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DEVELOPMENT OF A MODEL OF
COLLABORATIVE INSTRUCTIONAL
PLANNING AND DEVELOPMENT

DISSERTATION

Presented in Partial Fulfillment of the Requirements
for the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

by

John Eric Schneider, B.A., M.S.

*****

The Ohio State University
1972

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CHAPTER I

THE PROBLEM

"Education must shift into the future tense."

Alvin Toffler, 1970

Sometimes it seems education lives in the past and dreams about the future. Perhaps we in the educational establishment ought to not only dream about the future, but experience it.

Today, many of us in this culture are encountering a dichotomy of human values. On the one side we perceive a polarization of values; black-white, rich-poor, liberal-conservative, and on the other end of the continuum a blurring of those opposites; for-against, pro-con, moral-immoral. We live in a paranoical time, abundant and threatening, technological and humanistic, changing and unchanging.

Should we continue to get ready to plan change, as if change were something to get ready for? Change is here, with us; and yet there are those of us who can only react to it!

We have various biases in perceiving the educational enterprise. Our perceptions center around three major values: 1) viewing education as a human process; 2) viewing education as a technological process; and 3) viewing education as processes centered around things and materials. (Chin, 1967.) These major values provide a backdrop for considering the continuing evolution in education.
One of the most important but misunderstood phenomena of this continuing evolution is the fact that people concerned with instruction in our schools are increasingly being asked to, and are participating with others in activities directed toward maintaining, improving or changing instruction.

These groups, be they composed of community members, teachers, parents, students, administrators, and educational specialists, bring to the school environment various attitudes and skills based upon a combination of the three major values previously mentioned.

The ascension of this critical group process parallels to a great extent the slow evolutionary change which has occurred in American education. The processes of planning and development, leadership and management of instruction originally separately vested in teachers and administrators, is now becoming, in many educational settings, a shared responsibility.

Most of us would agree that the burden of planning, and developing teaching-learning experiences and measuring learning, traditionally shouldered by the teacher, is becoming a mutual responsibility: How did this come about?

"Groupness" Trends

The social-technical complexity of the world we live in makes cooperation mandatory among inter and intra dependent people. The following trends have contributed and are pre-
ently sharing responsibility for "groupness" in our culture:

- In international relations, a shaky, shrinking world has initiated organization of world-wide bodies and conventions with multi-group representation.
- In industry, the modern corporation has become an economic organization of great power.
- In government, within multi-layered units and multiple conglomerates, a great measure of social control has grown.
- Labor has become organized so as to make its membership and resources effective in dealing with both government and industry (Goodson, 1960, p. 19).
- The traditional American tool for decision-making, problem-solving, and action-taking is the community organization, and its meetings and inevitable committees.
- The primary social organization in America is the family. Additionally, the social forces in American cultural life have produced a great number of small groups. Each individual, it is said, belongs to five or six groups (Mills, 1967, p. 1).

More to the point, educators have long been members of a group known as "the faculty." As faculty members, teachers have met on countless occasions, and have served on many ad hoc and permanent faculty committees. More recently with the advent of innovative school organizational and grouping patterns, a desire for instructional efficiency has promoted the
concept of team teaching. In this form of instructional
group, teachers are supposed to spend a good bit of time to­
gether, deciding what is to be taught and how.

Fresh trends indicate a dissatisfaction with institu­
tionalized curriculum and instruction. This is expressed by
the need for involvement of students, parents and community
in creating new, alternative approaches to learning and study­
ing. (Saturday Review: December 18, 1971, p. 60-67), (Time:
April 10, 1972, p. 85), (Saturday Review: February 5, 1972.)
As a result new groups are forming to deal with this concern.

What of the future of groups? Toffler has suggested:

We must create a council of the Future
in every school and community: Teams
of men and women devoted to probing
the future in the interests of the
present. (1970, p. 347.)

It seems that as long as man needs to survive on this
planet, there will, in all certainty, be groups; but will
concerned groups deal realistically with each other and the
issues growing out of emerging, evolving educational needs?

Major Developments Promoting Grouping

Educators are increasingly being asked, and are required
to work together. What major developments in our pluralistic
society initiate the need for grouping of educators and others
in re-thinking and re-solving new approaches to teaching and
learning?

1) Knowledge explosion

The explosion of information in all areas of science,
technology and humanism is indisputable, and is inextricably
involved with well-established trends toward increasingly specialized training for some individuals and decreasingly generalized education for other individuals.

2) Integration

This concept and resultant action pervades every aspect of our life today. Needs to communicate or translate among and between the disciplines and social interaction generate requirements in science, technology and interpersonal relationships.

3) Public Demand

Growing numbers of members of our society are now demanding recognition of such matters as: increased medical services, more diversified educational fare, relevant school programs, more humane use and treatment of persons, honesty and involvement in governance, understanding of man's appropriate relationship to nature and our environments.

4) Social concern-Social awareness

Shifting emphasis from "group" to "individual" and from "person" to "team" has shown increased expression. The importance of the individual as a person and as a group member draws a wide circle that takes in the ecological, social welfare, communicational and expressive needs of individuals.

These trends and developments have resulted in educational institutions becoming more and more comprehensive and coincidently specialized. Gleazer, discussing interfaculty coordination in the community college, stated: "Integration
of the many parts of the comprehensive institution begins right here, with the faculty" (1968, p. 77). Bradford and Aiken saw "an integrating trend in the practice of medicine that stems from ecumenism in the sciences. Interdisciplinary cooperation has emerged, and with it the health team approach to providing health services" (1970, p. 18). Following district-wide training workshops in humanistic education, neighborhood school boards, composed of teachers, parents and administrators, were begun and empowered, as far as was legally possible, with responsibility for running their schools (Saturday Review, February 5, 1972, p. 54).

In educational and training settings in public, private professional, industrial, government and military schools, attempts are being made to increase faculty, student and lay coordination and information sharing in planning, evolving and assessing services and programs.

One of the key forces in the continuing evolution in education resides in the coordinated efforts, skills and understanding of groups and individuals changed with instructional planning and development. Groups of educators are being called together, some from different disciplinary fields, to rethink and integrate traditional curriculum content and learning methods, and to produce new instructional programs using creative teaching methods and materials. In many instances, a product is required from the combined work processes of individuals acting alone and together. Providing adequate orientation experiences for the conduct of those
tasks appears to be an important problem. After an extensive survey of elementary innovative practices, Goodlad concluded that: "Teachers are very much alone in their work. This aloneness becomes poignant in the face of problems which, clearly, cannot be solved by the individual teacher alone" (1970, p. 94). Traditionally and procedurally, teachers have worked somewhat unassisted in preparing instruction. Education has not provided the kind of role differentiation experiences needed for team planning and developing. Universities have not provided these experiences.

The need for orienting and training educators for group instructional planning, development and evaluation is vital. More and more often educators are assuming instructional team roles. Most of these persons have had neither prior experience nor adequate training in the concepts needed for rethinking and evolving instruction on a collegial basis. Critics of educational efforts refer to the lack of collegial relationships in coordinating curricular and instructional communication and decision making (Silberman, 1970, p. 161), Goodlad, 1970, p. 64).

