 / Helpful Variety
30. Student Folder
31. I'm Only Trying To Help You
32. Sunny Side Up
33. Education
34. Why Don't You - Yes, But...
35. Look How Hard I've Tried

10 / I-Know-Best Variety
36. Furthermore
37. Tell Me This
38. Professional
39. Why Did You - No, But...
40. Now I've Got You
41. See What You Made Me Do
42. Courtroom
43. Corner
44. It's Been Done Before (Ernst, 1972, Contents)
There are, of course, many other techniques of psychological analysis that can be applied in counseling. The methodologies mentioned in this paper represent the approaches receiving most current interest.

In summary, human interaction is an important aspect of instruction. Facilitation of effective human interaction involves: 1) creating conditions and climate for work, 2) establishing behavior standards and discipline, 3) promoting effective communication, 4) handling conflict and directing change, and 5) counseling individuals.
In Chapters I through V, several views of teaching have been presented. This review of the literature demonstrates that there is more to teaching than just a set of behaviors. Furthermore, there is currently no one theory of learning or teaching that encompasses all the factors that need to be considered about teaching. Even the eclectic instructional systems development approach does not deal with all aspects of teaching. It does not focus on implementation, for instance. Furthermore, it is only a sequence of specific techniques for handling content, and this limits its scope and flexibility. However, other approaches to teaching are limited in other ways. To view teaching as a process of human interaction is to ignore aspects considered important by instructional systems development. What is needed is an approach to analyzing teaching which draws all these points of view together into one model.

Currently, there are some trends which represent attempts to move in this direction. There are a number of models of teaching, each representing one approach to teaching (see
Appendix). No one has suggested a model to be used for teacher certification, although one approach to the analysis of teaching is being widely considered for a basis for teacher certification. This approach rests on the assumption that teaching consists of, and can be analyzed in terms of, a set of competencies. There are a number of different ways in which people define competencies, however. Some educators attempt to define competencies in terms of precise behavioral skills. Other educators believe this approach is too mechanistic. They see competencies as patterns, or processes. Taking this view are two important models of education: 1) the Integrated Day Program (open education), and 2) the ANISA Model. Both of these models of education have implications for teaching.

Teaching as a Set of Competencies

There is much talk about developing "Competency-Based-Teacher-Certification." Currently, most states are reviewing the concept.

In June of 1972 the first newsletter designed to provide information about a Competency-Based Certification project in New York was published and to date twelve trial projects have been established in the state.

At the same time, Florida

...is conducting one of the strongest performance movements in the nation. The Florida Center For Teacher Training Materials is cataloging and reviewing training
materials that promote the development of teacher competencies. The Florida Project, consisting of a consortium of teacher education institutions throughout the state, is collecting and reviewing Protocol materials that are being developed nationally. The Catalog of Competencies Project is developing an open-ended, comprehensive catalog of teaching competencies under the direction of Florida State University. Several orientation and several training sessions are being conducted throughout the state.

Utilizing an approved program approach to performance-based teacher certification, Florida is in the process of adopting state program approval standards which require the establishment of performance criteria within individual programs (Roth, 1972, p. 2).

The states which reported no activity in investigation of competency based instruction are: Alaska, Colorado, Kansas, Missouri, Nebraska, New Hampshire, New Mexico, North Dakota, Oklahoma, and Wyoming. However, work is being conducted on developing technologies of teaching in both Kansas and New Hampshire. In effect, this means that only eight states haven't begun formally to consider competency-based certification. This indicates the interest in identifying teaching competencies that can be used for training of teachers and certification. Furthermore, interest has spread to countries outside the United States to such a degree that UNESCO has felt it justifiable to set the identification of teaching competencies as a top priority in the work of its organization.

One major definition of competency is "The capability of a teacher to perform a given task (New Jersey State Department of Education, 1971)."
The New Jersey Performance Evaluation Project lists its evaluation objectives as:

1. To identify the minimum level of teaching performance required for initial regular certification. This includes:
   A. Identification of minimum performance criteria necessary to teach a given subject and/or age group
   B. Identification of those minimum performance criteria, if any, which are common to all subject areas or grade levels.

2. To develop a method for measuring the degree of competence of applicants seeking initial regular certification.

3. To teach educators involved in evaluating applicants for initial certification the proper use and interpretation of the methods that have been developed for evaluating performance (Ibid.).

The project's approach has been to establish task forces to investigate 16 areas, as follows:

1. Art Education
2. Business Education
3. Elementary Education
4. English
5. Exceptional Children
6. Foreign Languages
7. Health Education
8. Home Economics
9. Industrial Arts
10. Mathematics
11. Music Education
12. Nursery School
13. Physical Education
14. Science Education
15. Social Studies
16. Vocational Subjects (Ibid.)

This approach seems representative of a common weakness found in many attempts at specifying competencies. Competencies are often defined in terms of knowledge of subject matter
areas. This results in a fragmentation of efforts. Certainly, it would be more beneficial to define competencies in terms of basic processes common to all teaching rather than in terms of ability to use specific tools which are relevant only to one subject area. Competency based only on technique or knowledge of content rather than on process is inflexible.

Another weak approach to the specification of teaching competency is having professors "behavioralize" the courses they've been teaching. This method of arriving at competencies has several drawbacks. The first, and most basic, lies in the assumption that a behavioralization of all professors' courses will provide everything a future teacher will need to know. No overall framework is utilized for checking to see if there are any gaps. Also, such specification of competencies often results in competencies which are nothing more than abilities needed to repeat back one professor's particular opinions. One result is that individuals don't evaluate and consider various values and standards inherent in what they are learning.

Another common weakness in attempts to specify competencies is that the competencies are too mechanistic. Often, the goal, as far as the student is concerned, becomes to demonstrate that they have mastered the objective. Mastery of objectives becomes the goal rather than master teaching. This raises a serious question about the internalization of meaning. In effect, students are being given packaged answers.
They are not being exposed to all the disagreements in the field.

In addition, another problem with current competency specification is that it is possible for a master teacher to flunk a competency test because he was not familiar with particular jargon, or a particular professor's way of seeing things. This problem is illustrated by two behavioral objectives extracted from the "Weber Individualized Learning Kits (Burke, 1972)." These are two examples (out of six) selected by the Dean of the School of Education at Weber State College for publication. So, they were intended to be examples of good objectives.

3. Demonstrate a knowledge of the three levels of comprehension by defining the three levels in writing and giving examples of each (W-34 Reading Comprehension).

4. (a) Display comprehension of the four functions which aid us in the classification and understanding of the factors which account for motivation, as measured by a teacher-designed examination with a proficiency level of 80 percent (W-13 Motivation and Learning) (Burke, 1972, p. 25).

A master teacher may raise several questions about these objectives. Whose model of comprehension? Whose four functions and what model of motivation? Could Bruner or Piaget answer these questions?

It becomes obvious that anyone who didn't study the program at Weber State College would be considered incompetent.

The concept of Competency-Based training and certification is exciting, but such training needs to be carefully
thought through so that it is comprehensive, flexible, and helps the student form his own framework based on research rather than just memorizing someone else's package. Serious questions can be raised about a student's knowledge who has adopted a professor's integrations without knowing the differentiations that were related to make the integration.

These kinds of problems have led educators to analyze competencies in terms of teaching patterns or processes instead of specific behavior or knowledge.

**Teaching as a Process**

Another way to analyze teaching is to view it as a decision making or problem solving process. A process model could effectively integrate and make sense out of all the diverse research and theory while avoiding the weaknesses of the current competency based attempts just mentioned. The process approach avoids the problem of viewing teaching in mechanistic terms. It also steers away from the non-structuring approach proposed by some idealists.

In describing teaching as a process, Hunkins says,

Teaching is a decision-making process. To make an intelligent decision, one should trace to some extent the consequences of alternative lines of action. One must visualize possible outcomes that will result from pupil interaction with the curriculum. If the teacher has no idea of possible outcomes nor any idea of objectives and ways to achieve them, then what happens in the classroom is pure accident; he can take no credit for teaching. If learning has taken place, the pupil deserves sole praise. (Hunkins, 1972, p. 19).
So far, the most developed description of teaching as a process is by Schmuck, Chesler, and Lippitt. They describe "...the whole problem-solving sequence, from perception of classroom difficulties through the evaluation of the remedial action taken. (Schmuck, Chesler, Lippitt, 1966, p. iv)."

The process...

...deals with the issues of identifying problems in classroom life, selecting or developing appropriate diagnostic tools to analyze these problems, using diagnostic data and behavioral science resources to develop a plan for improving the learning atmosphere in the classroom, carrying out planned changes in classroom life, and evaluating the changes (Ibid.)

These authors go on to explain that

Teaching and learning are complementary acts that involve an interpersonal process between at least two people. When this process takes place in a classroom it is complicated and affected by the many relations among the students, and between the students and the teacher. In some cases the learning process is enhanced by peer relations that actively support a productive learning atmosphere; in other cases the learning process is inhibited by peer relations. The teacher's style and the subject matter, the child's own feeling about himself and his academic abilities, and the nature of the social relations in the classroom all are major influences on this teaching-learning process. (Ibid., p. 1)

These authors describe the problem solving style they support as an empirical-rational style. They say,

...it combines sensory data with rational or theoretical considerations. This approach can start with the collection of empirical data or the retrieval of prior investigations of a specific problem and proceed to a rational and empirical test of the alternatives for action. The aim is similar to that of behavioral science strategies; it constructs and tests reliable hypotheses derived from observable data collected or retrieved about human problems (Ibid. p. 7)
The authors go on to say that the process is divided into a five phase sequence with each phase making maximum use of the resources of the behavioral sciences. The phases are seen as flowing into one another in the problem-solving sequence.

The behavioral science resources are seen as (a) the data and conceptual frameworks derived from research that are particularly useful for understanding the complexity of classroom social interactions; (b) diagnostic instruments and observational techniques useful for gathering information on the attitudes and activities of students, and gaining feedback on their reactions to the teacher's methods; and (c) behavioral scientists themselves insofar as they can be used as demonstrators, collaborators, and consultants (Ibid. p. 8).

Briefly, Schmuck, Chesler, and Lippitt describe the five phases as follows:

**Phase 1: Identifying Classroom Problems**

The teacher should be clear about his own goals and values, and the learning potentials in his classroom. Secondly, he should be sensitive to the dynamics of student behavior. He watches for signs of student aggression, underlying hostility, and negative attitudes toward academic work. Furthermore, he is attentive to the friendship patterns in the classroom, the cliques that are influencing student behavior, and the feelings of those students who are excluded from these cliques. He is attentive to the influence his personality and teaching style have on his students, as well as to how their behavior influences his.

With this sensitivity to student behavior, the teacher is prepared to make a preliminary and tentative analysis of the problem, using the concepts of the behavioral sciences as an aid... Only after he has made a tentative analysis of the problem and constructed hypotheses can the teacher proceed with more formal diagnostic methods.
Phase 2: Diagnosing Classroom Problems

In this phase the teacher attempts to probe beneath the surface of classroom activity. He seeks to verify, refute, or refine his initial understanding of it, to locate the sources of disharmony, to find concealed supportive forces that he may work with. He is seeking detailed and sophisticated knowledge of what is happening in his classroom... He will look for specific information and will choose diagnostic tools and techniques that will give him knowledge of specifics. He can use diagnostic instruments and observational techniques developed and tested by researchers and other teachers, or he can develop his own.

Phase 3: Developing a Plan

The teacher can now begin to make a plan to improve the classroom situation.

Phase 4: Adaptation and Action

After the teacher has decided on a plan, especially if he has derived it from a colleague or from reading and research, he must take care that he adapts it to his particular situation. Adaptation calls upon the teacher to use creative insight. This is a crucial phase in the problem-solving process for three reasons: (1) each teacher has an unique personality and teaching style; (2) student characteristics such as age, social background, and previous school experiences differ from class to class; (3) classroom peer groups differ in their social structures and norms.

Phase 5: Feedback and Evaluation

There are two aspects to this final phase. The teacher should try to get continuous feedback from his students as to the effects the new teaching practice has upon them; and he should attempt a long-term objective evaluation as to whether or not the new practice has improved the classroom learning climate. A prerequisite to obtaining feedback is an atmosphere in which free communication can flow from students to teacher and vice versa. However, there are special devices that the teacher can use to open the communications atmosphere and stimulate feedback. Again, as with diagnostic tools, he may use devices developed and tested by educational researchers and other teachers, or he may develop his own. Long term evaluation often
involves more systematic measurement. The teacher may use instruments and observational techniques similar to those he used in the diagnosis stage in order to make before-and-after comparisons. He may also want to compare the class in which the new practice was used with one in which he used his old methods. (Ibid. pp. 9, 10, 11).

In presenting these five phases, Schmuck, Chesler, and Lippitt stress

Classroom problem solving is an unending activity, for until the teacher can say that his students have an optimal learning environment in his classroom, there will still be problems to solve. After an evaluation of the effects of a new teaching practice has been made, the teacher may find that the old problems still remain, although perhaps in an attenuated form, and that he should develop further plans for working on them. Often the solution of one problem will create a situation in which other problems can be seen more clearly and attended to. Occasionally the solution of a major classroom problem of peer relations may release heretofore buried or inhibited energies of ignored and rejected students; and thus new problems are created... Perpetual problem solving can be taken as a model for teaching (Ibid. p. 11).

This concept, presented by Schmuck, Chesler, and Lippitt, of a problem solving process being a basis for a model of teaching is very valuable. From a thorough analysis of such a process teaching competencies could be listed. Then, each listed teaching competency could be tested for its ability to predict its contribution to teaching ability.

Unfortunately, Schmuck, Chesler, and Lippitt present the process in only the narrow scope of solving only social-emotional classroom problems. They do not expand their concept of the process to include other aspects of the learning
process. They describe the process that they spell out only in terms of establishing a climate in which learning can then take place. They don't discuss the learning at all. So, their concept of the process must be expanded if it is to represent a complete model of teaching.

As it is now, their model is not a comprehensive model of teaching because it does not focus on all aspects of learning, nor analyze each phase thoroughly enough, nor even attempt to address all the phases mentioned. They focus mainly on diagnoses and diagnostic tools and on the one technique of role playing. In diagnoses they do not address diagnoses of learning problems, only socio-emotional climates. They really don't attempt to present a method of developing a plan (Phase 3). They say that a teacher needs to develop a plan and they give several examples but don't present a methodology. In addition, their discussion of Phase 4, adaptation and action, does not go beyond what was mentioned in the quote previously given. Teachers need other techniques besides role playing. For instance, the skills needed for improvisation are also needed.

So, whereas the basic concept of teaching being a problem-solving process is an excellent idea, and Schmuck, Chesler, and Lippitt have made a very good beginning in their effort to start outlining it, the concept remains to be expanded, the phases thoroughly analyzed, research and theory integrated, and methodologies, techniques and skills clearly spelled out.
A problem solving or decision making model of teaching can be useful, however, if the process is understood to require a well integrated frame of reference. This framework must be based on data supported by experience and research. It requires a theory broad enough to give meaning to an extensive and varied amount of information. In effect, in order for a decision making model to be useful for teaching, a paradigm representing the elements, and their relationships, involved in teaching is needed. The comprehensiveness of such a paradigm will determine the quality of the decisions. It is the paradigm which will differentiate between a good decision maker who is a teacher and a good decision maker who is an industrial executive. Therefore, while it is necessary to consider the decision making process in an analysis of teaching, more is required in order to have a comprehensive model of teaching. This leads this review to one last source concerned about teaching: models of education.

Models of Education

Today, many models of education are being tried and developed. Inherent in each is a model of teaching. Some models are more comprehensive than others. Some focus only on certain age groups. Some can't be distinguished through
observation from others. However, four models which are distinguishable from other models have been selected for discussion here. These models have applicability across all age brackets (although they may currently focus in only one), and are based upon a theory and philosophy. These models are: the Behavioral Systems model, the Montessori Method, the Open Classroom, and the ANISA Model. The Behavioral Systems model has already been presented. It was used as an integrative framework around which much of the review of the literature was tied. The other models are briefly outlined in the Appendix under *A Way of Learning* (Neubert, 1972), about the Montessori Method, *Characteristics of Open Education: Toward an Operational Definition* (Walberg, 1971), about Open Education, and finally, a brief summary outline of the work being conducted in the ANISA model.

The Montessori Model includes a philosophy, a theory of development, and specific guidelines for teaching and curriculum.

The Open Education Model is founded basically in philosophy and theory of Dewey.

The ANISA Model is a specific attempt at developing a comprehensive model of education. It includes among other things, aspects of the frameworks provided by the Montessori and Open Education Models. It is founded in the belief that in order to be adequate, a model of education must be based upon a well integrated philosophy, from which are derived theories of development, learning, pedagogy, and curriculum
ANISA grew out of the belief that:

Either we must find a way of translating what we know into a powerful and comprehensive system of educational practice or face the continuation of insignificant results that inevitably comes from piecemeal, short-term, and therefore necessarily superficial program planning.

Such a translation cannot take place unless we can organize knowledge from experience and research into a usable form and this cannot take place without the formulation of a coherent body of theory. But theories themselves, if they are not to be trivial or conflicting must have some means of defining their scope and securing their integrity. Husley referred to this need as a need for a noetic integrator - "symbolic or conceptual constructions which serve to interpret large fields of reality, to transform experience into attitude and unify factual knowledge and belief." We felt convinced that education would remain ineffective until it finds its noetic integrator. Thus, the ANISA Model was developed (Jordan & Streets, 1973, pp. 2, 3).

ANISA has carefully developed a philosophical base because:

Without a philosophical base there is no hope of creating an educational system that is consistent, coherent and free of the contradictions that make practice ineffective (Ibid. p. 6).