The team relationship, ranging quantitatively from many consultant specialists working with one or two instructors, to a group of instructors working together without resource or specialist assistance is, at best, a dimly perceived concept. "How do I work with instructional specialists"; "What do I need to know"; both questions are frequently asked (Haney, Langa, Barson, 1968).
Very often, to build instructional programs upon new
ground to meet immediate social and training needs and con­
cerns demands intellectual abilities, skills and value judg­
ments for the cooperative evolvement, planning and execution
of instruction that few educators possess.

**The Problem**

There is a void in the experiences of those who are
called upon to plan and develop educational programs at all
levels of education. A critical need exists for training in
group instructional planning and development activities, in­
cluded in a framework of coherent, systematic human inter­
actions which are operable with real people in a real world.
The problem statement, therefore, of this study is, "Could
a simulation exercise be developed to orient and train edu­
cators in team instructional planning and development with
the potential for facilitating future team and instructional
planning and development activities?"

This problem growing out of the aforementioned trends
and emerging developments is based on the author's own exper­
ience in assisting a team of educators at The Ohio State Uni­
versity. College of Veterinary Medicine, plan and develop a
new course which was part of a newly modified and integrated
curriculum designed to educate Doctors of Veterinary Medicine.
Veterinary educators representing many disciplines, a team
leader and an educational specialist (the investigator) com­
prised a team whose mission was to plan, develop, implement
and evaluate a new course in animal gastroentrology.

Following an eight-month development effort culminating in the teaching of the new course, the following observations were delivered by the investigator as part of an evaluation report to the Department of Veterinary Medical Education:

a) Team members did not at first understand the role of the education specialist and other instructional resource persons.

b) Team members did not fully understand the significance of information presented to them for decision-making in terms of tasks to be accomplished.

c) The team leader understood his role effectively and was a major force in moving ideas through the members; but, unfortunately, many of the ideas were his rather than team members, and were not adopted.

d) Team members did not seem to understand their individual and group roles on an interdisciplinary team.

e) The team members and the investigator had different feelings about the value of time; early, extensive planning was not viewed by most team members as relative and important.

f) Team meetings were not suitable for most task accomplishments.

g) Team members were not well motivated to work on their own.

h) Team members and the team leader needed experience
in understanding the whole of the instructional development process; where he would fit in; what he might be expected to do; what the process was to be like, and the product expected.

1) Team members and team leaders all needed experience in: making decisions, technical aspects such as writing performance objectives and developing appropriate learning experiences for students, being able to talk about the teaching-learning process itself—exclusive of discipline subject matter, and knowing and allocating resources.

These formative outcomes can be generalized to include those instructors and educational resource persons who are faced, collectively and individually, many for the first time, with this newly-featured instructional role. Developing or revising instructional programs and courses is a sharing procedure in which new understandings, skills and attitudes, in addition to well-known subject matter, is called for.

Simulation, as a medium of instruction, is seen as a means to involve educators with what may become their own problem; working with others in instructional development. Simulation can be viewed as an orientation-training exercise involving teams of persons with relevant problems. The use of simulation as an instructional means for learning has grown rapidly in only a few years. Early uses of simulation as a training procedure included application in diverse fields
such as the military, business and industry. Recently, its use has become increasingly widespread in education and the behavioral sciences.

The orientation and training needed by educators in developing instruction with others has not been included in previous simulation efforts. Simulation has been applied in training school administrators in specific roles, and in training in skills needed by program and project managers, evaluation specialists and communication specialists in education. In business management, simulation has been frequently used for instruction, research and even selection in various management positions. Simulation has recently been applied in helping school and community persons experience conflict, negotiation and resolution in different school settings.

**Purpose**

The purpose of this study was to develop and validate a simulation exercise for use in orienting and training of educators in collaborative instructional planning and development. More specific objectives were as follows:

1) to define a model for collaborative instructional planning and development;

2) to build an adaptive simulation of collaborative instructional planning and development which will enable participants to:

   a) gain an understanding of a total development
process;

b) try interacting with others and confronting issues in planning and developing instruction;
c) exercise planning and development skills;
d) identify important obstacles and problems;
e) create and evaluate an instructional development role for themselves;

3) to obtain evaluative information to be employed in determining the relevancy and usefulness of the simulation exercise in orienting and training teams of educational personnel in planning and developing instruction.

Definitions

Figure 1 - Relationship of Curriculum, Measurement-Evaluation, Resources and Organizational Support to Instruction.
Curriculum. That which is prescribed to be learned and that which is learned—even though the results of learning show that no prior prescription intentioned the learning results. Curriculum can assume several forms. It may include, but is not limited to, course content descriptions, objectives, and the substantive content of spontaneous or planned interchange of ideas and feelings.

Measurement and Evaluation. Subjective and objective measures of behavior and dispositions to behave in particular ways used wisely and humanely as evidence for assessing (judging) student learning. These data, which can be more or less qualitatively descriptive and/or judgmental, have as their precedents and antecedents curriculum and instructional intentions, resources and costs, as well as weaknesses and strengths of instructional plans.

Resources. The capability and means as a function of organizational support which may be available for supporting instruction and, in conjunction, curriculum and measures-evaluation. Resources may be classified as: human—such as teachers, students, clerks, specialists; technological—such as equipment and materials; and funds.

Instruction. Utilization of human and technological resources in structuring environments to facilitate human learning.

Organizational Support. The existing structure and personnel responsible for organizing and coordinating resources in such a way that human growth and change is facilitated in a cli-
mate in which each person and his product is valued.

Collaborative Instructional Planning and Development. A process involving cooperatively planned teamwork in which a synergy of human interaction enables needed instructional development competencies to be combined to support and supplement role definitions, functions and systems as essential requirements for instructional productivity.

Instructional Simulation Exercise. Because of the lack of clarity about what simulations are precisely, what they are intended to do and how they are best used—a comprehensive review of this term is included in Chapter II. As will be evident in Chapter III, the simulation exercise was designed to fit the essential elements of an adaptive model. It is not computerized, has no game elements in winning, losing, competition and scores, has not been used for research purposes, and is not a "simulator trainer" in the mock-up tradition. Simulation as used in this study means pre-involvement experiences in new roles, responsibilities, abilities, and feelings in a team planning and skill development exercise. The simulation exercise provides a situational setting permitting participants to interact with the effect of individual and group behavior on activities without requiring the participants to live with the results of the planning. It is a communication, consensus-seeking exercise structured around purposive team instructional planning, development and evaluation activity in a near real world setting.
Delimitations and Limitations

The present study was concerned with refining and re-dimensioning existing instructional planning and development constructs, then using the re-dimensioned model in an environment and process in which group members could mutually decide and explore activities for designing and creating instructional materials and methods. Because of the complexities involved, the following delimitations and limitations were made:

Delimitations:

1) A complete study of the domain of educational change was beyond the scope of this research.

2) The development of the simulation experience was primarily concerned with the initiation or pre-involvement phase of the developed model. The planning and development functions were described, but little emphasis was given to the Planning, Development, or Consolidation phases.

3) This study dealt only with knowledge and attitudes toward instructional planning and development which existed or could be positively influenced during the pilot testing of the initiation phase of the model.

4) The subjects used in this study were limited to Capital University School of Nursing instructors, involved in a workshop conducted by the investigator.
Limitations:
1) Educational personnel may exhibit different behaviors in in-service programs than they would normally on the job.
2) The observational intuitive data was collected by the investigator only.

Summary

Beginning with an analysis of the current context and backgrounds for groups affecting instruction, Chapter I reviews major trends and developments which lead to a discussion of the problem, purposes of the study, and definition of terms indigenous to the study.

Organized of the Study

Chapter II reviews relevant literature and research in concepts allied to instructional planning and development and instructional simulation.

Chapter III focuses on the development of a model of collaborative instructional planning and development and how a simulation-exercise was designed, developed and pilot tested in relation to the collaborative instructional planning and development model.

Chapter IV describes the evaluation of the pilot test of the simulation-exercise. The final chapter presents a summary of the study followed by a discussion of the findings, recommendations for further research, and a final comment.
CHAPTER II

REVIEW OF LITERATURE RELEVANT TO INSTRUCTIONAL PLANNING AND DEVELOPMENT AND INSTRUCTIONAL SIMULATION

Consideration of what collaborative instructional development could be invites questions and solicits thinking about simulation as a learning experience in sensitizing educators to the skills and realities of group instructional planning and development. Some of the questions raised may be: Can the elements of team planning and development be viewed both as a series of linked components and as a process? Can simulation be so defined and classified as to yield an instructional meaning appropriate for the context? What guidelines can be elicited concerning the design, modeling, development and fabrication of simulation exercises?

The information in this chapter attempts to relate selected statements, opinions and developmental research to these questions and concurrently to set parameters and operational requirements for the previously defined problem.

The first part of this chapter will define and describe instructional planning and development (IPD); the second half analyzes, delineates and defines an appropriate instructional role for simulation.
ANTecedents OF Instructional Planning and Development

Providing instruction has often resembled a card game or a pharmacy with the learned "dealing" or "dispensing" the instruction to the learner. Instruction has, as its Latin roots - to place in a structure. Searles (1967) defined instruction as in-structuring; the search for meaning in a structure.

Instruction as a subset of curriculum requires curriculum content for in-structuring in a setting appropriate for learning processes to occur. Significant efforts have been made by instructors to think through gradually unfolding programs of information and cognitive re-organization, but often time, inertia, and lack of "how-to-do-it" knowledge defeat the in-structuring procedure.

As education moved into the present period of change, there began an emphasis on the need to modify curriculum directions, concomitant with increased knowledge and skills and pressure to apply societal values. This need was expressed by curriculum reform and curriculum development efforts (Tyler, 1971), (McClure, 1971), (Taba, 1962).

A newer concept, instructional technology, is well known and widely used. Specific definitions are slippery. This is illustrated by Kenneth Silber's article "What Field Are We In, Anyhow" (1970, p. 21-24). Not one definition, but three are described that make up the domain of instructional technology. Instructional Management Functions, Instructional
Development Functions, and Instruction System Components. In these definitions, Silber considers instructional development as part of instructional technology.

Information system theory concentrates on the teacher (or instructional device) as sources and students as processors. Communication theory relates the similarity of "message" and "receiver" systems to "teaching" and "instruction" (Harrison, 1969). Smith defined an instructional system as "an integrated set of media, equipment, methods and personnel performing efficiently the functions required to accomplish one or more training objectives" (1966, p. 7). An instructional system, according to Twelker (1969), is a series of learning experiences, of which various components of instruction have been specified (media, content, instructional strategies, etc.), producing consistently and predictably a desired or stated behavior on the learner's part.

Heinich (1970), in his work on "Technology and the Management of Instruction", pointed the way toward an instructional management system which weaves in the various technologies of instruction at the curriculum planning level. This effort was an attempt to subsume all the theories of instruction in a management system.

Instructional planning and development has been carved out of the meanings contained in the fields of instructional technology, instructional systems, instructional management, and information systems (Stowe, 1971, p. 88).
A recent re-examination of the instructional development phenomenon (Audio-Visual Instruction, December, 1971) reveals that the development process is the most importantly visible facet of the term, as differing meanings for different settings and purposes are quite common. Not until the more recent past has instructional development emerged as a specialized activity. Training programs in government and industry geared to job performance, programmed instruction and behavioral psychology have provided the impetus to propel this concept into public and professional school domains.

What is Instructional Planning and Development?

In order to provide a state-of-the-art response to that probing question, an analysis of instructional planning and development literature and statements was synthesized from a number of sources no one of which can be cited specifically, but all of which will be cited below.

**General Observations**

1) Using the ASCD "Criteria for Theories of Instruction" (ASCD, 1965, p. 16-24), none of the statements reviewed were found to be theories of instruction. A proper distinction must be made between **model** and **theory** - two terms that seem to be used interchangeably in instructional planning and development literature. Chapanis's (1965) differentiation was used: A model is a convenient way of looking at things, but a theory should reflect knowledge and, to be accepted, must have been demonstrated to provide a means of predicting events.
Models, structures, heuristics, flow charts, and generalizations were found that described, explained, and investigated the instructional planning and development phenomena. Reports, ideas and projects, proposed or in progress, were also described as instructional developments.

(Note: Most often the literature refers to instructional development including planning as part of development. The investigator believes there is a significant reason for differentiating planning and development; this is alluded to later in this chapter.)

2) The systems approach is pervasive throughout the instructional planning and development literature. A system is an association of parts that are humanly constructed and directed into organized wholes for the realization of specific purposes. The purpose of a system is explained by referring to processes in which components of the whole interact. Thus, intention determines the process. Two philosophic positions are pre-eminent in regard to the "process" intention. One highly visible orientation is grounded in a technological scientific product-inducing systematic view; and the other is people oriented, using the system as a guide for planning and developing.

The major difference is in how the purpose is applied. A system, according to Abedor & Gustafson (1971, p. 22), can have a product orientation or a people orientation. One view of a systems approach as a guide is implied; as a
road map to be used as an indication of places intended to be visited while exploring the general area. In general, the majority of processes described as systematic have the former orientation and use concepts, tools and very often terms illustrative of a product orientation.

3) Most often the term instructional planning and development has been associated with media selection, construction and evaluation. Attempts are underway to bring media into a more dependent relationship within the teaching process, one which would result in making visible objectives and situations in planning, facilitating and assessing learning activities or instructional "products."

4) Instructional planning and development has evolved from consideration of several main branches: curriculum development, teaching methods, and teaching materials. Figure 2 is offered in an attempt to sort out the evolutionary growth of instructional planning and development.

5) The boundaries of instructional planning and development are difficult to discern, encouraged on the one hand by boundless enthusiasm and constrained on the other by lack of empirical or experimental research information. Following a survey of instructional planning and development literature, one is left with unsettled questions relative to the parameters and the substance of instructional planning and development. What is missing? Are further definitions and distinctions necessary? Are some basic considerations not being
taken fully into account?