Briefly, the ANISA philosophy is summarized as follows:

The chief feature which distinguishes man as organism from man as mechanism is creativity guided by purpose and expressed by the two fundamental capacities of man, namely, his ability to know and his ability to love. All potentialities of man are expressions of these two capacities; their actualization represents man's becoming and his essential reality. Since every actualization constitutes a new basis for further expressions of creativity, the creation of further potential is itself one of man's potentialities. The capacity to perpetually move beyond himself is indicative of man's superiority over all other created
things. The ANISA educational system, therefore, views
man as the apex of creation, capable of endless ex-
pression of an unlimited potential.

From this conception of man's nature we derived a
definition of good education as the process of trans-
lating potentiality into actuality at an optimum rate.
One of the Primary goals of the ANISA Model is to
enable each child to become fully conscious of the
process and take charge of it, thereby securing the
power to shape his own destiny (Ibid. p. 7).

From this philosophy ANISA focuses on the "process of becoming."
The process of becoming has basically three interrelated
characteristics: growth, development, and maturation.
Within the discipline of child development, the term
growth usually refers to a biological increase in the
size of the organism; development means an increase
in the complexity of its organization both physiolo-
gically and psychologically; and, maturation refers
to a genetically determined timetable that influences
the extent to which and the rate at which other develop-
mental potentialities become actualized through inter-
action with the environment. Developmental processes
are inextricably bound up with growth and maturational
processes; all take place as the organism interacts
with its environment. Thus, we have incorporated growth
and maturation within our theory of development. The
theory broadly defines development as the process of
translating potentiality (biological and psychological)
into actuality; makes that process synonymous with
creativity as the fundamental and inherent dynamic
characteristic of the organism; establishes inter-
action with the environment as the general means by
which the process is sustained; provides for a defini-
tion and classification of potentialities and environ-
ments; explains the nature of essential interactions
underlying the release of both biological and psycholo-
gical potentialities; identifies nutrition as the
primary element in the development of the former and
learning as the key factor in the development of the
latter; and, accounts for the emergence of personal
identity - the self-in terms of the structuring of
potentialities as they are actualized (Ibid. B= 9, 10).

The theory of development speaks to the importance of critical
periods in the process of becoming. Development has an order,
a rhythm. The "process of becoming" also requires attention to nutrition and learning. In focusing on learning, Jordan and Streets have said:

The role of educational institutions is to provide a means for the continuous engagement of students in the process of actualizing potential and to enable them to gain conscious control over it. The key factor in the process is learning; being in charge of the process by knowing how to learn is what is meant by learning competence. The ANISA Model thus defines the role of the teacher as a facilitator of the attainment of learning competence rather than as a disseminator of information only (Ibid. p. 12).

ANISA defines learning competence as:

...the ability to differentiate experience, whether internal or external, into separate elements, to integrate them in a new way thereby providing new information, new feelings, new skills, and new perceptions which may or may not become expressed immediately in some form of overt behavior, and to generalize the integration. Through these processes - differentiation, integration, and generalization - potentiality is translated into actuality. Control over them constitutes learning competence.

The processes of differentiation, integration and generalization are neither random nor haphazard. In most instances they are directed by intention or subjective aim, which determines what becomes abstracted, and how the abstracted or differentiated elements are then integrated and generalized (Ibid. p. 17).

Out of the ANISA philosophy and its related theory of development and theory of learning, a theory of curriculum has been developed.

The theory of curriculum defines curriculum as two interrelated sets of goals and what children do, usually with the help of teachers, to achieve those goals. One set of goals is process-oriented. It rests on the classification of environments and the organization of information one's culture has accumulated about them including the symbolic systems used to convey that information. The two sets of goals, process and content in orientation, are integrated
by the over-riding purpose of the model: actualization of the infinitude of potentialities of each child ... (Ibid. p. 18).

ANISA's categories of potentialities are: psycho-motor, perceptual, cognitive, affective, and volitional. These have been analyzed and specified in terms of subprocess (see Appendix). The classification of environments are: the physical environment, the human environment, the environment of unknowns and/or unknowables, and the self environment. So, curriculum goals center around development of the five categories of potentialities and development of knowledge and skills related to the four environments.

The ANISA theory of pedagogy defines how the teacher facilitates the actualization of these goals.

We have indicated that development is sustained by the human organism's interaction with the environment. It follows then that teaching will take its definition from this premise. Thus, to teach means to arrange environments and guide interactions with them to achieve the goals specified by the theory of curriculum. The theory of pedagogy classifies arrangements and interactions in terms of those goals. Since the main goal is the development or achievement of learning competence and since learning competence means the ability to differentiate, integrate and generalize aspects of experience, environmental arrangements and interactions with them can be classified in terms of the particular aspect of learning competence they facilitate. Some arrangements and some interactions may facilitate differentiation while others may foster integration or generalization, or do all three. Furthermore, since children are differentiating, integrating and generalizing on different developmental levels, the teacher must be able to make this kind of assessment before arranging the environments and guiding interaction. When the teacher can draw upon developmental theory to ascertain the child's level of functioning, her approach is more inclined to be diagnostic
and prescriptive (Street & Jordan, 1973, p. 17).

One major task, then, for the ANISA teacher is to arrange environments in order to create opportunities for differentiation, integration, and generalization on the appropriate developmental level. This includes such considerations as: 1) identification of deficiencies in the environment, 2) establishment of proper lighting, temperature, sound, and ventilation, 3) introduction of novelty, and 4) arrangement of appropriate social grouping.

A second task for the ANISA teacher is to guide the child's interaction with the environments. The teacher needs to determine whether active or passive interaction is most preferable, how to gain the most mileage out of activity generated goals as well as goal generated activity, when to intervene and when not to intervene, how and when to give feedback and reinforcement, how to organize space and time, how to encourage transferability, provide for repetition and practice, determine whether to offer an explanation to a child or lead him into discovery, and determine whether a child has mastered both content and the underlying process.

The ANISA Model also emphasizes that a teacher must be an appropriate model for students. Thus, teachers themselves must be competent learners. In order to be effective, teachers will also have to be well versed in the entire body of theory and the ability to translate the theory into practice. This requires a careful specification of all the aspects of environments, interactions, and how to arrange and
guide them. This has yet to be done. The philosophy, theory of development, theory of learning, and theory of curriculum have provided the broad general outlines. The specific filling in of detail is what remains to be done.

Believing that this framework provided by the ANISA Model is the most comprehensive to date, that it integrates experience and research into a coherent unified structure thereby giving meaning to diverse and previously fragmented data, the intention of part II of this dissertation is to utilize this "noetic integrator" and its articulated "conceptual constructions" to form a comprehensive paradigm of teaching which specifies the elements and their relationships that an integration of research and experience suggests are the basic factors in arranging environments and guiding interactions with them.
PART II. COMPREHENSIVE PARADIGM OF TEACHING
A review of the literature indicates no particular consensus in educational thought as it relates to teaching. Unfortunately, since each of these basic movements is limited in comprehensiveness, the benefits that can be derived from their particular point of view are similarly limited. Only through a comprehensive theory of pedagogy can an integration of the information provided by each be organized into a coherent form useful to teachers, teacher trainers and evaluators.

Education, like any other field, suffers if the basic model used for its explication is not broad enough. The inadequacy of a model derives from the exclusion of valid information which thereby limits its effectiveness. For example, in medicine, acupuncture was viewed with scepticism by American doctors since it contradicted the accepted model of the workings of the human nervous system. Now, however, faced with data that are hard to refute, American doctors are beginning to realize how limiting their model has been because it led them to focus on drug therapy in spite of the resultant negative side effects. Meanwhile, the model led to neglect of other alternative approaches suggested by folk remedies like mustard plasters, hot water bottles and ice packs because the remedies contradicted the mind set established by the accepted medical model.
In order to avoid analogous problems in education, a comprehensive, theoretically based model needs to be developed that integrates all relevant information obtained from research and experience and provides for its own perpetual self-renewal.

The Anisa Model of education represents an intensive effort in this direction. It is this framework, then, which appears best suited for the building of a comprehensive paradigm of teaching.

This portion of the dissertation is an attempt to construct a paradigm that will rest upon the extensive research into philosophy, development, learning, and curriculum conducted by the Anisa staff. A brief summary of the Anisa philosophy, theory of development, theory of learning, theory of curriculum and teaching can be found in chapter six. For a further elaboration of the Anisa Model see Appendix.

The intention of this paradigm, based on the work of Anisa, is to set forth some general hypothesis, in the form of propositions, which represent the most accurate interpretation of the reality of teaching which can be currently derived from research, experience, and our current state of knowledge.

The paradigm is termed comprehensive because it attempts to address all relevant aspects of teaching. However, calling the paradigm comprehensive does not mean that the paradigm includes or explains all educational practices, techniques, or goals. The paradigm represents
a stand on what teaching should be instead of what it is. Also, its focus is on teaching - not on curriculum, its planning or design.

Basically, teaching is viewed as arranging environments, guiding the child's interaction with them to achieve the educational goals of the curriculum, and evaluating development and the methods of its facilitation.
CHAPTER VII
THE ENVIRONMENTS

Teaching consists of arranging environments, guiding the child's interaction with the environments, and evaluating the child's development and the methods of its facilitation. The first step in the analysis of teaching, then, should be an examination of the elements which make up classroom environments, and how they can be arranged to promote development.

According to the Anisa Model, a child learns through interacting with the physical, human, self, and unknown environments. While it is important for the teacher to guide interaction with all four of these environments, the teacher can really only arrange the physical and human environments. Since the first step in this paradigm is an analysis of the elements which make up classroom environments and how they can be arranged, the focus in this section will be limited to an examination of the physical and human environments.
The environments cue behavior and facilitate development. A distinction needs to be drawn between cued behavior and development. Behavioralists have defined learning as a change in behavior. This view does not differentiate between behavior which adapts to a given environment, and behavior which modifies a given environment. Cued behavior is a response that represents an adjustment to an environment. Development is a processing that represents movement in the direction of increased control over the environment, consequences, and the future.

People are generally unconscious of the way in which environments cue behavior. Reflect for a moment how environments influence people's behavior. In an expensive restaurant people behave differently than in a soda fountain. In a restaurant people tend to sit straighter, talk more quietly, order more expensive foods, and generally behave more formally than in soda fountains where they sit on stools and rest elbows on counter tops. In the same way, behavior is dramatically different at football games than at symphonic concerts.

The man made environments of schools are no different in their effect on behavior. A school which is merely a string of small poorly lit rooms with desks bolted to the floor, blackboards mounted on walls, bare cold floors, and no storage or counter space has a different effect on students than a school which is divided into wet and dry and active and quiet areas in which materials are neatly displayed on shelves, traffic patterns are indicated by rugs and dividers,
and students have a variety of postural options. A science room filled with large tables, test tubes, microscopes, and other scientific apparatus will cue different behavior than a room filled only with desks and textbooks.

This aspect of the environment which cues behavior will be referred to as context for the physical environment, and climate for the human environment.

Context

Context may be analyzed in terms of the following:
1) setting, 2) display, 3) storage, 4) time, and 5) healthfulness.

Setting consists of room characteristics and furniture.

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The solid elements have the following attributes which also must be considered: shape, size, weight, color, texture, and substance.

It is easy to take elements and their attributes for granted. Just as a fish fails to recognize the effect of water (his context) upon his life and behavior, it is easy for educators to not realize the effect of setting upon the child. For example, the use of space has great potential for cueing behavior. Space can be arranged to guide movement (traffic)
from area to area. Corridors for traffic can be indicated by space between bookcases, shelves, rugs, etc. These arrangements can guide traffic away from work areas. This minimizes distraction.

Large spaces provide freedom for movement. Such space usually becomes an active area. Quiet areas need to be protected. This suggests smaller enclosed space insulated acoustically and visually (perhaps by shelves, carpeting, book cases, etc.).

In work areas (for building and constructing etc.) enough space is needed so that each worker has enough room to work without being distracted by another student or getting into another student's way.

Surface areas are also important. There needs to be different surface areas for wet and dry activities. Wet activities require surfaces which can be easily cleaned and dried. Dry activities may require soft surfaces for comfort. Cushions may be nice for reading. Rugs may ease working on the floor.

Surfaces must also take the reflection of light into account. Quiet rest areas can be provided by subdued color. Light colors open and brighten a room. Some colors show dirt more readily than others. Some paint and textures mark easily. Some textures are rough on skin if brushed against accidently. Generally, surfaces should provide a plain ground against which figures can be easily differentiated. Intricately designed wall paper would be distracting, easy to mark, and
would soil and stain easily while being difficult to clean and repair. Therefore, it is usually not found in schools.

The acoustical properties of a classroom are very important. A high noise level is distracting and can create an atmosphere of chaos—thereby fostering disorganization. Noise needs to be reduced from area to area. Carpeting, bookcases, and furniture arrangements can be utilized to cut down on sound. Room design, type of floor, ceiling and wall surface, and size of space all effect sound level.

Furniture should allow for flexibility of work, movement, and position. A room cluttered with typical school desks with attached chairs limits the use of space. Individual chairs, couches, pads, cushions, rugs, platforms, counters, tables of various sizes all provide for different functions.

Besides focusing on arrangement of setting, a teacher needs to display all the elements in a way that makes objects easy to identify, find, and put back. This suggests a grouping of objects according to some classification scheme. It also means placing them against a neutral background so their attributes are easily distinguishable. It further suggests placement that enhances removal and replacement with the least effort. Containers which separate classified objects and yet allow them to be visible are ideal. Obviously, their size should be suitable to the size and number of objects they contain. The containers can be placed on small trays upon which also can be placed any other related objects. There
should be space between each container and each tray so that they can be clearly differentiated.

Storage allows objects to be kept out of the way and out of sight in a place where they can be easily found and retrieved. There should be a storage place for every object in the classroom so that the environment can be easily changed.

Time is another important contextual factor. Time must be provided for activities when they are physiologically and psychologically most appropriate. For instance, difficult cognitive work should not be scheduled after lunch. Furthermore, it is important to provide enough time for effecting closure to the activity. Problems occurred during one art class because of inadequate time. The students liked their teacher, loved art, thought the suggested activities were great, but began asking to be transferred and generally began to socialize instead of work. The problem turned out to be that the students discovered it was impossible to finish anything they started. As soon as they began to get involved in a project it was time to clean up. It became easier not to start rather than face the frustration of lack of closure. This means pacing is very important. The teacher needs to schedule appropriate kinds of activities for beginning the day, know how long to let activities to go on, when to provide a change of pace, and how to schedule so that activities wind up at the end of the time limit allowed.
Generally, quiet work can be initiated in the morning. Involvement can deepen for about an hour and a half. Next, a change of pace is needed—something active. After lunch a quiet relaxing activity is most appropriate—like quiet reading. This can be followed by something providing more interaction. Variation is important. An educational T.V. program should not be followed by a movie because pacing needs to be varied.

Another factor to consider in the physical context besides setting, display, storage, and time, is the healthfulness of the environment. Ventilation, temperature, lighting, cleanliness, and freedom from toxic elements like bug sprays, lead paint, poisonous plants, and disease are important. Ventilation should provide fresh air without causing a draft or undertone of noise. Air vents for pulling in air should not be near custodial incinerators. Lighting should be evenly diffused, adequately bright without glare. The environment should be sanitary and clean. A careful watch needs to be kept for toxic elements which may innocently be brought into the room by workmen, janitors, etc. Bug sprays, paint fumes, etc. can be harmful to some children. Everything in the environment should be such that it generally couldn't be misused by children to accidently harm themselves.

A healthful context also provides good nutrition for meals and snacks. A school can greatly influence the way children feel by the food that is made available to them during the day.
All in all, then, context should not be taken for granted or ignored. Surroundings influence a child in many ways. It not only effects behavior, but feelings and social relationships. For example, if a child decides to play with some blocks, he will be influenced by the place that is available for him to use the blocks. If the child must build on an uneven shag rug surface he is forced to accommodate an obstacle not present were he to build on a flat bare floor. If there is no flat floor space, only shag rug, the child may try to find a table. If the only table available is being used for hammering peg boards or other activities which wobble the table, the block builder is going to get frustrated if he wants to build a tower. His frustration is caused by the limitations of the environment in which he is trying to operate. The inadequate work space may cause conflict between tower building, peg board hammering, clay pounding, and finger painting.

Such conflict is unnecessary. The teacher can re-arrange the environment to provide separate work areas for each of the activities. There can be a block area and an art area. The block area can be a dry area with thin indoor-outdoor carpeting for the children to work on. The area can be protected and enclosed by shelving. The art area should be in a wet area with linoleum floors. It could even be outdoors. Such an arrangement would promote greater harmony and enhance cooperation.

**Climate**

It is clear, then, that physical surroundings effect the socio-emotional climate of the human environment. A good climate is indicated by:
1. Solidarity: agreement of purpose, opinion, interest, and feeling.
2. Loyalty: members like the group and adhere to group norms.
3. Morale: persistence and group self-maintenance in the face of trouble or difficulties.
4. Satisfaction: Contentment causing members to work harmoniously together and endure disappointments, overcome difficulties, sacrifice for group, support group operations and goals, and not gripe or blame one another for occasional set-backs.

The elements which go into creating these aspects of climate are:

trust
security
empathy
standards
supportiveness
acceptance
respect
openness
responsibility
self discipline

These are affected by the dynamic attributes of the human environment.

consistency
reinforcement
freedom from threat, tension, and fatigue
degree of member sense of contribution
structure
sensitivity
objectivity
obedience

Of course, these are influenced by the more static attributes of the human environment:

count of people
age of students
age ratio
sex of students
size of students
Therefore, the human climate will have some degree of trust, security, empathy, standards, supportiveness, acceptance, respect, openness, responsibility, and student self discipline. The quality of these elements will determine the extent of solidarity, loyalty, morale, satisfaction and atmosphere. All of this will be influenced by the number of people, their ages, age ratio, and sex. The teacher can adjust and improve the quality of the climate by establishing consistency, reinforcement, freedom from threat, tension, and fatigue, allowing for member contribution, creating structure, being sensitive, objective, and being firm in requiring obedience.