Figure 2 - Growth of Instructional Planning and Development
Instructional planning and development is related to the larger question of providing positive change in education. Instructional planning and development seems to be oriented inward to a search for procedure and provisions. There is also a need for instructional planning and development to look outward from a different perspective to the stimulating world of creating development in the behavioral sciences as well as in the technology of education.

The following criteria, adapted from Chin (1961, p. 21-23) recognizes four aspects of development:

1) **Development has direction.** There are visible goals or end states; enroute activities contribute to end states.

2) **Development has identifiable states.** Over a period of time, development states can be identified. Over a period of time, also, states are differentiated from one another as stages, levels, phases or periods.

3) **Development involves progressive forms and movements.** Four forms can be described: a) **forward advance;** progression leads to eventual advance; b) **spiral form;** change and growth, might return to previous problem at a higher level; c) **cyclical;** phases which occur and re-occur; and d) **branching;** cut into differentiated forms and processes through increasing specialization, and autonomy.

4) **Different causal forces produce development.** Three forces can be described: a) **natural;** a stimulus release sets
off inherent growth forces; b) coping; a response giving rise to growth and development; and c) revolutionary; stress and strain release set of forces to create new structures.

The above criteria may be used in two ways: 1) in indicating what may be observed or intuited in real world planning and developing and, 2) indicating benchmarks for creating developmental models.

The most appropriate context in which to consider development as a concept is within the overarching context of the change process in education. This process includes both educational development and, as a subcomponent, instructional development.

The Change Process in Education

Havelock's (1970) analysis of the phases of natural and planned change processes identified three models of diffusion and change: The Social Interactive Perspective; the Research, Development and Diffusion Perspective; and the Problem Solving Perspective.

The Social Interactive Perspective, derived from studies in rural sociology, stresses the individual receiver of information as the integrating factor with the focus on the receiver's perception of a response to knowledge coming from the environment outside of himself. Evaluation is a constant activity across all phases of the process beginning with awareness and concluding with adoption. More recently, advocates of this perspective are becoming aware of crucial ele-
ments in a diffusion of innovation process; communication, channels, time and social system members (Rogers & Svenning, 1969, p. 1-7).

The Research, Development and Diffusion Perspective looks at the process of change from the viewpoint of the originator of an innovation. Beginning with the formulation of a problem on the basis of presumed receiver need, the initiative in identification is taken by the developer, not the receiver.

Guba (1968, p. 37-63), viewed the major steps in the change process as: research, development, diffusion and adoption. The development phase includes two stages: invention and design. Evaluation is described in this model as being continuing and inclusive of all steps.

The Problem Solving Perspective is inclined toward solving the problems of a specific receiver, and the problem solving process involves the receiver throughout. An intrinsic element is the outside resource; individuals or groups who can be generally characterized as "change agents." The change agent usually assumes the role of a sender of information to be received by the person with the problem (Lippitt, 1965, p. 11-28).

Within these three models, however, the idea of planning and development and its relationship to the educational change process is considered most completely by the Research, Development, Diffusion Perspective.
Educational Development

Guba has stated that development has, as its basic objective, "the identification of operating problems and the formulation of solutions to these problems"; and he observes that "the developer, unlike the researcher, is most acutely concerned with practice" (1968, p. 42). According to Guba, development implies more than coming up with an answer. The answer must be one which works with real people, in a real world. In Guba's view, development activities may be considered in four categories: a) depict the state of affairs in order to identify needs and problems; b) invent potential problem solutions; c) fabricate (engineer and package materials); and d) test in a real school situation.

The concept of educational development is very broadly oriented. Grimes and Doyle (1971, p. 55) summarized five current models of education development. A comparison of the major development models reveals a remarkable consistency (Figure 3).
Figure 3 - Current Models of Educational Development

**Instructional Development as a Subcomponent of Educational Development**

As part of educational development, instructional development has more to do with the creation of a product or process for specific instructional situations and related immediate pre- and post-preparations and decision-making rather than pre-post instructional exploration.

Contrasting instructional development as reviewed above, with educational development, it is apparent that the operational focus of instructional development is much more narrowly defined.
Intention or purpose of the society, policy or personnel within the educational institution may determine other kinds of development subcomponents that could co-exist with instructional development within educational development. Curriculum development, organizational development and resource development may be thought of as other possible linked subcomponents of educational development.

Two conclusions may be drawn from consideration of the context of instructional development: 1) As a part of educational development, instructional development seems to be associated with the change process in education. The relationship has been established but not operationalized. Change is easier to talk about than to facilitate. A direct relationship needs to be delineated between "change" and instructional development. 2) Even though educational development and instructional development are both concerned with the systematic means and processes of instruction, there is a difference in the relative scope of these concepts. Educational development may focus on an activity such as PP8ES - Programming, Planning, Budgeting, Evaluation, Systems - whereas instructional development may involve one or several teacher's revisions of a unit or course of instruction.

It should be reiterated at this time that most discussions of instructional development include planning as a component of development. In order to retain the original intent the term instructional development has been used interchangeably with instructional planning and development.
Planning as a concept and an activity may be part of development, but should be viewed as somewhat discrete from development. Hence, the investigator needed to distinguish between the two, not as separate terms, but as discrete, interwoven processes.

The broad characteristics as well as the subtle qualities must be defined if instructional planning and development is to emerge as an effective process and a positive force in changing instruction. Perceiving the educational venture as either technical, human, materials-centered, or combinations of the three, underlies human communication and action in developing instruction.

The values that spring from vital human experience, the values that people bring to a group enterprise, should be recognized in allowing for individual differences in attitudes and abilities.

The specific characteristics of instructional planning and development are discussed next because they reflect the major trends and needs that have arisen from the need for human understanding in a complex milieu, the knowledge explosion, integration in sciences as well as social life, public demands and social concern and awareness.

**CHARACTERISTICS OF INSTRUCTIONAL PLANNING AND DEVELOPMENT**

**Instructional Planning and Development as a Human Process**

Many years ago, W. W. Charters, exploring the parallels between engineering and curriculum planning, presaged the
It is evident that if these comparisons based upon the definitions of engineering are valid, we are justified in adopting the term educational engineering as a dramatic reminder to educators that the omnipresent man of ideas in education must be vigorously supplemented by those who are dedicated to the service of giving body to ideas (1945, p. 34).

Development is more than giving body to ideas or devising a solution to a problem. Development as a method, according to Guba (1968) is a complicated process which neither theoreticians nor practitioners are singularly competent to carry out. Originally teachers and then, increasingly, curriculum development groups established development patterns which have been mainly useful in sorting out appropriate content for learners.

The instructional planning and development process should seek to inject new life into the evolving domain of instruction, dramatically accentuating the person in the process. Procedure should activate change through developmentally influencing the behavior and attitudes of instructors, instructional teams, and, ultimately, the student.

An instructional system is a human organization with roots in a social environment. Events in instructional planning and developing are performed by human persons who are caught up in an institutional, man-made construct which is essentially natural—learning. In attempting to plot the course of and predict learning, many assumptions are made by the institution. One assumption is that this natural, human
function, learning, can be ordered and promoted. Rather than being dehumanizing, the systems approach provides a means whereby human interaction in the learning process can be enhanced.

Present educational practices place teachers in quite narrow human interaction; i.e., transmitting simple fact and information, passing out and receiving papers, scoring and recording grades, etc. The systems approach provides a potential power to augment the limited amount and kind of human interaction in instruction (Hamreus, 1968, 1-10).

Possibly one of the most neglected sectors of cognition about instructional planning and development has been intentionality. Without the recognition of personal and group intentions and purpose, relevance of linear graphic model descriptions drops to the zero point. Intention must be recognized in planning and development.

Westbury contended that "intention is the context which defines how propositions and actions should be understood" (1970, p. 242). Intentions derive purposes; it is both a personal and social activity. Intentions allow meanings to be conceptualized which can further receive group acceptance intellectually and behaviorally.

Reflecting on the person in the emerging process, it is apparent that group norms and individual contemplation about intention result in varied purposes. Purpose describes what has to be done and determines processes to be undertaken.
Purpose gives direction to the design and to the development. For maximum effectiveness, intentions and purpose should be mutually comprehended and perceived by team members and associates.

Substantive Dimensions of Instructional Planning and Development

To date, much verbage has been expended in an effort to locate the important elements of instruction. We are becoming increasingly aware of the many factors which influence learning and thus must be considered in designing instruction.

Most model developers writing in the instructional development and instructional systems field have pre-selected elements which were either used in a project or, according to the developer's rationale, should be used. The following section reviews and classified the major development elements most frequently mentioned in the literature. A number of sources were used, several of which will be cited specifically, with the remainder cited below.

What to Instruct

Sources. The sources of curriculum information are listed by Banathy in his information system model as "Federal, State and Regional Agencies, Educational Research and Development Domain, Science, Art and Technology, Other Schools, Professional Associations and Publications, Fellow Professional, Publishers and Media, Industry, Other Educational
Agencies, and the Community" (1970, p. 26). Hough and Duncan assumed that, "in the long run, the program of studies of the school is an institutional expression of the values of the people who support the schools" (1970, p. 25).

Implied in this context are decisions to be made. Stufflebeam's (1971) discussion of educational decision-making indicated a need to modify the "what" question with the type of change required and the degree of information grasp of the client group.

The learners. Without exception, literature describing instructional developing or developmental models recognized that the learner characteristics and capabilities must be considered.

However, in practice these considerations often have low priority in designing instruction. Many individual learning variables have been proposed, but validation of relating the learning characteristic, or individual personality variable, to learning prowess have largely proved unsuccessful. We know that capability, motivation, achievement and personality are learner qualities. How should these be considered in designing instruction? Other influences on the learner include expectations of parents and community, self-concept, age, sex, maturation, social context and course content, handicaps, talents and time.

When specific learnings can be identified, pre-testing or achievement testing of what he knows and doesn't know, or is able to do, or not do, may give us some idea by observing
his performance. We can ask the student about likely characteristics. We may learn from what he doesn't tell us as well as what he tells us.

Subject matter. The content of subject matter comes from a number of sources and in several forms: 1) Information received from relevant, previous course or program outcomes; 2) Task analysis, from external and internal sources, concerning knowledge, skills and attitudes. These sources may be inside the school system as institutionalized subject matter and/or outside the school system as naturally occurring subject matter derived from community and social needs. Content considerations would also include proficiency levels of what should be taught and/or learned, selections, organization, time, sequencing and grouping.

Course/Program Objectives. Usually identified as terminal objectives, they serve to limit the broad goals of the program, clarify scope, relate school goals to course objectives, and provide general guides for the actual instruction process. Substantive and managerial intentions may be identified in this level of objective as well as statements of relevancy, scope, criticality of performance, prerequisite skills and knowledges and attitudes. Course objectives may be placed in perspective by considering the source of the content/process goals as proceeding from national or local sources, expressed by the institution as goal statements or philosophy, by the support group as curriculum objectives and
by the instructor as performance objectives.

**Learning Objectives.** A relevant statement about the learner's behavior expected to occur as a result of learning. An ideal learning objective may include: requirements (givens), outcomes (conditions under which learner should perform), criteria of acceptable performance, and rationales for inclusion of objectives in a learning sequence. Alternate terminal behaviors planned and expressed as objectives for different types of learners may be identified. Descriptions of behavioral change as overt, e.g., ball-throwing skill, or covert, e.g., understanding square root, may be included in objective statements. Learning objectives may be substantive; behavioral manifestations of broad course goals, and/or managerial; non-substantive behavioral outcomes that facilitate the achievement of substantive learning objectives (Hough and Duncan, 1970, p. 57).

**How to Instruct**

**Instruction Learning Types.** Considerations should include clarifying and ordering the vast range of intentions expressed by the instructors and instructional team, institution and community. A functional system for classifying learning objectives helps guide actions necessary to realize the objectives. Intents should give priority to review, classification and inclusion of the following appropriate categories of learning:

a) **Domains.** The basic units are knowledge, feelings
and motor skills (cognitive, affective, psychomotor); (adapted from B. S. Bloom by Hough and Duncan, 1970, p. 65).

b) **Application Level.** These units are convergent, divergent, and evaluative; (adapted from Guilford by Hough and Duncan, 1970, p. 60).


Using these categories as a functional system for grouping learning objectives and/or helping guide actions necessary to realize the learning objectives or for unique purposes initiated by instructor, instructional team or students gives direction for student learning conditions and performance measures.

**Instructional Learning Conditions.** Human beings create, discover and express meanings. Learning conditions should be contrived so that a search for meaning along alternate pathways is possible. Intents of subsystems should be infused with hard data from learning experiments; findings from instructional research on problem solving; need achievement and content sequencing.

a) **Level of Learning.** With performance desired as an.
intention, is mastery, long-term or short-term retention, or intuitive generalization necessary?

b) Selection of Specific Modalities as a Condition. Considerations include: verbal, non-verbal, visual, auditory, olfactory, tactile and their relationship to task complexity, reality, fidelity, feedback response, cost and benefit.

Format for Instruction. Instructional procedures could include the following:

a) Communication Types. Gaining/controlling attention, recall, cueing, feedback, retention, outcome assessment (Gagne, 1969).

b) Instructional Strategies. Interactive, direct communication, independent, group activity (Hough and Duncan, 1970).

c) Teacher Key Behaviors. Clarifying, responding, questioning, accepting, encouraging, praising, checking, demonstrating, providing, managing, judging, lecturing, criticizing (Hough and Duncan, 1970), (Hughes, 1959), (Flanders, 1957).

d) Media Functions. Selection of specific forms: verbal, non-verbal, visual, auditory, olfactory, tactile, and their relationship to task complexity, reality conditions, feedback and response needs, cost and benefit.

e) Format of Instruction. A general idea of the structure and conformation of the learning experience and teaching
activities should be produced as a result of the interaction and engineering of the influences above.