Usually, when teachers have "discipline" problems (lack of cooperation) the trouble stems from a climate, created by the teacher, which lacks consistency, reinforcement, opportunity for contribution, clarity of structure (groundrules), sensitivity, objectivity, and firmness. These are usually replaced by threat and tension. In such a climate children rebel.

These problems can usually be avoided by the teacher establishing ground rules. By stating a few rules which present in positive terms what the children are expected to do the teacher can clearly indicate what behaviors are desired. Such rules tell children what to do and indicate what not to do. Once such rules are established the teacher needs to enforce them firmly and consistently. This means there can be no unjustifiable exceptions to the rule. The teacher must obey the rules also.
Once a set of rules is established the teacher has indicated behaviors which are to be reinforced. The children should be rewarded for correct behaviors. The teacher should give recognition to both individuals and to the whole group for following rules.

In this way, it is easier to be objective. A simple rule is either obeyed or broken. Structure is clear to everyone. There is no need for threats because rules are consistently enforced (enforcement is not threatened) and their observance is reinforced.

Only one other ingredient is required. Each child in the classroom must feel that he is worth something. This means the teacher needs to be sensitive to the way the child feels and give him opportunities to contribute.

Sensitivity does not mean accepting all behavior and emotional expressions because one understands. A teacher must always encourage appropriate behavior from a child. Sensitivity is the ability to see at what level a child is functioning, where he is striving, and how to intervene so as to effectively aid him in actualizing his potential.

A sense of contribution on the part of the student is also very important. A student who is constantly told that he can't sing will not continue in choir. In the same way, a student whose opinion is constantly corrected, suggestions rejected, and is never delegated responsibility will soon stop trying. A sense of contribution, then, is a factor influencing involvement and commitment.
In summary, in arranging environments teachers need to consider context and climate. In arranging context a teacher works with setting, display, storage, time, and healthiness. He focuses on shape, size, weight, color, texture, and substance while arranging space, surface, lighting, ventilation, acoustics, temperature, tables, chairs, shelves, drawers, rugs, platforms, dividers, couches, pads, etc. In establishing climate the teacher looks at solidarity, loyalty, morale, satisfaction, and atmosphere evaluating the level of trust, security, empathy, standards, supportiveness, acceptance, respect, openness, responsibility, and student self discipline. He achieves these qualities by establishing consistency, reinforcement, freedom from threat, tension, and fatigue, a sense of contribution, clear structure, appearing sensitive and objective and firm in his requirement of obedience.

Instructional Units

In addition to working with context and climate, the teacher also arranges instructional units. In the physical environment the teacher arranges supplies, materials, and equipment to create instructional objects, audio-visual aids, field trips, simulation games, reading matter, and bulletin board displays. In the human environment the teacher arranges the size of groupings, goals, procedures, communication and interaction patterns, feedback systems, and development of interpersonal task and socio-emotional skills to create effective lectures, demonstrations, discussions, modeling, role playing, group games, brainstorming, synectic and problem solving sessions. (For
the principles and procedures for creating instructional units and for a list of interpersonal task and socio-emotional skills—see Appendix).

Of course, in arranging environments, a teacher's focus needs not only to be on the elements to be arranged, but also on their content, structure, and the criteria for evaluating their arrangements. By content is meant the potential purposes or uses of an object, or objects, along with its potential consequences. Structure is the pattern and relationship between elements. Criteria are the standards against which the arranged environments will be judged.

Content

The important thing to realize is that the content of the environment, and even of single elements in environments, is almost unlimited. This implies two things for the arranger of environments: 1) elements can be used in a multiplicity of ways, and 2) if a particular use of an object is desired it must be clearly specified. In addition, the teacher needs to be careful that objects don't allow the creation of unintended content.

Structure

Structure is the patterned relationship among elements in the environments. Structure is very important in the arrangement of environments. Arrangement requires consideration of 1) patterns and their complexity and variation, and 2) the individual elements which make up the patterns and their concreteness and clarity.
Patterns

A pattern is a grouping of elements whose relationship is repeated thereby forming some meaning. For example, a tree is a pattern of elements (a structure). The tree is made up of limbs, leaves, roots, trunk, etc. And, each of these elements is composed of sub-elements. Leaves have shape, color, veins, cells, etc.

Patterns vary in complexity. Complexity is influenced by the number of elements (variables) in a structure, their relevance, and the amount of change they undergo over time.

Obviously, the number of elements in a structure influence its complexity. The number of elements is important because a child's ability to handle variables changes as he develops. In the Preoperational Stage (approximately 2-7 years) the child lacks the ability to coordinate variables. He only focuses on the one variable which stands out perceptually. It is not until the stage of formal operations that a child is able "...to incorporate into one single system all the variables that may be relevant, and to vary only one factor at a time (Kamii, 1972, p.102)."

In addition to complexity being influenced by number of variables, the relevance of the variables further contributes to complexity. Some elements are more relevant to the general function of a structure than other elements. Irrelevant elements are distracting. They require a child to be able discriminate relevant elements from the irrelevant. "Mind buster" puzzles use irrelevant elements to distract and mis-lead a problem
solver. Therefore, a teacher should attempt to eliminate unnecessary distractors. Plain wooden blocks would be better than wild psychedelic plastic blocks. The wild designs are not related to the function of the blocks. The designs only confuse and hinder perception of edge, shape, dimension.

When a child has difficulty the teacher should check to see if the child is having a problem discriminating relevant from irrelevant stimuli. In reading this is particularly important. It has been found that one chief difference between slow and fast learners is that the fast learners know how to select out the relevant stimuli. The slow learners attend to the wrong elements. Young children may attend to the size of letter instead of shape. Older children may not be able to pick out main ideas in reading passages.

Students having this kind of difficulty need materials which have few distractors. They also need cues which aid focusing on relevant elements. As the children progress the cues can be withdrawn and distractors added so the students can learn to differentiate at higher levels of complexity.

Another factor which adds to complexity is change. If elements or their relationships change the structure becomes more complex. It becomes even more complex if the change is rapid. For example, a dance step may be easy to imitate if it is demonstrated slowly, but it may be nearly impossible to differentiate out its movements if it is demonstrated up to tempo.
In addition to effecting complexity, however, variation (change) serves another important function. It introduces novelty. A balance needs to be struck between too much variation which causes too great complexity, and too little variation which allows for no novelty. This presents a problem of pacing. The teacher should carefully watch students for signs indicating too much novelty or too little. The teacher should then adjust the pace of changing the environment to fit the students. This means that in arranging environments the teacher needs to first set out a limited number of instructional units and watch the child's interaction with them. The child determines his own pacing in the use of materials displayed. The teacher determines how much is displayed and how fast the displays are changed based on the child's interactions.

The more versatile the materials are, the more leeway there is in pacing. Old materials can be used in new ways. Versatile materials can be used by several different developmental levels. For example, blocks can be used by three year olds as well as six year olds.

In brief review, then, in arranging environments the teacher must consider structure. The teacher aids the student in discovering patterns by controlling the degree of complexity and providing a proper amount of variation in the environment. One way of making this task easier is by utilizing materials that are versatile.
In addition to these aspects of structure, the teacher must also consider two basic characteristics of elements which make up structure: 1) concreteness and 2) clarity which involves contrast, focus, and order which involves consistency, subtlety, immediacy, and sequence.

Elements

Instructional units can be concrete or representational. In other words, an element may be real (like a dish) or representational (like a picture of a dish). As mentioned in the review of the literature, Twelker claims that elements can be either concrete, iconic, analogical, or symbolic. Blocks would be concrete, paintings iconic, models analogical, and writing and speech symbolic. Actually, elements can be judged on a continuum from concrete to representational. Therefore, it is possible to have concrete symbolism and abstract symbolism.

As far as determining which kind of stimuli is most preferable, Montessori and Piaget recommend that children move most naturally in a sequence from concrete to abstract.
Montessori observed that children form abstract concepts by repeatedly manipulating concrete materials. Young children are able to perform operations using concrete materials that they cannot perform until older without the aid of the materials. Montessori believed that children were led easily into abstractions through the structured use of materials. Thus, some apparatus is introduced to the pre-school child and is worked with on the sensorial level; his actual experiences with the material continue through the primary grades; he discards the materials when he no longer needs them. More complex and abstract uses of the material are presented to the child as he moves along in school; the child discovers many of the concepts in the materials without the teacher's having brought them to his attention (Rothman, 1973, p.23).\(^1\)

Besides environmental elements having some degree of concreteness, they also have, or lack, some degree of clarity. Clarity is created by contrast, focus, order, subtlety, consistency, and immediacy of information.

Contrast is the degree to which an element stands out and is different from other elements. Teachers need to consider contrast in arranging the environment in order to facilitate differentiation.

In arranging environments placement of equipment and display of materials requires proper contrast for drawing attention.

Young children won't be able to select out individual objects from a jumble of objects if they are all placed together. For example, a one and a half year old boy was playing ball with his father. The ball rolled into a pile of toys and the child couldn't find it. He stood looking right at the ball in the pile of toys while asking where the ball was.

Contrast is also important for aiding differentiation. Instead of giving a child one color to paint with a teacher should give the child at least two colors. In teaching a child a concept like "dog" a teacher can improve understanding by contrasting the features of a dog against the features of other animals like cats, cows, etc. In this way, contrast aids in clarity of definition. It helps focus attention.

Focus is the degree to which a stimulus has distinct, precise definition. Clarity of outline and careful attention to specifics help focus. For example, writing can be made more distinct and clear by outlining a general framework and then defining it with specifics.

Obviously, in outlining a general framework for a speech or a piece of writing, the outline clarifies order. Order is how the different parts, elements, or sections fit together. It's only through order that we can better understand and deal effectively with the world. Montessori pointed out how important order was for children's learning and growth.
The term "order" as used by Montessori means the order of life, the relationship of things, places, and times—not just keeping things in their proper places. A small child must construct an ordered picture out of chaos; he has to make thousands of classifications and connections. One of the main purposes of the Montessori apparatus is to help the child to classify and to discover relationships. At home, the parents can try to give him a routine he can depend on (though naturally one can't keep a schedule 100 percent of the time). His room and toys should be arranged in a consistent fashion. Parents should tell him where they are taking him and why, instead of dragging him around without any explanations. He should be disciplined and reacted to in a consistent, dependable way. This helps him to feel secure, to organize himself, understand the world, and "construct" his personality. (Orem, 1971, p. 33).

About order, Paula Lillard adds, "Only in such an environment can the child categorize his perceptions, and thus form an inner conceptual framework with which to understand and deal with his world (Lillard, 1972, p. 33)."

Order exists naturally in the universe, but sometimes it is too subtle or too complex for a child to explore without some assistance. Both the Montessori and Anisa teachers help the child considerably by carefully arranging the environment. The environment is arranged so that order is highlighted. Order that is self apparent in materials enables the child to learn about his errors through the materials;

...he is not dependent on the teacher for correction or rewards. A Montessori teacher is not to interfere with a child who makes a mistake with the materials; when the child uses and reuses the material, he will come to understand it fully and will see his own error. The didactic materials are carefully sequenced so that the child can proceed from one step to another, from the simple to the complex, from the concrete to the abstract with only a minimum of teacher intervention (Rothman, 1973, p. 11 taken from Montessori, 1965, p. 44).
Predictability is a central concept throughout all of Montessori's philosophy. The child who enters a Montessori classroom always knows where the materials are kept. He knows how to care for himself, for the materials, and for the environment: he has been taught a sequence of steps which will lead him to success every time. He knows how to use the materials in the room properly. Since materials are always returned to their proper place, the child knows where to find what he needs. Ground rules and standards for order remain constant, because the teacher, also, is consistent in her classroom tone, the child knows there will be a calm atmosphere in which he can work. The materials may change from day to day, but the general approach, the ways in which the child goes about his work remain constant (Ibid. p.17 and 18)

Guidelines for creating pedagogical materials are:

1. Any material which is in the room is there for a specific purpose.
2. The equipment is easy for the child to handle and manipulate.
3. The apparatus for a given exercise is kept together so that the child can proceed in his work in an orderly fashion...
4. The purpose of the material is readily grasped by the child.
5. Materials are constructed which isolate the difficulty or the new concept which the child is to learn. Only one new concept is presented at a time.
6. The materials are self-correcting either by the child's own sensory perceptions of the material or by the child's use of an answer key or master chart.
7. The materials are able to be used by the child after a concise, simple introduction by the teacher.
8. The materials are carefully sequenced to build upon former learnings and to lay the foundation for new knowledge. It is because the teacher is fully aware of the sequence and the breadth of parallel exercises available at every level that she is able to bring into the environment what the child needs at any specific time and is able to keep track of the child's work.
9. The materials proceed from the concrete to the abstract.
10. The materials are interdependent. Learning from one material is reinforced and expanded by using companion materials.
11. The materials are able to be used over and over again. The child gains new insights into the material as he continues to use it. Most materials are designed to be used in a variety of ways, each of which brings out a particular attribute of the material.

12. Each material has been developed to be used with children of different ages, different interests, and different ability levels. The child brings his own level of understanding to the material; the child gains from the material learnings that correspond to his developmental level (Ibid. p. 22, 23, 24).

Arranging concrete environmental stimuli in an orderly fashion becomes an effective and powerful way of structuring the environment for facilitation of learning. Consistency, subtlety, immediacy, and sequence are necessary for establishing such order.

Order is maintained through the provision of consistency. Consistency is agreement, and logical connection between things, acts, statements, decisions. If there is inconsistency the search for order must continue. Inconsistency means that predictions can't be made. Inconsistency requires a person to find some rule or principle which will at least improve predictability.

Usually, the problem of consistency presents itself in two types of situations. In one kind of situation, inconsistency is perceived because of inadequate interpretation of complex phenomena. In such cases, children may find it too difficult to discover the consistency by themselves. The teacher's task is to arrange the environment so that the number of variables are reduced, thereby making it easier for the children
to find the consistency. In the second kind of situation, inconsistency is perceived because a social phenomenon truly is inconsistent. In such cases, the teacher needs to be careful to help social behavior become more consistent (especially the teacher's own behavior).

So, in the first kind of situation, natural phenomena may appear inconsistent because of great complexity. Even simple unknowns may appear inconsistent until the various factors are explored and understood. For example, a child may at first think two bar magnets react in an inconsistent way because they sometimes repel and sometimes attract. However, because the variables are fairly simple, the child soon learns that certain ends consistently attract and certain ends consistently repel. In more complex phenomena, however, a child may not be able to discover the consistency because there are too many variables. In such cases, the teacher can simplify the problem by reducing the number of variables that the child has to explore at any one time in order to find consistency.

Inconsistency also appears in the human environment as well as in the physical. In the human environment teachers are inconsistent in action by varying 1) rules and their application, 2) amount of attention they are willing to give, 3) punishments, 4) reactions to questions, and 5) expectations.

In addition, teachers are often not aware how the consistency of their actions are inconsistent with their intentions.
Often they say one thing and do another, threaten but never carry out the threats, say assignments are important but never correct them, say they want students to be self-governing and then dictate, tell students how important creativity and freedom are and then react negatively to styles of dress, say that students should be enthusiastic about learning and then give them drill, etc.

Sometimes, teachers appear inconsistent to their students because they don't clarify the reasons and intentions underlying their behavior. For example, a teacher who claims that he has no favorite students may appear inconsistent to students because he always seems to select certain students for the important jobs. For instance, if the class produces the school newspaper, the teacher may have Jane type the final stencils because she is the only person who has had typing and types well. Many members of the class probably like to type and would like the job. Therefore, they may think that Jane is one of the teacher's favorite students. As far as the teacher is concerned he is picking Jane because she can do the best job. He would be willing to let anyone else do the typing if she could type fairly rapidly without too many mistakes. The teacher believes he is not showing favoritism. However, the teacher's reasons are not clear to the students and they do not feel that there is any way that they could
get a chance to type. They see it as favoritism. The teacher
is causing an unnecessary problem by not discussing the typing
job with the class. The class is learning only the teacher
has favorites and is learning nothing about job requirements,
efficiency, division of labor, by the teacher making the
decisions himself. Student participation in decision making
would soon clear up what appears to them to be an inconsistency.
As inconsistencies disappear, learning takes place.

Teachers need to be careful to make sure that apparent
inconsistencies are explored, and that actions are consistent
and they are also consistent with intentions.

Sometimes individual elements, or patterns of elements
are too subtle to be easily differentiated out by a child.
In such cases the child may need help in focusing and
contrasting the elements in order to differentiate them.

Subtlety, of course, may occur in the human, physical,
and self environments. In the human environment, for example,
a teacher may consistently give one child certain privileged
responsibilities because the child has proven himself capable,
responsible, and dependable. Meanwhile, another child who is
not yet responsible and dependable because he hasn’t
learned (differentiated and integrated) the elements of
dependability and responsibility probably will not recognize
that the first child was chosen for the job because of his
dependability and responsibility. He will probably think the
first child was chosen because of favoritism. So, the teacher
must help the second child learn dependability and responsibility by clarifying their elements. These elements can be defined by bringing them into focus. The teacher can draw attention to them, point them out, and illustrate them. Then, he can contrast them with irresponsibility. In this way, through attention and specific definition, a teacher can help subtle elements become more obvious.