Concerns for the individual learner may be reflected in opportunities for alternate instruction formats befitting the instruction and the learners.

Instructional Prototype Development. May include the following activities: production, equipment, specialist assistance, scheduling and development cost.

Try-out: Analyze Prototype Program. This procedure should occur in a real setting with real constraints.

Whether It was Achieved

Student Performance Measures. Teachers evaluating learning outcomes may wish to consider appraisal as implied in objectives and derived from them, knowledge of results (feedback for learning in a learning sequence and for teacher measurement of learner performance), attitude toward instructional variables, maintaining the same domain and kind of learning expressed in the learning objective in the test situation. Criterion references and expressed intentions of the instructor for the student should also be regarded.

Evaluating Instructional Planning and Development. Considerations include: A procedure of trial and revision is important to success of the development. If time or funds do not allow for testing procedures and materials, observations of student performance during first period of actual use are necessary. Quantitative methods are used to evaluate instruc-
tional costs in relation to students served and the outcomes of instruction such as Program Evaluation Review Techniques (PERT) and Planning-Programming-Budgeting-Evaluation-Systems (PPBES). Kinds of costs are also important. Developmental and operating costs in dollars, as well as time costs (student's and teacher's), political costs, etc. Informational and attitudinal questionnaires, rating scales, and follow-up studies of and by students, teachers, staff members may indicate degrees of success of the instructional program.

Generally, most sources acknowledged that evaluation should be a pervasive, inclusive element during all phases and at all times during the educational planning-developing-instructing-evaluating cycle (Stufflebeam, 1971), (Stake, 1967), (Scriven, 1967). Assessment of student performance, the instruction plan and outcomes gives direction for decisions affecting modification, revision, inclusion or deletion. (Kemp, 1971), (Twelker, 1969, Chapter II), (Hamreus, 1968, Chapter I), (Banathy, 1968), (Baker & Schutz, 1971), (Tuckman & Edwards, 1971, p. 21-26), (Nord, 1971, p. 11-17), (Douglas, 1971, p. 46-50), (Goodman, 1971, p. 37-38).

Composite Nature of Instructional Planning and Development

Human intentions, purpose and behavioral variability, differing instructional contexts and environments give the process a composite nature. Nord explained the relationship of elements from various instructional development models as follows:
While the elements are the same, the difference in their relationships may indeed create different results, just as the different relationships with the letters ATE, EAT, TEA, illustrate (1971, p. 13-14).

Nord referred only to differences in published models; however, if taken a step further, we can begin to look at the differences as discrepancies between the real world of developers and the ideal world of theoreticians.

Many learning systems models have been constructed. In calling for a moratorium on model construction, Voegel asserted:

The beginnings of a 'model backlash' already exist 'out there' among those (teachers, etc.) responsible for instructing, in that they express concern about the inflexible lock-step approach, and how dehumanizing all those boxes, squares, triangles, lines, dotted lines, and so forth appear to be (1971, p. 5).

Perhaps the key words "inflexible lock-step approach" and "dehumanizing" will give us pause to think about how development models are usually described.

In applying a system concept to education, the thrust for application has come from outside the education field. Many of the earlier applications used special technical jargon which have impersonal machine-like meanings, while through complex flow diagrams a robot-like process was inferred. A typical educator's reaction to this process remains essentially negative; he may deem the linear system as more appropriate to requirements of industrial training than to the broad cognitive and intellectual needs of education.
Kemp believes that the technological basis of the systems approach means more than machines. He pointed out that "it is essentially a process that establishes a way to examine instructional problems and sets a procedure for solving them" (1971, p. 7).

Hamreus suggested that "the systems approach is simply a guide for planning and developing the instructional program to achieve that which is desired" (1968, p. 1-9).

The verb "guide" has two meanings: one set means counsel, advise, beacon; the other means rule, control, govern. A systems approach can, therefore, counsel or control. Using the "counseling" meaning of a systems approach is consistent with the variabilities of human nature; those responsible for instruction may find greater personal relevance in non-linear or integrated applications of systems technology.

In rejecting the linear, step-by-step application which most often appears in the literature, the investigator did not reject the idea of progressively moving from one developmental activity to another. He did, however, note that instructional planning and development models and statements found in the literature seldom indicate how the model can be adapted to the particular environment and needs of the potential adopter of the process. It is most apparent that adopting groups, as they struggle with new concepts, will discover more differences than similarities in instructional planning and development.
The differences will become clearer as one considers the substantive elements just reviewed, the intentions and values held by individuals associated with instruction, and the context of the development. Group instructional development could be differentiated by intention, context and selection by those responsible for developing. As an example, if we make a loose comparison among the term chemical element, compound and mixture, an instructional planning and development process would appear to be more of a mixture.

Dynamic Group Interaction in Instructional Planning and Development

Functioning groups in an organization are shaped by what happens in them and to them. They need to develop a collective focus and a sense that what they are engaged in has significance. The working method must be such as to relate each individual's contribution to that of others.

Speaking of future management challenges, Bennis has said:

One of the most difficult challenges will be the task of promoting conditions for effective collaboration or building synergy teams. Synergy is where individuals actually contribute more and perform better as a result of a collaborative and supportive environment (1967, p. 6-19).

Building synergy teams or being an effective member of a synergy team requires the understanding of the following related concepts and influences: organization, groups and group dynamics, roles and role and behavior. Each of these
requirements will be discussed next.

**Organization**

Methods of solving problems and sets of activities can be created by men. Special identities grow up around separate functions, the functions are transferred into roles and the interconnected network of these roles forms a problem solving social system (Havelock, 1971). "As a social system develops fixed routines and forms for regulating its processes, it begins to deserve the designation 'organization' " (Havelock, 1971, p. 2-26).

The developer, his team, and individual associates can influence and be influenced by organizational conditions such as leadership style, flow of authority, work satisfaction, individual motivation, needs fulfillment and communication as a reciprocal exchange of ideas, feelings, emotions and concepts.

The creation of an effective instructional design and development environment includes the ability to perceive and manage organizational conditions that are both satisfying to its members and supportive of effective human interaction culminating in maximum opportunity for meaningful learning.

**Groups and Group Dynamics**

Reeves (1970, p. 77-99), categorized groups as: **formal**, whose best example is the work organization; **semi-formal**, such as lodges, churches and social clubs; and **informal**, evi-
danced by friendship, hobby, informal work, self-protective and convenience groups.

In some of the planned group experience forms described by Rogers, there exists varying degrees of concern for group synergy:

a) **T-group** - originally intended to emphasize human relations skills, but has broader approach now.
b) **Encounter group** - tends to emphasize personal growth and development and improvement of interpersonal communication through experimental process.
c) **Sensitivity group** - may resemble either of the above.
d) **Sensory awareness groups** - body awareness groups, physical awareness and expression through movement, spontaneous dance.
e) **Creativity workshops** - creative expression through art media, with individual spontaneity and freedom of expression.
f) **Organizational development group** - growth in skill as a leader of persons.
g) **Team building group** - used in industry to develop more closely knit and effective working teams.
h) **Gestalt group** - expert therapist focuses on one individual at a time from a diagnostic and therapeutic point of view.
i) **Synanon group** - tends to emphasize almost violent attacks on the defenses of the participants.
While none of the described groups above fits the notion of group instructional planning and development, the team building group and encounter group may hold out a promise of providing elements to assist understanding of the team characteristic of instructional development.