Psychological and emotional elements from the self environment can also be extremely subtle. Students need to learn to differentiate out the subtleties so their underlying aims can be identified and directed. For example, a student may be trapped in a low expectancy cycle where he begins to feel there is no way to be successful. On the surface, he can't point to any concrete cause for depression, falling self esteem, and his declining confidence. Low expectancy on the part of others is too subtle as is his own sense of self esteem and confidence. The student may turn to escape (like drugs) without even realizing what is happening.

The physical environment can also present very subtle stimuli. For example, the problem of infection from bacteria due to unsanitary conditions is too complex a notion for children to discover by themselves. Therefore, natural order in the environment is not enough to promote learning by itself. The teacher must arrange phenomenon so elements become more obvious. For instance, in the case of bacteria, just by introducing microscopes, a teacher has improved the chances for children to discover the world of micro-organisms.
Another element that effects clarity, through its influence on subtlety, consistency, and therefore, order, is immediacy. Immediacy means a direct relationship is apparent. For example, the relationship between unsanitary conditions, bacteria, and disease may not be readily apparent to students because of the passage of time between unsanitary contact and effect of disease. In such cases, the teacher needs to clarify the link or arrange the elements so that information is more immediately available.

Immediacy of feedback becomes particularly important. This is why self correcting materials are so effective. Whenever a student must depend upon the teacher to correct responses, there is a time delay. If a student has to wait a long time before receiving information about the correctness of his response he may lose the connection between his response and the feedback and forget the nature of the original response. In addition, his learning is greatly slowed because exploration of variation is brought to a stand still while unproductive time passes waiting for information.

Sequence refers to an orderly change in the environment. A teacher can help students discover the order present in the change by making the sequence become more apparent to the children. The sequence can help define the change. Sequence needs to be emphasized. Timing can be used effectively in pacing the steps in a sequence in order to aid differentiation.
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To summarize this last section on structure, it can be said that a teacher in arranging environments, chooses the level of complexity and the degree of variation, concreteness and clarity which is appropriate for a child's developmental level. Clarity is influenced by contrast, focus, and order. Order is an important aspect of structure by itself. The clarity of order is influenced by consistency, subtlety, immediacy and sequence.

Choice among these variables is made by considering certain basic criteria.

Criteria for Evaluating Environments

In this chapter many different elements have been listed that teachers need to consider in arranging environments. All the elements are judged against three basic criteria: 1) feasibility, 2) desirability, and 3) functionality.

Feasibility

In considering feasibility a teacher must ask if an arrangement under consideration is possible, if it is economical, if it is the most efficient use of resources, and if there is time to arrange it.
Desirability

Next, a teacher needs to consider how valuable the proposed environmental stimulus will be. Will it be suitable (match developmental level and interest)? How healthy will it be (will it promote development)? Is it politically astute (will some parents object)? Is it aesthetic? Is it moral? Is it ethical (does it conform to ground rules, school rules, professional code and judgement, and state laws)?

Functionality

Lastly, and certainly important, is the environmental stimulus useful? What is the degree to which it meets purposes. What are the deficiencies in the proposed arrangement? Does it satisfy needs in terms of content, process, necessary attributes (size appropriate for students, etc.) and structure? Can it serve several purposes? How much flexibility does it allow? Will it serve several developmental levels?

Summary

There are many things to consider in arranging environments. First of all, the two basic environments that the teacher arranges are the physical and human environments. In the physical environment the teacher arranges context and instructional units. The general attributes of both are: shape, size, weight, color, texture, and substance. Context consists of the following elements: space, surface, lighting, ventilation, acoustics, temperature, and various types of furniture. In arranging these the teacher needs to consider setting, display, storage, time, and healthiness. Physical instructional units are
instructional objects, audio-visual aids, field trips, simulation games, reading matter, bulletin boards, and physical demonstrations. These are arrangements of supplies, materials, and equipment.

The human environment consists of humans and their patterns of interaction. The human environment can be analyzed in terms of its general climate and patterns of activity which form human instructional units. The human environment has the following static attributes: number of people, size, age, age ratio, and sex. It also consists of the following dynamic attributes: consistency, reinforcement, freedom from threat, tension, and fatigue, degree of member contribution, structure, sensitivity, objectivity, and obedience. These influence the elements of trust, security, empathy, standards, supportiveness, acceptance, respect, openness, responsibility, and self discipline. These elements go into establishing a climate which will consist of some degree of solidarity, loyalty, morale, satisfaction, and atmosphere.

Instructional units involving the human environment are: lecture, discussion, modeling, demonstration, role playing, group games, brainstorming, synectics, and problem solving sessions. These require arranging group size, goals (agendas), procedures, communication networks, feedback systems, interaction patterns, and the managing of interpersonal skills—both task and socio-emotional.

Both the physical and human environments need to be analyzed in terms of content, structure, and criteria for evaluation. Content requires consideration of potential
purposes, consequences, and information. Structure requires arrangement of patterns and their complexity, variation, concreteness, and clarity. The basic criteria for evaluation are 1) feasibility, 2) desirability, and 3) functionality.
CHAPTER VIII

INTERACTION

Observing Interaction

Once a teacher has arranged an environment to facilitate development, his next responsibility is to carefully observe and guide the student's interaction with it. Interaction is the way in which the environment and the student operate upon each other. The quality of the interaction is a function of the match between environmental arrangement and student developmental level. The previous chapter addressed the subject of environmental arrangement. This chapter will focus on the relationship between student developmental level and interaction.

Developmental Level

According to Piaget, children construct knowledge (schemas) about the world around them.

Fundamental to Piaget's theory is the notion that knowledge is not passively received from the environment but actively constructed by the organism. Piaget rejects the S—O—R model because it assumes that the organism perceives and receives the stimulus from the outside in a passive way. As Piaget puts it, there is nothing stimulating about the stimulus itself, and stimuli as such do not stimulate the organism. It is the organism that acts on the stimulus, and not the other way around. ...For example, the baby may be exposed to his bottle hundreds of times, but he does not know it well enough to recognize it until he has constructed the object in his mind (Kamil, 1972, p.112).

Piaget has discovered that this process of construction changes as the child develops. Piaget has identified four major stages which represent different levels of cognitive development. These are: 1) sensory motor stage, 2) preoperational stage, 3) stage of concrete operations, and 4) formal operations.
In the sensory motor stage

Children...encounter objects through random physical movement, without thought (Dyrli, 1972, p.6).

The muscular reflexes by constant exercise, become modified and the child's physical movements in space get coordinated. He acquires notions of objects and their permanency... (Raman, 1973, p.7)

In the preoperational stage the child approaches problems through trial and error.

...the child does not use logical operations in his thinking. ...the child is perceptually oriented, i.e. he makes judgements on the basis of how things look to him... He is aware of only one variable or property since it stands out visually. He lacks the ability to coordinate variables... The development of logical process, though not stagnant, is very slow... (Ibid; p.8)

In the stage of concrete operations:

...the child...begins to think logically, but this thought is concrete rather than abstract. In other words, while he can now perform simple logical operations, the child can do more advanced thinking if given physical objects to manipulate than he can if he is expected to do the same problems symbolically (Dryli, 1972, p.12).

Finally, in the stage of formal operations

The individual in the stage of formal operations learns to manipulate symbols and deal with ideas verbally without the necessity for always working directly with the physical objects. In other words, he becomes able to think in increasingly abstract terms.

The individual in this stage also learns to hypothesize before doing something. He can suggest for example What might happen if I put an ice cube in a glass of cooking oil," and can then perform the operations necessary to either prove or disprove his suppositions (Ibid. p.23).

The first step, then, in observing interaction is to identify the general developmental level of the child. The environments should then be arranged with the consideration of developmental data. The teacher can observe the degree of complexity that can be handled and the degree of abstractness. The teacher also needs to observe the length of time children
spend in various activities (see chapter VII for discussion on complexity, abstractness, and pacing). A two year old may spend thirty minutes dropping pennies through a slot into a can. It is unlikely that a normal ten year old would be interested in doing that activity at all. The ten year old might spend half an hour writing a story—something that is very unlikely for a two and a half year old.

Obviously, a child cannot handle information until he has a framework for dealing with it. Watching the activities in which a child engages, the activities he avoids, the appropriate and inappropriate behaviors he manifests helps a teacher determine the level of development of a child's framework. The importance of the level of development of this general framework has been related in an example given by Kamii.

Let's take the example of the knowledge that Washington is the capital of the United States. If we tried to teach this knowledge to our preschool children, the most we would get would be rote recitation. The children would not even understand the statement because they do not have the general framework of knowledge into which they need to fit the statement in order to understand it. They need a framework of geography and political organization to understand this sentence. To have this framework, they have to have a general cognitive structure. Even the four-year olds living in Washington would not understand that they live in Washington, or that they live in a city and a country at the same time. To them, "capital" may mean a person, or a building, or a fountain, or nothing at all. Classification is thus involved in understanding each of these words, as well as the relationship among the three main words. In addition, space has to be structured to understand the spatial relationship between Washington and the United States.

A sixth grader can more or less understand that Washington is the capital of the United States. However, after six additional years of living, reading the newspaper, studying history and civics, and taking a senior trip to Washington, the same child will be able to derive much richer meanings from the same statement (Kamii, 1972, p.93-94).
The Learning Process

A child develops his schemas through learning. Learning consists of the processes of differentiation, integration, and generalization.

Differentiation is the process of selecting out, finding the differences in or between, distinguishing, discriminating, separating, or setting apart. It is facilitated by increasing clarity, reducing complexity, providing focus through cues, supplying comparison and contrast, and allowing for exploration of variation. These can be provided by re-arranging the environment (non-symbolic intervention) or through symbolic intervention.

Arranging the environments (non-symbolic intervention) has been discussed in the previous chapter. The environment should be arranged to provide for clarity. Children should be able to easily recognize materials, determine their use, and be able to find where to return them. This suggests that instructional materials should be contrasted against a plain ground. Walls, shelves, carpet, etc. should be a neutral as possible. The use of instructional units should be clearly indicated by their placement and display. They should be separated by space so that they can be clearly seen as a separate unit. Color and form can be used to provide definition. If the environment seems too difficult for a student the teacher should attempt to simplify it even more and perhaps even provide cues. For example, if a child is having trouble seriating ten different sized cubes in a building tower, the teacher might reduce the number of cubes giving the child only
three—the biggest, smallest, and one half way in between in size. The correct order could even be cued by laying the blocks out in a line in the correct sequence. If cueing is necessary, attempts should be made to eliminate it as soon as possible.

Sometimes the information a child needs is not provided naturally by the environment or is too subtle for the child to differentiate and the teacher needs to provide the information to the child symbolically. If the information is subtly inherent in the environment the teacher can use indirect symbolic intervention (ask questions). If the child is too frustrated or unable to get the information from the environment the teacher should use direct symbolic intervention (tell him).

A teacher can use indirect symbolic intervention (asking questions) when information is available to the student but he has not focused on it. Questions help focus a child's attention. During differentiation, a teacher should ask questions that help a child attend to separating data. These would be knowledge questions. A young child might be asked the difference between a watermelon and a cantaloupe. A college student might be asked the difference between learning and development. The significant thing for a teacher to realize is that he shouldn't begin with just any knowledge question. The teacher must select the important elements to which the child is failing to attend. Secondly, the teacher must ask the child the difference between these elements and other elements. Thus, a teacher doesn't just ask a child "What
is a cantaloupe?" He asks "What is the difference between a cantaloupe and a honeydew?" This focuses on the color of the flesh and the taste. He can then ask, "What is the difference between the cantaloupe and watermelon?" This draws attention to the texture of the outside.

Telling a child (direct symbolic intervention) should be used when information is not easily accessible for the child. For example, the only way for a young child to learn the name of the large, smooth, green egg shaped object with a red juicy inside and many small black seeds is to be told that it is a watermelon. There is nothing inherent in the appearance of the object that suggests that the particular sounds which make up the word watermelon should be connected with it.

In facilitating differentiation it is preferable to attempt to guide the process by first re-arranging the environment. If this is not enough, non-verbal cues should be used next followed by indirect symbolic cues (questions), and finally by direct symbolic cues (penciled marks, arrows, diagrams to spoken word).

Whereas differentiation is the process of separating elements, whether internal or external, integration is the process of organizing and relating the elements together in a new way providing new information, feelings, perceptions, or skills. Integration is the bringing or fitting together of parts into a whole. After a child is able to select out elements, he must figure out the relationships between the elements, how they organize into a whole. Students must put things together, combine, make connections, and synthesize.
Bloom has said:

This is a process of working with elements, parts, etc., and combining them in such a way as to constitute a pattern or structure not clearly there before. Generally this would involve a recombination of parts of previous experience with new material, reconstructed into a new and more or less well-integrated whole (Bloom, 1956, p.162).

For Bloom, integration is

...the notion that every experience involves a combination of parts of previous experience with the present experience in such a way that the organism is permanently changed, however slightly.

Often the concept of integration is discussed in terms of "creative learning."...In one sense all learning is creative; the individual has acquired an understanding or some other reorganization of experience which is novel for him (Ibid. p.165).

Once elements have been clearly separated out (differentiated) attention needs to focus on how they relate together. This process is facilitated by redirecting the procedures used to promote differentiation. A relationship represents aspects that elements have in common. Therefore, clarity, simplicity, and cues can be used to focus on similarities and for drawing comparisons rather than on differences. For example, for differentiation, attention was focused on the differences between watermelons, honeydews, and cantaloupes. Students focused on the outer texture, inner color, and taste, in order to discover these qualities. Now, during integration, the child needs to discover that the smooth green outside always has the red inside with small black seeds and watery taste while the rough tan outside and orange inside consistently has a stronger and different taste while yellow smooth outside and green inside has a sweet taste. The relationship between the yellow smooth outside and green inside is that they both belong to the same unit which has a sweet taste. This unit of color,
texture, and taste can then be distinguished from the other
two units—cantaloupe and watermelon. (Next, a generalization
can be drawn by noting the similarities between them—they
each have a rind, seeds, are juicy, and their internal substance
is similar in texture—defining attributes of "melonness."

Integration, then, is finding similarities and patterns.
Patterning takes time.

Psychologists have long known that, when properly spaced,
periods of learning are more effective than when continuous... here we see novelty in ideas appearing after intermittent
attack upon the problem. Back of these facts stand a
physiological process which is not yet completely under¬
stood. I suggest that we take the fact of increasing
neural organization and growth as a phenomenon and deal
with it as such until we know more about it (Hutchinson,

Dr. Maltz (1961) has provided findings which suggest that
integration requires time. He gave examples of amputees
continuing to respond as if they still had their missing limb
up to twenty-eight days after amputation. They could obviously
see that the limb was missing, they could talk about it being
gone, but they would still act as if it were there. They had
differentiated out that the limb was gone, but it took time
to integrate that fact into their thinking and behavior.
Thus, it seems appropriate to assume that integration can
be facilitated when a series of experiences are spread over
a period of time allowing time for incubation during which
neural organization can take place.

In addition, multi-sensory and modal stimulation may also
increase pattern formation. One current theory, based on the
mathematical formulas derived from a study of holograms,
hypothesizes that multi-sensory input is important because the
nervous system stores information according to holographic principles. The theory claims that interference patterns from multiple signals which come to the nervous system at the same time are recorded at the synapse. Therefore, multistimulation facilitates pattern formation and recall.

In brief review, integration is the pulling together of elements into a pattern. It is facilitated by focusing attention on finding similarities and drawing comparisons, by providing time for incubation, and by providing a variety of experiences over time through different senses and modes of learning (perception, cognition, etc.).

The third process in learning is generalization. Generalization is the process of extending the newly discovered relationships and patterns to include similar phenomena. It is the transferring of patterns of relationships to new situations. It is the inference of similarities and differences between one situation and event and other situations and events. In a way, generalization is a further, broader set of differentiations and integrations. In the example of the melons, the focusing on color, texture, etc. represented differentiation. The putting together the elements into a relationship which formed a unit (smooth green outside, red inside with seeds composes a watermelon) represented integration. The recognition that watermelons, cantaloupes, and honeydews are similar (are all melons) represented a generalization.
It is important that students be able to transfer learning from the specific situation they encountered to other similar situations. Such carry over is facilitated by exposure to other situations, phenomena, incidents, etc., and having students focus on similarities and differences with their specific newly integrated experience. Generalization calls for the newly integrated pattern to be treated as an element which is to be differentiated from other elements and integrated into an even broader pattern. It helps to allow the child to test out his newly found pattern of relationships in other contexts through reflection, direct comparison and contrast, or, if possible, by direct application.

Altogether, learning competence is the gaining of conscious control over differentiation, integration, and generalization as applied to the multiplicity of processes underlying the five general categories of potentiality: psycho-motor, perceptual, cognitive, affective, and volitional. These processes are utilized in developing skills for interacting with the physical, human, self, and unknown environments creating technological (for the physical environment), moral (for the human environment), and spiritual (for the unknown environment) competencies. This means that interaction involves both process and content. Therefore, a teacher must diagnose and guide interaction on the basis of the development of process and the learning of content. This necessitates knowledge of the important processes
underlying the five categories of potentialities and the information to be acquired in the major categories of content.

Categories of Potentialities

As mentioned, the basic categories of potentialities are volitional, affective, psycho-motor, perceptual, and cognitive. Of course, there are an infinite number of potentialities. Each may become a specific process of interaction with the environment. A process is an "...ordered expression of a potentiality (Kalinowski & Jordan, 1973,p.5)."

Because there is no way to determine all of the processes, it becomes necessary to

...identify those processes which are central--those which have the greatest importance for the subsequent life of the organism. The importance of a process is defined by two criteria: (1) the degree to which it engenders effectance, (i.e., the degree of control over the environment it brings to the organism); and (2) the extent to which it is fundamental to other processes, (i.e., the extent to which it creates or extends potentiality).

Processes themselves are initiated and maintained through interaction with the environment (Ibid.).

In the actualization of potentialities through an ordered expression (process), a stage (representing the basic unit of change) consists of differentiation and integration (and the sub-stage of generalization in psychological expressions) (Ibid.p.13). In guiding interaction a teacher needs to be able to identify important processes, the units of change (stages) which take place in each, and the elements which need to be differentiated, integrated, and generalized in each unit of change (stage).
This information can be found in the specifications of the Anisa Model. For each of the five general categories of potentialities the Anisa Model has identified the "central" processes which "...have the greatest importance for the subsequent life of the organism (Ibid.p.5)." A specification has been written for each process containing a definition, description (and a review of the literature), developmental sequence, justification for selection of the process in terms of its importance to learning competence, educational objectives, proto-typical experiences for facilitating differentiation, integration, and generalization, and procedures for evaluation. A listing of processes identified by Anisa can be found in the appendix.

A recognition of the central processes, the developmental hierarchy of changes for each, the elements in each which need to be differentiated, integrated, and generalized is important. It has been found

...only about half of the adult American population fully reaches Piaget's stage of formal operational reasoning and only 5% reach the highest moral stage demonstrat(ing) that natural or universal forms of development are not inevitable but depend on experience (Kohlberg & Mayer, 1972 p.486).

The task of the teacher is to influence the kinds of experience a child has in order to insure maximum development of potential. This means the teacher needs to recognize the child's current stage of development and be able to arrange environments and guide interaction in such a way that facilitates the differentiation, integration, and generalization leading to the next
stage (a change representing a higher level of competence). Consequently, the teacher is in charge and responsible for providing general goals, the manner of organization which will facilitate their achievement, and evaluation of that organization and the level of achievement attained.

**Guiding Interaction**

In order to guide interaction, a teacher must understand the nature of structure in the classroom. Structure refers to process of organization. The central questions involved are what decisions are to be made, who is to make them and when are they to be made. Traditionally, this has raised questions about intentionality (who makes the decisions) and discipline (what to do in order to have student decisions match teacher decisions). Romantics (Rousseau, A.S. Neil, proponents of free schools and de-schooling), believe the decisions should be left to the child and the teacher should not interfere. Cultural transmissionists (Skinner, Ausubel) believe the teacher should make the decisions and intervene when a student decision does not match the standards set by society as represented by the teacher. A developmentalist (Piaget, Kohlberg, Anisa), on the other hand, takes neither view. The child cannot be left to fend all by himself. Development does not occur naturally and should not be left to accident. However, this does not mean the teacher should be dogmatic and an elitist. The teacher is guided by general principles of development which allow for growth of increased
competency. Using these principles the teacher provides opportunities for the kind of interaction which allows the child to construct his own knowledge (knowledge is not forced upon or demanded of children) (Kohlberg & Mayer, 1972). Environmental arrangements (both physical and human) provide the organization which facilitates development. In this way, the structure that is provided is a precondition for learning and development. Within the structure (upon the conditions established) the child makes decisions. If the structure is clear and consistent the child will get the information and feedback he needs for making better decisions, gaining control over the environment, and thereby developing competence.

The teacher's task, therefore, is not so much to tell the child exactly what to do, how to do it, and when to do it. Nor is the task to punish a child for making an inappropriate decision. Instead, the task is to arrange the environment in such a way as to allow a child a number of decisions anyone of which will provide opportunity for development. If in interacting the child makes an inappropriate decision the teacher's job is to guide the interaction so the child gets the feedback he needs to change. Everyday many opportunities are available for psycho-motor, perceptual, affective, cognitive and volitional development. In addition, opportunities for moral, technological, spiritual, and symbolic development are also provided. These opportunities are at various levels of complexity so that the child can become engaged with those at his own developmental level.
Guiding interaction involves 1) rearranging environments, 2) establishing groundrules (which are part of the human environment), 3) intervening, and 4) pacing. Inherent in all are purposes (goals), clarity and consistency of organization, and method of evaluation.

Rearranging environments

Although environmental arrangement has already been discussed to some extent, it needs to be stressed that environments cue and direct behavior. The stereotype of a traditional classroom gives the student the following choices: 1) sit at desks, stand up, move around, sit on floors, 2) read textbook, listen to teacher, talk to friends, bring in own activities, do nothing, doodle, experiment with few resources at hand—throw spit wads, carve on desks, and so on. How many of these choices does the teacher wish the child to take? What choices does the child have for psycho-motor activity? (Climbing over desks? Throwing spit wads?) What perceptual activities are available? (Counting holes in the tiles in the ceiling? Looking at members of the opposite sex?) Obviously, the child has a few options. However, they are not options which will maximally benefit the child. The teacher probably only desires the child to choose one or two of these options. Therefore, the teacher probably establishes groundrules to limit the child's options.

If, in such and environmental arrangement, the groundrules limit the choices even more so that the children can only sit at desks and either read or listen to the teacher, and if intervention is basically intended to take place through
paper exchanges (tests), and if pacing consists only of variation between book assignment and teacher talk, the teacher is faced with an impossible task of providing something meaningful enough to initiate and maintain involvement. The task becomes even more clearly hopeless when the differences in developmental level are considered.

In such an environment, the student has only one choice that he can make that will satisfy his teacher. That one choice may, or may not, facilitate his development. The student also has a limited number of other choices which he could make that would not satisfy his teacher. The question arises of how to reverse the situation putting the student in a position where he has a number of choices to make that will not only satisfy his teacher but will promote his development and only a few choices which would be inappropriate.

The teacher needs to consider what options are being offered to students to take. The environment should be arranged so that the options are clear, there are at least several, and most of them are desirable. Undesirable options should be eliminated environmentally if possible.

Establishing groundrules

Options which cannot be eliminated through environmental arrangements are, ideally, eliminated through groundrules. Groundrules should focus attention on what is done. For example, one groundrule might be "Here we walk." That rule implies that running is not appropriate in class. Nothing
is wrong with running. In class, however, it may result in accidents (slipping, knocking over someone else's project etc.) because children have not completely developed control in movement, coordination, timing, judgment of momentum, etc. Environmental arrangements can decrease tendencies to desire to run (space is divided into small activity areas, corridors provided by shelves etc. are fairly short), but it would be ridiculous to go to the extremes necessary to environmentally limit running altogether (fill room with water, lower ceiling to two feet from floor etc.). So, a groundrule is established. It eliminates problems. It helps create order. It focuses attention on some options while drawing attention away from others. Walking is quieter. It eliminates games of chase.

Enforcement of groundrules is important. The rules need to be clear so they can be consistently enforced. It is easy to see if a child is walking or running. Rules that require constant interpretation should be avoided. Therefore, rules like "No goofing off" should be changed.

Rules need to be consistently enforced. Exceptions should be few and based on a good rational. Even visiting adults should be asked to follow the rules. If a rule is broken the teacher should not threaten to enforce the rule, he should not dish out verbage, and he should avoid punishing or humiliating the child. Depending upon the seriousness of the infraction the teacher should either just say, "here we don't do that" and tell the child to correct his mistake, or remove the
child from the activity or the activity from the child. This should be done in an unemotional, objective tone that clearly indicates a statement of fact.

If the structure is clear and well thought out, the teacher should never have to vacillate in determining whether to put up with behavior which is inappropriate. Such behavior calls for immediate intervention.

Intervening

When environmental arrangements and groundrules are not enough to move the child in the direction of development, intervention (guiding interaction) is necessary. Intervention is only necessary when 1) a child is breaking a groundrule, or 2) a child is moving away from success. Intervention with children who have broken groundrules has just been discussed.

Intervening to facilitate success implies that the teacher has an idea of some potential outcomes that can be derived from the experience that is appropriate for the child. The first kind of situation that might arise is the child may not be able to ascertain from an instructional unit its purpose or possible uses. The child needs to be introduced (initiated) into the use of the instructional unit. This calls for demonstration.

Demonstration is a technique for displaying information in basically a non-verbal way. It is useful because, if it
is done well, it is direct and uncluttered. Verbal symbolization is a step removed from reality and requires translation on the part of the student.

An effective demonstration provides a child with a clear view and orientation. It provides a clear demarcation between each step (usually indicated by a pause) and focuses attention only on the important aspects of process.

No matter what processes the instructional unit was chiefly intended for, the teacher should always keep volition and affect in mind. The teacher should not look bored, hurried bothered etc. He should look attentive and effect closure in his operation.

Ideally, a demonstration should be given to just one student and no more than three so the teacher can give personal attention to the learner. Once a demonstration has been given, students can teach other students. Demonstrations can also be introduced through audio-visual aids. But, this allows for no exchange of feedback.

Focusing is a second type of intervention for facilitation of success. A teacher may attempt to help a child differentiate, integrate, or generalize by non symbolic or symbolic efforts to get the child to attend certain elements (see discussion on differentiation, integration, and generalization).

Feedback is a third type of possible intervention. If a child cannot receive appropriate information from the environment about the appropriateness of his efforts, the teacher may
need to provide the information. Such is the case in the breaking of groundrules. Feedback doesn't always have to be negative, however. Reinforcement may be thought of as positive feedback.

Pacing

Pacing is the rate or tempo of an activity. The tempo of activity should vary during the day. Tempo should be adjusted to physical and psychological needs. Providing options and choices allows individuals to adjust the pace to their own needs. However, the teacher needs to provide for some variation and plan for overall timing.

Variation can come from shifts between active, quiet, and passive activities, social and individual activities, and even from goal generated activities to activities which generate the goal.

Experiences which are active involves a fast pace and movement. Quiet experiences require less movement. Dancing is active and sewing is quiet. In both of these types of activities the student is acting upon the environment. In passive activity, on the other hand, instead of acting the student is influenced by, and receptive to, receiving. Listening and observing are passive activities. Watching football on television is passive, playing football is active, and playing chess is quiet. Each of the three types of activities are appropriate for meeting different needs. Passive activity should be minimized for students who have yet to reach the stage of formal operations. Unfortunately, students currently spend about 57% of their time in school in passive activity.
Evaluating Interaction

Evaluation involves gathering data on the effectiveness of the program in terms of pre-determined objectives, and analyzing that data for making decisions about future programming. The teacher needs to judge the quality and clarity of goals, the manner of organization for their attainment (structure), the shifts in student development, and the accuracy and appropriateness of measures used for evaluation. With this information the teacher can make effective decisions to improve his efforts at guiding interaction.

Goals

Goals need to be based on philosophical and developmental principles which facilitate the actualization of human potential. This calls for process as well and content goals. They should be stated in empirically identifiable terms. This is particularly difficult for process goals. A single behavior or skill does not represent a process. An evaluator must search for a hierarchical pattern of changes in behavior which are irreversible and generalized across a field of responses. (Kohlberg & Mayer, 1972).

Attainment of Goals

Development needs to be evaluated over time. Has a lasting change taken place? Does the change represent improved competence?

Structure

The way to evaluate structure is to check the ratio of teacher output against the level of student development.
If teacher output is great and student development is low, something is wrong in organization (assuming the goals are appropriate). The evaluator needs to consider the options available to students, the use of the environment in defining those options, the clarity of groundrules and the consistency of their enforcement. In addition, the evaluator needs to consider the quality of intervention (demonstration, focus, and provisioning of feedback).

Measurement and instrumentation

Instrumentation refers "...to any systematic approach for gathering observations which can aid the evaluator in making decisions (Lyons, 1970)."

Measurement is the process of using a test, scale, or instrument to obtain a relatively objective and quantified indication of a person's standing on a characteristic represented by the device employed (Wilson, Robeck, Michael. 1971, pp.456).

Measurement is the placing of a value relationship on the information.

The question is how to gather objective information which will indicate level of development. This requires gathering data about each one of the processes central to the development of learning competence. This means, for example, that the teacher needs to gather information about goal setting, attention, will, effective coping, management of anxiety etc.

At this point in time instrumentation has not been developed for adequately evaluating many of the processes.
Further research is required to more clearly ascertain developmental sequences in the areas of learning competence and educational objectives which could then serve as criteria for measurement. Meanwhile, the most complete compendium of information available is summarized in the Anisa specifications. At this stage, the teacher must rely to some extent on intuitive hunches. This is due to a lack of attention devoted by researchers and evaluators to development. Unfortunately, the methodologies created for evaluation of skill attainment are not directly transferable to evaluation of the development of processes.

To summarize this chapter on interaction, the teacher needs to determine the student developmental level when possible. A child's level of development is reflected in his facility for differentiating, integrating, and generalizing experience in each of the multiplicity of processes classified under the five categories of potentialities: psycho-motor, perceptual, affective, cognitive, and volitional. The teacher facilitates this development through arranging environments and guiding interaction. This is the basic method of organization (structure). Structure is a precondition for learning and development. It requires principles for arranging environments, setting up groundrules, for intervention, and for providing pacing. Purpose, clarity and consistency of organization, and method of evaluation should be inherent in the structure.
Part I of this dissertation reviewed the literature concerned with teaching. It showed that there are many views of how teaching can best be analyzed. Chapter I showed that some educators think teaching can be understood as a set of behaviors. These people reject the idea of using theory as a basis for research believing theory prejudices investigation. Chapter II presented the opposite view. Many educators feel that theory is the key factor in an analysis of teaching. Some authorities believe in the importance of learning theory while others stress the need for a separate theory of teaching. In chapters III and IV another view is presented that is not as concerned with theory or behavior as it is with specification of a systematic set of procedures. Chapter V focused on the educational belief that prefers to see teaching analyzed in terms of human interaction. Chapter VI set forth some current models of teaching. Some educators believe teaching can be analyzed as a set of competencies while others see teaching as a decision making process.

It is helpful to see these views in the broader context of which they are a part. This broader context, the major current trends in education, is summarized on the next page.

Since each view fills a gap left by the other views, none is adequate by itself. Part II of this dissertation has attempted to outline a basic framework (a paradigm of teaching) within which all the views can be integrated. The chief elements of this paradigm are summarized following the next page.
TRENDS IN EDUCATION

Focus  The Educator  Philosophy  Theory of Development  Learning Theory  Motivation Theory  Communication Theory  Curriculum Theory  Teacher Role
---  ---  ---  ---  ---  ---  ---  ---  ---
1. The Romantic  (Rousseau, Romantic  Psychosexual  Rational  Irrational  Projection  Interest of subconscious of child  Protector  Leave child alone
      Naturalism  Personality View  Impulses  Happiness  of dreams, fantasy, etc.)
      Free Schools  Deschooling
2. The Social Interactionist  (Open Education)  Eclectic  Experimentalism  Explore  Need  Communication  techniques  S-R  Social process  self chosen  simple  Facilitator  Facilitate  problem solving
      (Gregor)  Progressivism  Experience  Need satisfaction  satisfaction  active  experience
3. The Personalist  (Carl Rogers,  Psychosexual-  Eclectic  Eclectic  Explore  Need  Use the  The self in  Counselor  Non-directive  reflective
      Glasser,  Personality View  Exploration  Experience  Need satisfaction  concrete  relation to consequences
      Dreykurs)  Existentialism  View
4. The Behavioralist  (Skinner)  Behavioral  S-R  Reinforcement  State in  Anything  Programer  Programed  instruction
      Realism  Environmental  View-Atypical  behavioral  terms  use systems  methodology
5. The Traditionalist  (Ausubel)  Normative-  Maturational  Reception  To know  Rhetoric  Cultural  Cultural knowledge transmission
      Essentialism  learning  To complete
6. The Developmentalist  (Piaget-Werner)  Cognitive-Transactional  Developmental  View  Differentiation  To know  Precise definition of words  Developmentalist  Operations  Arrange  Environments
      Developmental Epistemology  View  Integration  Competence  processes  Guide  Interaction
      Bruner, J.  McV. Hunt  Information Processing
The following is a sample illustration of some of the elements to be considered in a Western classroom taken as a case in point.