Recently training materials have been developed by Jung, Pino and Emory (1970) which make available to teachers opportunities to learn problem solving and research utilization in identifying and diagnosing classroom problems. The workshop setting features interpersonal communications, small group interactions and structured encounters. The authors stated that the workshop (and related activities) "enable teachers to plan and manage learning experiences more effectively" (1970, p. 1). The training schedules a five day workshop, followed by two three-hour meetings while actively practicing the skills learned in their own classrooms. This in-service program combines trying steps of the process while engaged in increasing interactive teamwork skills.

We need to understand group behavior. Bradford explained that "examples of the need for cooperation and hence of the need for understanding group behavior are found wherever individual goals must be merged with the goals of others" (1961, p. 1).

In industry, research indicates that management decisions are increasingly team decisions. Blake, Moulton and
Sidwell (1968) compared seven managerial theories in terms of how each dealt with 1) organizational needs for production and profit, and 2) human needs for mature and healthy relationships. They developed a Managerial Grid on which they were able to relate the above two concerns. They also found that only under the team approach is an integration achieved where the goal is production through people.

Group life and membership as we all know are complex activities. Bradford and Reeves mentioned the following interlaced dimensions: organizing for work, cohesiveness, building group goals for individual perceptions of task and purposes, response to leadership and interpersonal relationships, threats to group, other group memberships, status and individual ego needs. (Bradford, 1961, p. 3-6), (Reeves, 1970, p. 133).

A method of improving the complex activity known as group life was given by Bradford, Stock and Horowitz as providing a feedback mechanism:

Such a process of feedback calls for collecting information on the discrepancy between what the group wants to do (its target) and what it is doing (reaching its target).... (1961, p. 45).

Group dynamics is defined by Reeves as "the study of the forces exerted by the group on the individual or by the individual on the group" (1970, p. 12).

Small face-to-face groups, the environment for team interaction in instructional development, are primary groups.
The group itself may play an important part in influencing the attitudes and opinions of its members.

The group affects the individual in various ways. Reeves suggested that:

1) Groups act as policemen to enforce conformity to the norms it has established.
2) Groups will mold the general behavior of its members.
3) Multi-group memberships force individuals to become highly adaptable in survival.
4) The individual is the sum of his group memberships. (1970, p. 159-160).

The effects of the individual on the group are equally powerful, but not as predictable due to the infinite variety of human characteristics among individual group members. Groups will be efficient and prosper or be inefficient and die as a result of the effect on them of their individual members. Contributing to efficient and effective groups is an important group member skill; awareness and sensitivity to fluctuating forces within the group. (Bradford, 1961, p. 2).

Team teaching, a group process, should involve joint planning. Yet, as indicated earlier, education shows little visible results of team efforts. In discussing implications of team teaching organization, Feyereison, Fiorino and Nowak indicated that "the team-teaching concept in operation requires increased attention to planning, with added emphasis

Surveys of present practice and descriptions of highly sophisticated procedures for instructional development revealed several things; instructional development teams have been variously described as consisting of one or two instructors with the balance made up of instructional, evaluative, behavioral, and media specialists. This is unrealistic, "pie in the sky", and is typified by Baker and Schutz's recent (1971, p. XVI) naive assertion that the day of the instructional generalist is over. Perhaps we need educational, behavioral and subject matter specialists, but typically instructional teams will continue to be staffed with teachers, augmented perhaps with consultant assistance. Kemp, speaking of instructional team working relationships, was more realistic:

Some teachers may be reluctant to work in this team planning framework. You cannot force instructional change on a teacher or a team that is not receptive to change (1971, p. 90).

Interpersonal communication, decision-making, social power and pressure are change factors in considering innovative adoption. Guskin (1971) split adoption factors into two parts—one dealing with the indirect group influences on individuals and the other dealing with the direct influence attempts of others. Careful consideration of relevant influences need to occur in structuring development experiences.
An analysis of the ways in which groups can become more effective and productive by giving concern to the human persons in the group through understanding of the group forces can provide strategic insight into essentials of collaborative development.

Roles

Role is the behavior expected of or attributed to an individual in a given position. Or, as Trow put it, "it is a pattern of activity - what a person has to do (or thinks he has to do) in order to validate his eligibility for the position he holds" (1960, p. 33).

Havelock referred to roles as "...complex norms representing as they do the normalization and standardization of functions (activities) maintained by shared expectations about the.......role holder and the manner in which the role is to be acted" (1971, p. II-25).

In discussing the techniques of mobilizing human resources for development, Taba described several role criteria:

1) A clear analysis is needed of the functional roles necessary in the various aspects of work, so that the competencies required by those roles can be considered in making up the work team.

2) ....leadership is needed to deal with the human factors. The range of required leadership functions goes beyond usual professional competencies and extends into psychological insights and into the techniques for managing the human dynamics.

3) The strategy of systematic curriculum work involves a projection of a sequence of the essential steps and of the essential leadership roles for each step. (1962, p. 481).
Mooney (1970) has said that men relate to one another through the role positions they occupy; but one role man have in common is fellow man in search of a fulfilling life.

**Role and Behavior**

Role, according to Jensen is "a set of behavioral acts that comprise an integral part of a long chain or sequence of differentiated actions that are taken to accomplish the immediate and long range objectives of an educational system" (1969, p. 102).

There are three main categories of behavioral acts, Jensen postulated, that can be assigned to organizational roles:

a) **technical work acts**, that produce the end product of the system; b) **communication acts**, that relay between role information about the status and progress of work contributing to the end product and; c) **decision making acts**, for coordinating technical work acts and communication acts (1969, p. 102).

Men (and machines) who are organizational role holders performing behavioral acts in patterns or interconnected combinations, constitute an **inter-role structure** (Jensen, 1969, p. 103).

**Interpersonal/Interprofessional Role Structure**

Effective inter-role structures should be built upon professional potential for action within an organized instructional development effort. Human personnel, unlike machines which fit some organization roles and perform some behavioral acts, reconceptualize the organizational roles to fit their
personal needs. Once the inter-role structure is established and operational, role holders should carry out activities and tasks of their roles in accordance with agreed-upon conditions and specifications. Successful completion and utilization of the professional inter-role structure concept depends upon how the individual meets the personal challenges presented.

The climate in which personal and professional potentials are valued and called upon should provide the conditions for promising inter-role structures. The vigor of an individual's inclination to change, the integration of new information, presently-held values and beliefs, and the norms possessed by the group interact as individuals involve their personal and professional concerns in instruction-building activities.

**INSTRUCTIONAL SIMULATION ANTECEDENTS**

Fishing lures, manipulable mockups of jet liner cockpits, Monopoly, astronaut paraphernalia, learning games, moot courts, are all popularly termed "simulation." Simulation in its various forms has become established in many endeavors from computer system analysis to military training to medical diagnosis.