ENVIRONMENTS

<table>
<thead>
<tr>
<th>PHYSICAL ENVIRONMENT</th>
<th>HUMAN ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong></td>
<td><strong>Instructional Units</strong></td>
</tr>
<tr>
<td><strong>Configurations</strong></td>
<td></td>
</tr>
<tr>
<td>(physical) setting</td>
<td>instructional objects</td>
</tr>
<tr>
<td>display</td>
<td>audio-visual aids</td>
</tr>
<tr>
<td>storage</td>
<td>field trips</td>
</tr>
<tr>
<td>(non physical) time</td>
<td>simulation</td>
</tr>
<tr>
<td>healthfulness</td>
<td>games</td>
</tr>
<tr>
<td>Elements</td>
<td>reading material</td>
</tr>
<tr>
<td>a) room characteristics</td>
<td>bulletin boards</td>
</tr>
<tr>
<td>space</td>
<td>instructional objects</td>
</tr>
<tr>
<td>surface</td>
<td>audio-visual aids</td>
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<tr>
<td>lighting</td>
<td>field trips</td>
</tr>
<tr>
<td>ventilation</td>
<td>simulation</td>
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<tr>
<td>acoustics</td>
<td>games</td>
</tr>
<tr>
<td>temperature</td>
<td>reading material</td>
</tr>
<tr>
<td>b) furniture</td>
<td>bulletin boards</td>
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<tr>
<td>tables</td>
<td>instructional objects</td>
</tr>
<tr>
<td>chairs</td>
<td>audio-visual aids</td>
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<tr>
<td>desks</td>
<td>field trips</td>
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<tr>
<td>cushions</td>
<td>simulation</td>
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<td>pads</td>
<td>games</td>
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<tr>
<td>rugs</td>
<td>reading material</td>
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<tr>
<td>platforms</td>
<td>bulletin boards</td>
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<tr>
<td>shelves</td>
<td>instructional objects</td>
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<tr>
<td>drawers</td>
<td>audio-visual aids</td>
</tr>
<tr>
<td>dividers</td>
<td>field trips</td>
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</tbody>
</table>

The table above shows the elements of a Western classroom, categorized into physical and human environments, along with instructional units and climate elements.
<table>
<thead>
<tr>
<th>Attributes</th>
<th>Dynamic Attributes</th>
<th>Static Attributes</th>
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</thead>
<tbody>
<tr>
<td>a) of solids</td>
<td></td>
<td>age of students</td>
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<tr>
<td>shape</td>
<td>consistency</td>
<td>sex of students</td>
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<tr>
<td>size</td>
<td>reinforcement</td>
<td>size of students</td>
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<tr>
<td>weight</td>
<td>freedom from</td>
<td>number of students</td>
</tr>
<tr>
<td>color</td>
<td>threat, tension,</td>
<td>age ratio</td>
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<td>texture</td>
<td>fatigue</td>
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<tr>
<td>substance</td>
<td>degree of member</td>
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<td>temperature</td>
<td>contribution</td>
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<td>color</td>
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<td>c) of air</td>
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<tr>
<td>temperature</td>
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<tr>
<td>flow</td>
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</tbody>
</table>

Content

- potential purposes (uses)
- potential consequences

Structure

Patterns
- complexity (variables, relevance)
- variation (variety, quantity, versatility, effect of time, novelty)

Elements
- concreteness (real to representational)
- clarity (contrast, focus, order)
  - consistency
  - subtlety
  - immediacy
  - sequence

Criteria for evaluating environments

Feasibility
- possibility
- economy
- efficiency
- time

Desirability (value)
- suitability (match with level of development and interest)
- healthfulness (promote development)
- political
- aesthetic
- moral
- ethical (conform to rules)

Functionality
- usefulness (degree of meeting purposes--check for deficiencies in configurations and elements needs in terms of content, attributes, structure multi-purposed-flexibility)
INTERACTION

Observing Interaction

Developmental Level

Stages
Sequence

The Learning Process

Differentiation
Integration
Generalization

The Categories of Potentialities

psycho-motor
Perceptual
Volitional
Affective
Cognitive

Guiding Interaction

Rearranging Environments

Establishing and Enforcing Groundrules

Intervening (symbolically and non-symbolically)

Demonstrating
Focusing
Providing Feedback

Pacing

Active v.s. quiet, v.s. passive activity
Social v.s. individual activity
Goal generates activity v.s. activity generates goal

Evaluating Interaction

Goal Clarification
Goal Attainment (results)
Structure (organization)
Measurement and Instrumentation
APPENDIX

A. The Anisa Model: A New Vision and a New Way in Early Education. Daniel C. Jordan and Donald Streets.

B. Partial Listing of Processes taken from Releasing the Potentials of the Child an unpublished manuscript by Daniel C. Jordan and Donald Streets.

C. An Annotated Bibliography
During the past fifty years a large number of research findings have accumulated in support of the old adage "as the twig is bent, so grows the tree." Consistent with the intuitive judgments of teachers down through the years, these findings indicate that the early years may be even more critical than was formerly realized. Thus, the growing concern for modifying the institutions which have a direct influence on the lives of children is not misplaced. Poor schools and deleterious social conditions have bent millions of "twigs" into stunted trees and have been rightfully blamed for contributing to the impairment of the growth and development of children. The awareness of such conditions became so widespread by the 60's that Congress provided extensive support for many new programs (such as Headstart and Title I of the Elementary and Secondary Education Act of 1965) which promised to counter the destructive effects of educational and social disadvantage.

Successive assessments have shown that the promise is not being fulfilled; the results, for the most part, have proved disappointing.
And yet, in spite of this, many educators are still optimistic that a significant breakthrough in early childhood education is in the offing. The continuing trend of providing greater varieties of educational programs and services for the young is evidence of that optimism. While this is in one sense encouraging, perpetuation of the tendency to implement new programs without regard for careful thinking, long-range planning, and painstaking evaluation is disturbing. Logically, such thinking and planning would draw upon the vast body of research findings concerning the development of children and provision would then be made to apply those findings systematically and to assess their practical utility. But even those who would be inclined to make that use of research findings are frustrated and discouraged from doing so because their fragmentary and sometimes contradictory nature makes translation into practice difficult, impossible, or inconsequential. Thus, after a decade of the most extensive social legislation in our history and the investment of billions of dollars into inadequately conceived and hastily implemented programs for children, we find ourselves at a critical juncture. Either we must find a way of translating what we know into a powerful and comprehensive system of educational practice or face the continuation of insignificant results that inevitably comes from piecemeal, short-term, and therefore necessarily superficial program planning.

Such a translation cannot take place unless we can organize knowledge from experience and research into a useable form and this
cannot take place without the formulation of a coherent body of theory. But theories themselves, if they are not to be trivial or conflicting must have some means of defining their scope and securing their integrity. Huxley referred to this need as a need for a noetic integrator — "symbolic or conceptual constructions which serve to interpret large fields of reality, to transform experience into attitude and unify factual knowledge and belief." We felt convinced that education would remain ineffective until it finds its noetic integrator. Thus, the Anisa Model was developed. It is the product of an intensive effort to discover such an integrator for the field of education and to articulate the "conceptual constructions" which comprise it so that theory may significantly increase the efficacy of practice.

Anisa, an Arabic word that means "tree of life," symbolically represents never-ending growth and fruition in the context of protection and shelter, and signifies the blending of the usable and fruitful past with a new sense of the future. It thus takes on contemporary significance as the symbol for this effort to provide that noetic integrator, that comprehensive conceptual scheme for organizing the vast amount of information critical to helping teachers work effectively with youngsters. From its beginning nine years ago, the Anisa project¹ has been a multi-disciplinary enterprize. It has culminated

¹ In 1971, The New England Program in Teacher Education (NEPTE), an affiliate of the New England Regional Commission, granted substantial financial assistance to The Center for the Study of Human Potential, School of Education, UMass at Amherst, for the purpose of fully developing the Anisa Model and a teacher preparation program based on it.
in the formulation of a philosophical base, from which was derived a theory of development, a theory of curriculum, and a theory of teaching—all in service of one over-arching goal: the creation of a comprehensive educational system that would be unique in its power to release human potential.

The unifying force of the Anisa theory derives in part from the fact that it extracts and preserves from the past those elements of experience which serve to keep us in touch with reality while creating an awareness of potentialities for development in the future. In other words, it blends knowledge of the past with a vision of the future. To disregard the past would render us impotent to determine where we are going. Rootlessness in the past forces one into a pattern of living entirely in the present, reacting rather than initiating action, always responding on the basis of impulse rather than careful thought. This pattern of living is devoid of a sense of future; it is without long-range goals that provide the perspective needed for wise decision-making. When educators follow this same pattern professionally, they produce a flurry of hastily conceived and crisis-oriented innovations accompanied by an exaggerated emphasis on change for change's sake. One of the inevitable consequences of this approach is a parade of shortlived changes that fragments experience for both teachers and children. Innovations lacking solid roots in the past can hardly serve a vision of the future. They inevitably bring about their own extinction after having consumed
valuable resources. The "do-away-with-tradition" idea of innovation that characterizes many of the new programs in education today are prime examples.

Our approach to change has been to draw from the past what has served man well and to merge it with a new vision that expresses the noetic principle required to fuse tradition with a sense of destiny. To appreciate this approach necessitates a knowledge of how education came to be what it is. Once that has been grasped, one is better equipped to determine what new directions it ought to take.

FROM PAST TO PRESENT

The history of psychology, particularly as it emerged from philosophy to set up its own household, sheds an interesting light on the present state of education. When psychology declared its independence from philosophy it borrowed concepts from an existing scientific tradition then dominated by Newtonian physics. Consequently, psychology's view of man was strongly influenced by mechanistic conceptions of reality far in excess of the influences of man's own experience as reflected in his history, his ideals, his art, and his religion. This led to a basic flaw in western psychology, namely, the assumption that one can know the totality of something by examining the pieces or parts that comprise it. The whole of something has a reality that is more than its component parts represent. Thus, this atomistic, mechanistic, view of man misguided psychologists into believing that elementary sensations, reflexes, and conditioned responses are sufficient
to explain the entire nature of man, and that freedom, dignity, sense of purpose, aspiration, will and creativity are mere illusions that have no place in a scientific understanding of man. An application of this belief rests on the assumption that one can understand man by looking at the behavior of lower forms of creation. We see this as a fundamental error, for it ignores those aspects of human functioning that are characteristically unique to man. Educators who would follow this mechanistic line of reasoning and adopt it as a basis for an entire educational system will find it woefully inadequate and ultimately unworkable. Its utility as a comprehensive theory for understanding man is too restricted and fails to integrate all that we know about human beings in a way that would enable us to create an educational system that maximally fosters growth and development. To avoid this, we took pains to develop a philosophical basis for the model broad enough in scope to account for phenomena characteristic of lower-order beings while at the same time dealing with the unique qualities of man, such as consciousness and his capacity to have a sense of purpose and destiny.

THE PHILOSOPHY OF ORGANISM

We have drawn heavily on Whitehead's philosophy of organism as the means of rationalizing a new vision that can integrate the incredible amount of child development knowledge in a way that illumines the nature of man and accounts for the phenomenon of purpose and its role in the continual actualization of human potentialities. Without a philosophical base there is no hope of creating an educational system that is consistent, coherent and free of the contradictions that make practice ineffective.
The chief feature which distinguishes man as organism from man as mechanism is creativity guided by purpose and expressed by the two fundamental capacities of man, namely, his ability to know and his ability to love. All potentialities of man are expressions of these two capacities; their actualization represents man's becoming and his essential reality. Since every actualization constitutes a new basis for further expressions of creativity, the creation of further potential is itself one of man's potentialities. The capacity to perpetually move beyond himself is indicative of man's superiority over all other created things. The Anisa educational system, therefore, views man as the apex of creation, capable of endless expression of an unlimited potential.

From this conception of man's nature we derived a definition of good education as the process of translating potentiality into actuality at an optimum rate. One of the primary goals of the Anisa model is to enable each child to become fully conscious of the process and take charge of it, thereby securing the power to shape his own destiny. The capacity for consciousness itself is inherent in the nature of man, but its quality is dependent upon the experience of the organism, the accumulation of its past stored in the form of memory (a form of immanence) and the contrast of that past with the experience of the immediate present in preparation or anticipation of the future (a form of transcendance). These qualities of immanence and transcendence -- prerequisites of consciousness and self-awareness --
define man's essential being in spiritual rather than material terms, a central proposition of the philosophical basis of the model. This is not to be construed as a sectarian or denominational definition of man, but rather an acknowledgement of obvious characteristics of human functioning which distinguish man from animal. These characteristics underlie man's ability to determine his own future and make it possible for him to escape the limitations of materiality. In other words, a higher ontological principle is operable in the life of man. It is evidenced by man's ability to structure the unknown and to form ideals which express subjective aim or intention which in turn guides the process of becoming--perpetual self-transcendence. It was that self-transcendence to which Teilhard de Chardin referred when he said that man is like the tip of an ever-ascending arrow, the "last-born, the keenest, the most complex, the most subtle of the successive layers of life." And Huxley reaffirms that view in his statement that man is "the only repository of cosmic self-awareness in the universe" and that makes him managing director of the biggest business of all: evolution.

A teacher who accepts this view of the nature of man will see each child as a creature of unlimited potentiality who can never be classified as uneducable. The very atmosphere of an educational system staffed by teachers who consciously affirm the spiritual nature of man is much more likely to release the potentialities of its students than one whose staff denies this fundamental characteristic. Understanding how the actualization of any potentiality creates further
potential alters perception and feeling about children and enables one to approach teaching differently. The Anisa Model defines those experiences which teachers may use to actualize given potentialities of their students in ways that continually and actively create further potential while at the same time providing a conceptual means for identifying supressive experience that should be avoided.

A THEORY OF DEVELOPMENT: DEFINING THE PROCESS OF BECOMING

The process of becoming has basically three interrelated characteristics: growth, development, and maturation. Within the discipline of child development, the term growth usually refers to a biological increase in the size of the organism; development means an increase in the complexity of its organization both physiologically and psychologically; and, maturation refers to a genetically determined timetable that influences the extent to which and the rate at which other developmental potentialities become actualized through interaction with the environment. Developmental processes are inextricably bound up with growth and maturational processes; all take place as the organism interacts with its environment. Thus, we have incorporated growth and maturation within our theory of development. The theory broadly defines development as the process of translating potentiality (biological and psychological) into actuality; makes that process synonymous with creativity as the fundamental and inherent dynamic characteristic of the organism; establishes interaction with the environment as the general means by which the process is sustained; provides for a definition and
classification of potentialities and environments; explains the nature of essential interactions underlying the release of both biological and psychological potentialities; identifies nutrition as the primary element in the development of the former and learning as the key factor in the development of the latter; and, accounts for the emergence of personal identity — the self — in terms of the structuring of potentialities as they are actualized.

The theory also emphasises the importance of timing in the process of becoming. It has an order, a rhythm. Certain needs arise at particular times. If the needs are not met at these times, developmental impairment may result.¹ Such times are known as sensitive or critical periods. It is well established that such periods exist in the physical development of the human organism. During embryo-genesis, organs or tissues which enter a period of rapid growth tend to be more sensitive to positive or negative influences whereas either before or after that period there may be little effect. The deleterious effects of rubella during the first three months of pregnancy, the damaging consequences of taking certain drugs such as thalidomide during pregnancy, the impairment of vision due to absence of sufficient light stimulation to the retina during the first few months of life, and the retardation of language acquisition if no linguistic models are provided

¹ Diagnosing needs and/or developmental levels is prerequisite to individualizing instruction and without individualizing learning experiences there can be no equalization of educational opportunity.
between 8 months and 2 years are all evidences of the existence of critical or sensitive periods. Thus timing in the organism's interaction with its environment is an important factor in the actualization of both biological and psychological potentialities.

NUTRITION AND THE ACTUALIZATION OF BIOLOGICAL POTENTIALITIES

One basic form of interaction is the assimilation of nutrients from the external environment. From these nutrients come the materials for building and maintaining the tissues of the body and the energy to sustain their functioning. Poor nutrition means a deficient body and inadequate functioning; it is a suppressor of potential.

The Anisa Model therefore has a strong emphasis on proper nutrition and good health. It makes a provision for intervening in the anticipated life of a child a year or so before his conception by insuring that the nutritional status of the mother and father is maximally improved in preparation for his genesis. Since the provision of adequate nutrition remains important throughout life, the model provides for collaborative efforts among community, school, and home to maintain an optimum nutritional status in all students and staff.

There are countless examples that demonstrate the necessity for a strong nutritional component in any comprehensive educational model: the effects of thiamine deficiency and its relationship to anxiety, irritability, depression, and increased sensitivity to noise and pain; the effects of nicotinic acid deficiency and its relationship to lassitude, apprehension, and depression; Vitamin B-12 deficiency which can
cause mental confusion; a lack of iodine which may lower the metabolic rate and cause physical or mental languor; and, insufficient iron which tends to result in lowered hemoglobin which reduces the capacity for the blood to carry oxygen, thereby lessening motor activity. The above in no way exhausts all the ramifications of proper nutrition and its relationship to the development of the human organism, but merely highlights the need to provide adequate nutrition throughout life. The implications for education are fairly obvious. Not only is proper nutrition essential for maintaining the biological integrity of the organism, but it is also indispensable for the release of psychological potentialities since that integrity is a necessary, though not sufficient, condition for their expression.

LEARNING AND THE ACTUALIZATION OF PSYCHOLOGICAL POTENTIALITIES

The role of educational institutions is to provide a means for the continuous engagement of students in the process of actualizing potential and to enable them to gain conscious control over it. The key factor in the process is learning; being in charge of the process by knowing how to learn is what is meant by learning competence. The Anisa Model thus defines the role of the teacher as a facilitator of the attainment of learning competence rather than as a disseminator of information only. Failure to attain learning competence makes the child more a victim of his environment rather than a master over it—a prey to the manipulative elements of society and certainly someone who is not in charge of his own destiny nor attracted by the mystery of his own becoming. Any successful educational system of the future
must redress those forces which destroy the attraction of that mystery—the limitless potentialities of knowing and loving. This necessarily involves helping students to develop an inner acceptance of responsibility for developing their own infinitude of potentialities through the acknowledgement and cultivation of a sense of purpose as it relates to aspirations and ideals.

Thus, the quality of any educational system of the future will be determined by the extent to which it can help youngsters translate potentiality into actuality—a process Alfred North Whitehead describes by the term "concrescence" (1929). Concrescence not only includes everything normally conveyed by the word development but goes beyond it to encompass man's unique ability to go beyond himself—the ability to accumulate the past, bring it to bear on the present while structuring the future, thereby moving perpetually beyond any present state of being. Learning is the means of that "moving beyond" which Whitehead calls the "creative advance into novelty." Such a creative advance means transcending apparent limitations. We have many examples of man's ability to go beyond such limitations through learning. Using instruments invented by man we can see beyond the capability of the naked eye, hear beyond the limitations of the ear, and can experience phenomena for which we have no sense receptors (i.e., radio waves) and which would remain inaccessible to the organism if it were left to function alone. Therefore, this broadly conceived notion of learning which fuses immanence with transcendence in a conscious pursuit of
destiny accounts for the means by which man is able to leap over his material and biological limitations and move beyond them. Such a notion is completely incompatible with any idea of fixed intelligence and in fact predicts the eventual formulation of a new definition of intelligence that will be far more comprehensive than the one reflected in traditional IQ tests, and one which is more congruent with our definition of learning competence.

Without learning competence there is little likelihood of attaining high levels of self-actualization. Thus, to be effective, any institution which has educational responsibility will have to maintain a staff which understands the nature of learning competence and how it can be achieved. The function of the theory of development is to explain learning competence and the means of attaining it.

A clear understanding of the nature of learning competence as it relates to the total body of theory underlying the Anisa Model is important because it can dramatically increase the teacher's power to facilitate the release of potential by providing guidelines for gearing learning activities to the child's developmental level. It also enables the teacher to take what is useful from any given theory, integrate that with pertinent aspects of other theories and apply them in teaching. This may help to avoid subjecting youngsters to the inherent weaknesses that any single non-comprehensive theory may possess.

For example, stimulus-response theory defines learning primarily as a modification of behavior, views the individual as relatively passive
in the selection and regulation of mental processes, focuses on stimulus inputs, behavioral responses and reinforcement, ignores the importance of internal states of the organism and defines motivation as being dependent upon extrinsic factors alone. Yet reinforcement must take its definition from the internal nature of the organism, not the least of which are the intentions and purposes it may have at any given point in time. Because it ignores what goes on inside the organism, it is severely limited in explanatory power. This is not to say that stimulus-response theory has no useful applicability to certain educational situations; rather, it is ill-suited to stand alone as a comprehensive theory of development for educational practice. We feel that process theories such as those developed by Piaget and Bruner are as a whole more congruent with the philosophy of organism. Process-oriented theories view the individual as active in the selection and regulation of his mental processes, deals with inferred mediational processes, includes in the definition of learning the mastery of certain central processes termed operations or strategies, and emphasizes the role of intrinsic motivation including pre-dispositions toward resolving incongruities (Levitt, 1968).

While we acknowledge that drive reduction and extraneous stimuli can motivate an individual, the most powerful form of motivation is an intrinsic force which comes from a subjective confirmation that competence is being gained. Robert White (1960) calls this sense of competence "effectance."

My proposal is that activity, manipulation, and exploration
which are all pretty much of a piece in the infant, be considered together as aspects of competence, and that for the present we assume the one general motivational principle lies behind them. The word I have suggested for this motive is effectance because its most characteristic feature is seen in the production of effects of the environment. At first, these effects may consist of any changes in sensory input that follow upon activity or exertion, but before long the child becomes able to intend particular changes and to be content only with these.

White describes effectance as a neurogenic motive to distinguish it from viscerogenic motives upon which drive reduction theories of learning have been predicated. There is no doubt that viscerogenic motives, such as thirst, hunger or sex do exist. But White hastens to point out that they do not account for everything we do (as Freud has proposed in his theory of libido). We feel that effectance, which cannot be solely understood in terms of sensations, reflexes, and physiology, is neither a neurogenic or viscerogenic motive, but a psychogenic motive which arises out of the structure of consciousness and although it may depend upon nerves and physiology for its functioning, it cannot be wholly explained by them. Thus, effectance is expressed in the attainment in a variety of competencies which collectively define learning competence. As each of the competencies are strengthened, the organism becomes more effective in dealing with the environment and pursuing his own destiny.

Our procedure for developing the definition of learning competence was to review the major theories of learning and development in the hope of discovering a common denominator which could be reasonably expected to figure prominently in such a definition.¹ We found that the processes

¹ Gagne's Eight Types of Learning, Walter's brain wave theory, Tolman's sign learning, Lewins' field theory, Snygg and Combs' perception theory,
of differentiation, integration and generalization were common to them all. We thus define learning competence as the ability to differentiate experience, whether internal or external, into separate elements, to integrate them in a new way thereby providing new information, new feelings, new skills, and new perceptions which may or may not become expressed immediately in some form of overt behavior, and to generalize the integration. Through these processes—differentiation, integration, and generalization—potentially is translated into actuality. Control over them constitutes learning competence.

The processes of differentiation, integration and generalization are neither random nor haphazard. In most instances they are directed by intention or subjective aim, which determines what becomes abstracted, and how the abstracted or differentiated elements are then integrated and generalized. A teacher who understands these processes and who can teach in a way that enables the child to gain conscious control over them while assimilating information (content) about the world he lives in is a master teacher. Becoming a master teacher thus depends on knowing the coherent body of theory concerning development, curriculum, and pedagogy and how to translate it into practice.

DEVELOPMENT AND THE THEORIES OF CURRICULUM AND PEDAGOGY

The Anisa theories of curriculum and pedagogy are derived from theory of development which defines development as the process of translating potentiality into actuality and designates interaction with the

Bandura's modeling theory, Mowrer's two-factor learning theory, Newell and Simons' information processing theory, various mediation theories, Piaget's theory, the TOTE theory of Miller, Pribram and Galantar, Skinner's work on conditioning and Harlow's theory of learning sets were among the theories analyzed.
environment as the means by which the process is sustained.

The theory of curriculum defines curriculum as two interrelated sets of educational goals and what children do, usually with the help of teachers, to achieve those goals. One set of goals is process-oriented. It rests on the classification of potentialities and the processes which comprise them. The other set of goals is content-oriented. It rests on the classification of environments and the organization of information one's culture has accumulated about them, including the symbolic systems used to convey that information. The two sets of goals, process and content in orientation, are integrated by the over-riding purpose of the model: actualization of the infinitude of potentialities of each child in a way that creates further potentiality and fosters the emergence of personal identity that is master of its environment and in charge of its own destiny.

The theory of pedagogy defines teaching as arranging environments and guiding the child's interaction with them to achieve the educational goals. Thus, teaching insures the achievement of learning competence (process) while assimilating information about the environments (content). Process and content are fused as potentialities are actualized and structured to form an identity—a self—with the characteristics of a competent learner.

DEVELOPMENT AS VALUE FORMATION: IMPLICATIONS OF THE ANISA CURRICULUM THEORY AND TEACHING THEORY

Since 1950, considerable interest has been shown in formulating a theory of curriculum and then defining the curriculum within that theo-
retical framework. Some educators, such as Taba (1962), Bruner (1966), and Beauchamp (1961), have made efforts to define the characteristics of curriculum theory which address basic issues rather than formulating an actual theory. Other curriculum specialists have drawn upon disciplines outside of education, such as systems analysis or decision theory, as a means of gaining a new perspective on curriculum development. While it is understandable that curriculum design can hardly be considered apart from curriculum theory, pressures for curriculum revision have been so great that curriculum designers could not wait for a theory. Many theorists, such as Elliot and Foshay (1963) and Tanner (1966), have suggested that it is premature for work on a comprehensive curriculum theory. We would agree that until a philosophy which discloses the nature of man's reality is adopted and a theory of development is derived from it, construction of a curriculum theory is impossible. Curriculum theory or a theory of teaching cannot be created in a vacuum.

Until we had established the philosophical base of the model and generated the developmental theory, it was not possible to identify the process and content aspects of the curriculum and clarify their relationship to teaching on the one hand and formation of values or character on the other. Following is a brief presentation on these aspects of the model.

### Classification of Potentialities and The Process Curriculum

We have organized the potentialities or powers of man into five categories each of which is comprised of processes that underlie learning competence and are the means through which those potentialities become actualized. The categories of potentialities are: psycho-motor,
ceptual, cognitive, affective, and volitional. Specifications on the basic processes in each category have been developed. These specifications constitute the process curriculum and include definitions of each process, its relationship to learning competence, a translation of the process into an educational objective in the form of operational definitions, explanations of pertinent developmental aspects of the process, a presentation of several prototypical learning experiences needed to master it, and a statement concerning evaluation. There are no doubt an infinite number of processes in each category. Preliminary selection of processes for inclusion in the functional definition of the model was determined by the degree to which a given process appeared to engender effectance and the extent to which it constituted a fundamental prerequisite to other processes in the extension of potentiality. ¹

A. Psycho-motor Potentialities

Competence in this area refers to a capacity to coordinate, control, and direct the movement and position of the voluntary muscles. Starting at birth a child experiences a variety of motor activities which become organized and represented internally. George Early (1969) refers to this internal representation as the motor-base. As the child comes to know where and what his body powers are and how they work together, he attains a positional and functional awareness of the body as

¹For example, discrimination of the color blue is a visual perceptual process, but achieving it alone gives rise to few other expressions of potentiality. However, discrimination of hue (all colors) is more fundamental and includes the above. Hence, the model contains a specification on hue discrimination.
as a reference point to which he relates the physical environment within a space-time context. Among the processes which comprise the motor-base are balance and posture with their subprocesses (laterality, verticality, and directionality), locomotion, manipulation, receipt, and propulsion. It is important to point out that psycho-motor potentialities are not actualized independently; rather, they are associated with perceptual, cognitive, affective, and volitional elements. However, any activity may have a major focus with a primary educational goal pertinent to a given process within a given category of potentiality. The formation of the motor-base and the achievement of psycho-motor competence comprise one of the most important developmental requirements of the infant and preschooler.

B. Perceptual Potentialities

Perceptual competence refers to the capacity to differentiate sensory information and then integrate that information into generalizable patterns which constitute interpretations of reality that enable the organism to make meaningful decisions and to act. Interpretation involves the organization of incoming stimuli in terms of past experience, present needs, aspirations or intentions which concern the future. It is through this process that the organism is kept in touch with reality and increases its effectance. Perceptual competence therefore rests upon the development of a perceptual-base, an internal structuring analogous to the motor-base, which functions as a set of rules generating and directing the basic processes of dif-
differentiation, integration and generalization as they relate to perception. Processes in this area include those associated with vision, audition, olfaction (smell), gustation (taste), the cutaneous senses (touch, cold, hot) and the vestibular senses (equilibrium). Both vision and hearing have been broken down into a large number of processes, mastery of each one of which is an educational objective of the Model.

C. Cognitive Potentialities

Cognition is nearly always associated with some sensory input and it is frequently accompanied by muscular reactions, overt or covert, as well as emotions and some form of intentional behavior. While man has expended considerable effort over the years in an attempt to ascertain the elements which constitute thinking, a great deal of clarity is still needed. Like all other potentialities, thinking develops from interaction with the environment. Piaget says (1970, p. 104) "Actually in order to know objects, the subject must act upon them and therefore transform them: he must displace, connect, combine, take apart, and reassemble them." "Displace" and "take apart" are reflections of the general process of differentiation while "connect", "combine" and "reassemble" refer to the processes of integration and generalization. Through these differentiations and integrations internal structures develop which form the basis of cognitive competence. The cognitive processes which collectively comprise learning have been explored to some extent by Piaget, Bruner, and others. All of them are interrelated; some serve as developmental predecessors of others.
which are composed of differentiative and integrative functions operating in different ways at different levels. Among the thinking processes which make up cognitive competence are such operations as analysis, synthesis, classification, seriation, number relations, deductive and inductive inference, interpolation, extrapolation, analogy, and conservation. We have tentatively identified some forty processes on which specifications are being developed.

D. Affective Potentialities

Attaining affective competence refers to the ability to organize one's emotions and feelings that energize the system and support in a positive manner the release of further potentiality. Emotions are associated with all other processes, though in varying degrees of intensity, and if they are not organized then the integrity of other areas will also be affected. How to feel about things is for the most part learned but rarely "taught" in any deliberate or conscious way. The organization of emotional life depends on being able to differentiate emotions, integrate them in reference to objects, events, or ideals and generalize them in ways that provide a basic stability in life. Teachers can assist children to achieve affective competence through the relationship they establish with them, consistency of feedback being one important element in its achievement. While a detailed theory about emotional development awaits further research and elaboration, we have identified a large number of processes, pertinent to gaining affective competence, which involves inhibiting, coping, managing, and facilitating emotions in terms of subjective aim or sense
of purpose. For example, coping with sadness or disappointment, managing anxiety, inhibiting a destructive impulse, or facilitating expressions of joy and gladness are all manifestations of affective competence.

E. Volitional Potentialities

Recent trends in psychology have begun to address the theoretical vacuum created by psychology’s rejection of volition, or will, as a meaningful aspect of human functioning. This was for the most part a consequence of the mechanistic, reductionistic view of man as a creature whose behavior is determined by external stimuli rather than intention or some intrinsic determinant. And yet the vast number of changes that happen within the organism between stimulus and response provide the meaning that defines the relationship between the two. In other words, it is virtually impossible to make sense out of anyone’s behavior without ascertaining his intention or purpose. From our philosophical basis we would assert that purpose in the life of man is an element of behavioral causality just as physical forces or genetic inheritance are also part of causality. Whitehead places great emphasis on the role of purpose as a vital element in the translation of potentiality into actuality. It is through purpose, or subjective aim, that concrescence is guided and directed; it provides criteria for making choices among a variety of possibilities and enables man to achieve control over his own destiny. If one does not take charge of his own destiny, someone else will. Thus, the role of subjective aim or purpose in concrescence is basic. In summary,
volitional competence is the capacity to form ultimate aims, differentiate them into operable goals and integrate them into a perpetual flow of intentional behavior directed towards the achievement of those goals.

Some of the processes which relate to the development of volitional competence are attention, goal setting, self-arousal, perseverance, effecting closure, and fantasizing a state of goal attainment. While a great deal of research is needed to understand the dynamics of volitional behavior, the above processes provide a rich, theoretical beginning that will enable educators to address that aspect of human functioning in educational planning.

Classification of Environments and the Content Curriculum—

It is not only the individual person who can accumulate and store information about his experience and the world he lives in. Societies do, too. The collective memory of a society is its culture. As individuals, we do not have to start from scratch to discover things about the universe simply because vast numbers of millions before us have made countless discoveries and pass them on as part of the cultures to which they belonged. Information about the universe in which we live—our total environment—constitutes the content curriculum. In the Anisa model, it is organized around a classification of environments.

A. The Physical Environment

This environment includes everything except human beings. It can be broken down into three sub-categories: mineral, botanical, and animal.

B. The Human Environment
This environment includes all human beings one may come in contact with.

C. The Unknowns and/or Unknowables

Consciousness includes the ability to know when we don't know and when we are dealing with unknowns or the unknowable.

D. The Self

The self is a combination of the above three environments. The unknowns in a Self include the nature of the as yet unexpressed potentialities, the future, and the phenomenon of personal mortality.

Three interrelated symbol systems mediate the assimilation of the content curriculum, one for each of the first three environments listed: math for the physical environment, language (English, Navajo, Swahili) for the human environment, and the arts for the environment of unknowns. Since the Self is a combination of the other three, all three symbol systems are used to assimilate information about the Self.

The way disciplines have been organized traditionally does not deviate significantly from the organization of the Anisa content curriculum. For instance, the physical and biological sciences, math and technology constitute content organized around the first category.

Value Formation: Structuring the Fusion of Content with Process—

As the child interacts with the environment, his potentialities (expressed through the processes) are actualized, i.e., they become powers. But these powers are not expressed in random fashion; they are structured. And as they are structured, factual information (content) is fused and structured with them to form the attitudes and
In summary, then, the child

<table>
<thead>
<tr>
<th>Actualizes these potentialities (processes)</th>
<th>As he interacts with these environments</th>
<th>Assimilating these bodies of information (content)</th>
<th>Utilizing these symbol systems</th>
<th>Thereby forming these values (content fused with process)</th>
<th>On which these higher-order competencies are based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psycho-motor</td>
<td>Physical</td>
<td>Physical and biological sciences, and technology</td>
<td>Math</td>
<td>Material</td>
<td>Technological</td>
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<tr>
<td>Perceptual</td>
<td></td>
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<tr>
<td>Cognitive</td>
<td>Human</td>
<td>Social Sciences, history, human relations, communications, law, human rights</td>
<td>Language(s)</td>
<td>Social</td>
<td>Moral</td>
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<td>Affective</td>
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<tr>
<td>Volitional</td>
<td>Unknowns</td>
<td>Philosophy, religion, aesthetics and</td>
<td>The Arts (as expressions of ideals of structuring of the unknown)</td>
<td>Religious</td>
<td>Spiritual</td>
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<td></td>
<td>Self</td>
<td>All of the above as they relate to Self (which is important for physical health and spiritual health)</td>
<td>All of the above applied to the Self (symbolic of Self)</td>
<td>Personal identity or character (All of the above combined into the Self)</td>
<td>Personal effectance (All of the above combines into this aspect of the Self)</td>
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values which constitute the character and personality of the human being. The structuring takes place in relationship to the various environments with which the child is interacting. Thus, different value systems reflecting these environments emerge.

Interaction with the physical environment releases potentialities (psycho-motor, perceptual, cognitive, affective and volitional) which when blended with content (information) concerning that environment, are structured into material attitudes and values. On these values rest the technological competence of the person.

Interaction with the human environment translates potentialities into structured actualities or powers which, when fused with information about mankind form the social attitudes and values on which a person's moral competence rests.

To interact with an unknown is to structure it and to structure an unknown is to form an ideal, broadly defined. Such interaction leads to the formation of religious attitudes and values, on which spiritual competence rests. Again, "religious" and "spiritual" are used as psychological terms rather than as denominational ones. To structure an unknown requires an act of faith and is therefore religious in that sense.¹

As the Self interacts with its ownself (an environment always present in the life of each person) in the context of the other en-

¹ When a Buddha, a Christ, a Moses or a Mohammed "reveals" a structuring of the ultimate unknowns and large numbers of people accept it, a religion is founded. All people form religious values as we define them, including atheists, simply because there is no other way to relate to unknowns except on faith.
environments, all of the other values (structuring of actualized potentialities fused with what is known about those environments and its ownself) are integrated. This integration constitutes the structural and functional reality of personal identity. The development of the Self—the structuring of process with content, the formation of values—is the fundamental expression of creativity inherent in all human beings. On this integrated structuring rests personal effectance—mastery over the environment and thus the capacity for self-transcendence and continuing development. Personal effectance is "self-competence"; it is a combination and integration of technological competence, moral competence, and spiritual competence.

It should be noted here that since the self includes parts of the physical and human environments, all of which embody unknowns, the attainment of spiritual competence subsumes all other competencies. Thus, the future of an individual and the nature of his potentialities at any given point in time are unknowns. If he has no "faith," he cannot structure these unknowns, i.e., he cannot create a self-ideal and pursue a destiny consistent with it. This results in a suppression of all other potentialities, because without that ideal self (which is a combination of all the ideals derived from interaction with the unknowns inherent in each environment) there are no criteria by which the Self can make decisions about its future. Without it, decisions will be made in terms of what brings immediate pleasure and what avoids present pain or discomfort. And since facing unknowns always produces the discomfort of anxiety, a vicious cycle
is set in motion, which causes the organism to avoid precisely what has to be done in order to make that "creative advance into novelty" which self-actualization represents.

By now it is obvious that the Anisa Model embodies a comprehensive value theory. We found no way to explain values in affective terms alone; nor could we exclude content or information from the definition. All categories of potentialities and information are involved. Thus, we define values as relatively enduring organizations or complexes of information blended with actualized potentialities—psycho-motor, perceptual, cognitive, affective, and volitional—which provide an orientation or predisposition to respond in a particular way to some aspect of the individual's environment usually in terms of some purpose. They include an evaluative or judgmental element which clears the way for action. They are higher-order organizations of related attitudes centering around response possibilities to different elements of the environment. The value system is composed of all the values integrated around fundamental aims, purposes, or ultimate concerns that are inherent within the values. Thus, attitudes are values in their differentiated forms; values are integrations of attitudes; the total value system of the person is the integration of all his values; it is the character of the person—his identity. In the broadest sense of the word, then, education means the process of value formation which is synonymous with character formation.

The information represented in the content curriculum is imparted to children as they interact with environments while at the same time
all the processes which constitute learning competence are strengthened. Thus the curriculum itself reflects both vertical (content) and horizontal (process) organization. In other words all content would be taught in ways which strengthen process (learning competence). The horizontal organization facilitates the transfer of knowledge, an ability that is the hallmark of a competent learner.

CLASSIFICATION OF INTERACTIONS WITH AND ARRANGEMENTS OF ENVIRONMENTS:

THE ANISA THEORY OF TEACHING—.

A full understanding of teaching, defined as arranging environments and guiding interactions with them to achieve the goals specified by the theory of curriculum, depends on a classification of arrangements and interactions in terms of those goals. If the goals all relate to the achievement of learning competence and learning competence means the ability to differentiate, integrate, and generalize aspects of experience, then we can classify environmental arrangements and interactions with them in terms of which aspect or aspects of learning competence they facilitate. For example, some arrangements\(^1\) and some interactions may facilitate differentiation, others may foster integration or generalization; some may do all three. Since children are differentiating, integrating and generalizing on different develop-

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1 The theory translates into thousands of applications. For instance, finger painting with only one color will not facilitate differentiation where visual discrimination of hue is concerned. Thus the educational mileage to be gained from one-color finger painting is less than it might be. The environment needs to be rearranged (i.e., one or more additional colors provided) and/or interaction must be guided in a different way (i.e., child can be encouraged to use another color).
mental levels, this must be assessed before one can know how to arrange environments and guide interaction with them. Thus Anisa teaching is diagnostic and prescriptive where enough is known to make a good diagnosis. In the absence of sufficient knowledge to make such a diagnosis, Anisa teaching is speculative, experimental, and improvisational.

Through such approaches more becomes known about the child's developmental level in regard to given process or content and teaching can become more prescriptive. Ultimately, the child will come to help actively in the diagnosing and prescribing and will eventually become a good teacher of his own self, i.e., he will arrange his own environments and determine his own interactions with them.

It is important to note here that the teacher, himself, is a part of the human environment and how he "arranges" himself and guides the child's interaction with him is of critical importance. On that depends the emergence of the relationship between them, and on that relationship much hangs in the balance: whether or not the child falls in love with learning, desires to pursue his destiny with joy, excited by the mysteries of his own potentialities, and encouraged by a faith that somehow deep down says, "I can and I will."

STAFFING ARRANGEMENTS

Launching an educational enterprise of this magnitude requires not only a highly skilled and experienced staff, but a diversification of efforts that only specialization can provide. The Model designates the master teacher as the key staff person. Preparation of the master teacher includes understanding the entire body of theory and the ability
to teach so that children can become competent learners. This role is supported by the following staff positions: assistant teachers and aides; a diagnostician and evaluation specialist; curriculum and programming specialist; communication and media technologists; multi-arts specialists, who are competent in all the arts and know how to draw upon them as effective means for the development of learning competence; a family-community-school liaison worker whose job is to reduce cultural discontinuities between home and school and help to administer substantial parental and community participation in all activities; learning disabilities specialists; health and medical specialists; and the program administrators and their staff whose function is to organize resources to achieve the educational goals with maximum efficiency.

Differentiated staff thus represents a structural response to a need for the individualization of instruction through specializing staff assignments according to the needs of the child. Since teachers are not interchangeable parts within the educational system, teaching personnel must be employed in ways that are consistent with their areas of strength and preparation thereby insuring the maintenance of an effective and comprehensive support system for the child. Such a differentiated staffing arrangement will also include the utilization of students to teach other students. This requires a particular kind of training for master teachers to enable them to train children and benefit youth to teach their colleagues. The ultimate benefit for the teacher-student—the child as teacher—is the consolidation of his own learning. The master teacher is envisaged as a new kind of generalist,
one who possesses a wide array of competencies which make him effective in working with children and supporting staff. Among his roles are the arrangement of environments and the guiding of interaction with them, making decisions about instructional activities within the context of the various curriculum areas of the model; determining modes of instruction and selecting the appropriate media, supervising teachers and aides, orchestrating the assistance of the support staff as needed and to some extent participating in home-community-school activities which are arranged to maintain experiential continuity for the child.

The "learning competence" of a social system—the means by which the potentiality of the total group as a group becomes translated into actuality—depends in large measure on the same processes which release the potentialities in the individual: differentiation and integration. Thus staff differentiation is essential to the Model. The demise of a differentiated staff comes when the provision for their integration is neglected. Integration is only possible when those differentiated staffing roles become integrated around well-articulated objectives that are related to the philosophical and theoretical bases of the model. A noetic integrator unites people as well as ideas. The philosophical basis of the model is therefore essential to the success of staff differentiation and its effective integration. The presence of purpose, agreed to by all staff members enables the differentiation to be flexible and situationally determined on one hand and yet consistent and ever-present on the other.

PROSPECTS

Education faces two critical and interrelated problems: how to
improve education generally and how to equalize educational opportunity. Because the Anisa Model fully addresses these two issues, its prospects are promising.

General improvement of education will depend on the following characteristics, each of which the Model incorporates:

1. Comprehensiveness

2. Institutionalized self-renewal by perpetual up-dating through research and evaluation.

3. Broad philosophical base with coherent and clearly articulated body of theory which enables the system to translate research findings into practice.

4. Clear-cut specifications that embody goals stated in operational terms where feasible so that evaluation, modification for improvement, and cost-effectiveness determination are facilitated.

5. Process emphasis coordinated with more logical and coherent organization of content.

6. Individualized and developmentally based curriculum which reduces failure and increases probability of success.

7. A competency-based staff preparation program which insures quality control in staff selection.

8. Provision for home and community collaboration in formation of total support system from conception on.

Equalizing educational opportunity depends on a number of the above factors. Equalization cannot mean providing everyone with the same experiences at the same time, determined by chronological age. Ultimately it comes down to providing whatever experiences are needed, when they are needed, to release the potentialities of the child at an optimum rate by enabling him to become a competent learner. This is only possible if the curriculum is comprehensive, process-oriented,
and covers content important for effective dealing with environments, if the learning experiences are individualized and developmentally based, and if it imbues the child with a sense of his own illimitable potentiality and commits him to perpetual learning. Finally, it means having competent learners as teachers, for more learning than we care to admit comes from living and working with good models. Thus, equalizing educational opportunity necessitates a radical reconceptualization of education itself—a new way based on a new vision.

We have presented a new vision of education as the transformation of man and a way to sustain it. "Every transformation of man," says Lewis Mumford, "except that perhaps which produced neolithic culture, has rested on a new metaphysical and ideological base; or rather, upon deeper stirrings and intuitions whose rationalized expression takes the form of a new picture of the cosmos and the nature of man (1962, p. 171).

For us, the Anisa Model is a rationalized expression, in the form of an educational system, of those "deeper stirrings and intuitions" which we have sensed in so many dedicated teachers of young children. If that rationalized expression is a reflection of a fundamental truth about man that has begun to surface in those stirrings and intuitions, then Anisa may come to be the long-awaited renaissance in education.
PARTIAL LISTING OF PROCESSES

PSYCHO-MOTOR

I. Balance & Posture
   a. Laterality
   b. Verticality
   c. Directionality

II. Locomotion
   a. Sequence
   b. Synchrony
   c. Rhythm

III. Manipulation/Contact
   a. Receipt
   b. Propulsion

PERCEPTION (detailed here only for visual mode)

I. Movement Perception
   a. Directionality (convergence)
      1. fixation
      2. horizontal pursuit
      3. vertical pursuit
      4. circular pursuit
      5. depth pursuit
      6. combination
   b. Duration (time perception)
      1. velocity
      2. synchrony (simultaneity)
      3. rhythm
      4. sequence
      5. pace
   c. Cause and Effect

II. Space—2&3 dimensional
   a. Figure-ground (form perception)
      1. contour
      2. edge
      3. proximity
         a. above/below (height)
         b. left/right (width)
         c. front/back (depth)
         d. size/area (distance)
      4. separation
      5. closure (filling in gaps)
      6. continuity (organize objects in sequence)
      7. constancy
b. Projective Space (3-D)
   1. Monocular cues
      a. proximal size
      b. brightness
      c. shading
      d. texture gradient
      e. linear perspective
      f. interposition (closer objects obscure objects behind them)
      g. movement parallax (closer objects move faster)
   2. Binocular cues
      a. convergence (eyes must turn in)
      b. retinal disparity

III. Color
   a. Hue (red, blue, etc.)
   b. Saturation (amount of grey in color)
   c. Brightness
   d. Contrast

IV. Translation of 2D to 3D referents

V. Translation of 3D to 2D

Other sense modes also-
Auditory, etc.

COGNITIVE (in alphabetical order)

abstraction implication
analogy induction
analysis inference
associativity interpolation
asymmetry interpretation
attribute inversion
causality metaphor
classification measurement
closure negation
combination number relations
conjunction object Permanence
correlation prediction
deduction reciprocity
disjunction reversibility
equivalence seriation
equivalence space/time
experimenting structuring
extrapolation symbolization
formulating Models symmetry
generalizing synthesis
generalizing transitivity
hypothesizing
Each of the above processes has to be understood in terms of both developmental stage and sub-process.

The overall developmental stages are:
   a) sensory motor stage (0-2 years)
   b) preoperational stage (2-7)
   c) concrete operations (7-11)
   d) formal operations

Each of the processes can be divided into sub-processes and their own stages of development also. For example,

Classification: (can be divided into)
   1. Simple sorting
   2. "True" classification
   3. Multiplicative classification
   4. All-some relation
   5. Class inclusion relation

(And, classification seems to go through the following developmental sequence)
   a. Stage I (Graphic Collections—2 and a half to 5 years)
   b. Stage II (Non-graphic collections—4 or 5 to 7 or 8)
   c. Stage III (Classification—one aspect of the period of concrete operations—8 to 12)
   d. Stage IV (Period of formal operations (around 12 years)

AFFECTIVE

I. Inhibition
   of hate, rage, hostility, etc.
II. Coping
   with rejection, failure, pain, disappointment, criticism, loneliness, sadness, etc.
III. Management
   of fear, anxiety, anger, frustration, jealousy, etc.
IV. Facilitation
   of ecstasy, joy, happiness, etc.

The affective area deals with emotional energy.

In the beginning, the energy is unfocused. As competence is gained, the learner gains an ability to focus the energy.

VOLITION

(Volition refers to purpose, subjective aim, or will)

I. Attention
II. Goal Setting
III. Will
   a. Self Arousal
   b. Perseverance
   c. Effecting Closure
IV. Fantasy

Of course, each of the above can be broken down into sub-processes also.
For example:

Goal Setting
1. Direct attention toward future
2. Consider alternative courses of action
3. Project consequences of action
   a. Eliminate negative consequences for greater long run
   b. project and evaluate feasibility of alternatives
4. Determine priorities of alternatives
5. Integrate alternatives into coherent plan of action
6. Commit oneself to plan of action
   a. sense of faith in rightness of choice
   b. confidence
   c. temporarily giving up other possibilities

CREATIVITY

"Creativity is a complex condition wherein exists a continual interrelationship between the creative person who is involved with the creative process within a creative environment, producing a creative product which is ongoing in time (Walter Leopold, 1973)"

I. Attributes of the Creative PERSON:
   a. Openness
   b. Sensitivity
   c. Productivity
   d. Divergent Thinking
   e. Involvement

II. Attributes of the Creative PROCESS:
   a. Motivation
   b. Preparation
   c. Incubation
   d. Illumination
   e. Verification

III. Attributes of the Creative ENVIRONMENT:
   a. Psychological Safety
   b. Psychological Freedom
   c. Cultural Freedom
   d. Internal Evaluation
   e. Support
IV. Attributes of the Creative PRODUCT:
   a. Uniqueness
   b. Technical Skill
   c. Expressive Form
   d. Deliberateness
   e. Closure

SOCIAL

Successful Group Members Can . . .

(Task Functions)  ____ Initiate (Propose Tasks, Define Problems, Suggest Procedures)
                   ____ Seek information or opinions (Request facts, relevant information, ask for suggestions and ideas)
                   ____ Give information or opinions
                   ____ Clarify or Elaborate (Interpret, reflect, clear up confusion, indicate alternatives, give examples)
                   ____ Summarize (Pull related ideas together, restate suggestions)
                   ____ Test Consensus (Send up trial balloons to see if group is reaching consensus, check to see how much agreement)

(Social Emotional Functions)  ____ Encourage (Be friendly, warm, responsive; Accept others & their contributions; Listen; Show regard by giving opportunity or recognition)
                             ____ Express Group Feelings (Sense feeling, mood, relationships within group; Share own feelings)
                             ____ Harmonize (Attempt to reconcile disagreements, reduce tensions, get people to explore their differences)
                             ____ Compromise (Offer to compromise own position, ideas, status; Admit error; Discipline self to help maintain group)
                             ____ Gate Keep (See that others have a chance to speak; Keep discussion a group discussion rather than a 1-2-3-way conversation)
                             ____ Set Standards (Express standards to help group achieve; Apply standards in evaluating group functioning and production)

The Effective Communicator-Listener Can . . .

   ____ Paraphrase
   ____ Make relevant point to the discussion
   ____ Direct expressions of feelings
An Effective Group has . . .

- Morale (unity, positive group identity, emotional climate, need satisfaction, actualization, esteem, flexible social interaction, security, trust)
- Supportive Relationships (judgement suspended, acceptance, respect, equality, worth of individuals, empathy, feedback, communication patterns, interaction patterns)
- Common Goals (common agenda, no hidden agendas, identified issues, clarity, concreteness, ability to resolve conflict and make decisions)
- Constructive Processing (maintaining agendas, everyone participating, openness, setting standards, initiating, mediating, expediting, clarifying, encouraging, relieving tension, summarizing and gate keeping)
- Basic Prerequisites (identify group norms, read non-verbal cues, discipline self, be objective, obedient, resist temptation, have patience, delay gratification, be socially graceful.)

This book represents a significant sample of the research on the application of Piagetian theory to education.


A clear account of the major features of Piaget’s work. A chapter is devoted to each of the following: the sensorimotor period, the pre-conceptual sub-stage, the intuitive sub-stage, the sub-period of concrete operations, and the period of formal operations.


A listing of differences and similarities between objective and essay tests with explanations of when to use each kind of test.


A well written and useful guide for teachers on how to clarify objectives in terms of learner outcomes. Whereas many other books on behavioral objective writing focus on the writing of content objectives, Gronlund makes an attempt to show how behavioral objectives can also be written for process objectives.


A very helpful analysis of the major models of teaching. Some models use social interaction as a basis for their model, others use information processing. Some models are based on the personal while others are based on behavioralism.


A complete listing of criterion measures which can be used for evaluation of school programs.
Mosston, Muska, *Teaching: From Command to Discovery.*

A helpful analysis of seven basic teaching styles. Each style is analyzed in terms of the decisions it asks students to make. A sequence of styles is suggested which gradually allows students to take the responsibility for more and more decisions.


A presentation of many of the important Montessori ideas in outline form. This book makes for a handy listing of principles.


This book represents an introductory overview and framework for several other books. It gives a brief glimpse of the view that teaching can be considered a problem solving process.


One of the main books that analyzes group process in the classroom. Among other things, the book presents the task and social emotional functions that a successful group member can perform. In addition, it gives what the effective communicator-listener can do.


This is a book on grouping. Appendix A and C presents an interesting and rather thorough assessment battery for indicating student preference in such things as types of classroom activities, participation, types of teacher, who should make decisions, ways of doing things, values, etc.


This outlines the characteristics of Open Education. Appendix E presents the pedagogical characteristics of Open Education and Appendix D presents an Observation-Rating Scale.


A presentation on how to develop instructional units using an instructional systems approach and media.


34. Cohen, Dorothy H. and Stern, Virginia. Observing and Recording the Behavior of Young Children.


40. Cronbach, Lee, J. "How can Instruction be Adapted to Individual Differences?" Learning and Individual Differences. Edited by Robert Gagne, Columbus, Ohio: Charles E. Merrill, 1967.


150. Silber, Kenneth H. "What Field Are We In, Anyhow?" *Audiovisual Instruction*. May, 1970.