What about games? Klietsch perceived that "while games had been around for a long time, nobody took them seriously until the major institutions were sold on the possibilities"
of use in business, military and research problems" (1969, p. 3).

The word simulation-game is frequently used by educators as a blanket term, probably because most practitioners have not located a well-defined meaning for either game or simulation.

Tracing the roots of simulation is difficult. Perhaps due to the increased use of the word by non-technical persons and its application in many diverse areas of concern, the word simulation may be thought of as a multiple meaning word.

The genesis of the word simulate is, in its Latin origins, derived from the Latin word simulatus, the past participle of simulare, which means to imitate, represent or feign. The dictionary definition—the assumption of the appearance of something without having its reality (Webster's Dictionary 1959)—indicates that the modern usage of the word has moved away from misrepresentation (as suggested by a fishing lure) to more of an application-based usage.

Often quoted is the Thomas and Deemer paraphrasing of the dictionary definition—"to simulate is to obtain the essence of, without the reality" (1957, p. 1). According to Twalker, essence is a vital distinction; "Simulations contain the important parts, but not all of reality" (1971, p. 133).

Other definitions are based partly on intent of the
simulation design. Such as Harmon's "act of representing some aspect of the real world by numbers or other symbols that can easily be manipulated in order to facilitate its study" (1961, p. 18)(research purpose); or Cruickshank's "creation of realistic models to be operated by participants in order to provide them with problem solving experiences related to their present or future work" (1966, p. 23)(teacher preparation); or Beck and Monroe's "a procedure in which a model of or an analogue to a real situation is created for the purpose of testing or teaching" (1969, p. 45)(instruction or research); or definitions in terms of systems such as Crawford's "a representation of several variables in the same arrangement as they occur in a particular natural or artificial system" (1967, p. 2).

Another definitional approach depends largely on the discipline or subject matter area in which the simulation is used.

For example:

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<tr>
<th>Discipline</th>
<th>Simulation Means*</th>
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<tbody>
<tr>
<td>Social Science</td>
<td>constructing and manipulating an operating model or represent-</td>
</tr>
<tr>
<td></td>
<td>ing reality or study of structures in a laboratory</td>
</tr>
<tr>
<td>Education</td>
<td>creating of games or modeling of a system</td>
</tr>
<tr>
<td>Industrial</td>
<td>decision making exercise structured around a model of business</td>
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(continued)
A general definition may be summarized as follows: a procedure of representing or the representation of selected aspects of a real or proposed system, process, or setting through a combination of physical, verbal, mathematical, or iconic means.

Games

Probably the real antecedent and origin of simulation lies in games. Most cultures, ancient and modern, have devised and used games as a form of social encounter and diversion both challenging and pleasant. According to Twelker "games may be thought of as competitive encounters between individuals that involve some degree of skill or luck" (1970, p. 313).

Coleman listed the following as game characteristics: "active participation, rules governing play, goals of players given, definition of winning and losing" (1970, p. 185).

The range of application of the game concept is vast. The mathematical theory of games, pioneered by Von Neuman and Morgenstern (1953) and Luce and Raiffa (1957) is to some extent a rigorous treatment of the logical analysis of uncer-
tainty exemplified in most games of chance. In behavioral psychology, Berne (1964) has described human interactions as kinds of "games."

The rise of the educational game, Carlson observed, is a product of complex but related factors:

The long, rich history of war gaming; the development of computers, and quite recently, the growing appreciation by educators of a link between play and learning add to this game theory, which made it possible for many different opponents to compete in a game. Game theory led naturally to the development of simulations for theory building and predictive purposes in many areas (1969, p. 22).

Perhaps Carlson is suggesting that a research application of simulation evolved from games.

Simulation and Simulation Games

There seems to be no agreed-upon distinction existing to separate simulations from games. Cruickshank and Broadbent said that games are "usually characterized by interpersonal or team competition...(and) that simulations usually give greater attention to lifelike representation of the physical characteristics of the system" (1970, p. 2).

Others in the field (Boocock & Schild, 1968; Abt, 1970) do not acknowledge the distinction between game and simulation.

Without belaboring the point there are great similarities between games and simulation, but also some dissimilarities. The uniqueness of each may be discussed as follows:
A *game* is a process in which participants voluntarily allow their destiny to be in part determined by chance events, and part by personal skill, direct control and a trust in luck. There is a winning-losing element which is not wholly part of simulation. A *simulation* is a process designed to replicate essential aspects of reality for the purpose of discovering, managing, and controlling discrepancies and ultimately agreeing upon courses of action. Selected forms of reality may be included in games, but only for increasing involvement.

Simulation and games may be thought of on a continuum, with games on one end and simulation on the other. We are able to define simulation games somewhere on this continuum by deciding if the simulation game has more game elements or more simulation elements.

Differentiating simulations that are games from simulations that are not, Coleman gave us a success criterion:

In a game, success is well-defined, and there are one or more winners to the game. In a non-game simulation, at the end of the exercise, each participant is in a given position or condition, but there is no explicit comparison of these to determine winners (1970, p. 104).

**Role Play**

Role playing can be part of either simulation, games, or simulation-games, and is usually defined in terms of the activities of games, simulation or simulation-games. Role play-
ing is part of the milieu of drama, and there is usually a large element of drama in any simulation. The common element of involvement, different in stage plays and simulation, is described by Tansey (1971) as predetermined dialogue and outcomes (stage plays) vs. predetermined outcomes, but free action and dialogue (simulation). Garvey (1971, p. 207) related role playing to two types of activities: a) the act of 'being someone else', or b) the act of acquiring experience in a set of activities in which the actor seeks to acquire or increase his competence.

The notion of role play as it is used in simulation needs clarification. It has been found (Twelker, 1969), (Lindsay, 1972, p. 57), that transfer from the simulation situation to the real-life situation, has a different sort of effect on role adopters than it does on those whose simulation role is the same in real life. Twelker summarized the difference between these two transfer effects in the following manner: "Simulations that are based on the learner 'being someone else' may be termed 'role assuming' simulations, while techniques that are based on the learner practicing his own (present) or future role may be referred to as role performing simulations" (1969, p. 33).

**Use of Simulation and Games in Fields Other than Education**

The American Management Association undertook the development of the first widely known business game in 1956 and clearly stated that it resulted from study and consideration
of military war games (Dillman, 1969, p. 16).

"To some extent in the early games, but particularly in a business game like Carnegie Tech," reported Cohen and Rhenman, "another interaction that has been of prime interest in the design of the game is the interaction between functional groups within a company" (Dillman, 1969, p. 23). Speaking of business games, Twelker concludes, "These games exercise all aspects of management, including production, marketing and inventory control" (1969, p. 128). More than 250 different forms of business simulation games are used in industry to assist employees in decision making and in doing so to better understand the business.

In prefacing his reference text listing more than 1500 references in Instructional Simulation Systems, Twelker reported that simulation has been applied in over 3,000 different ways by the military. "Examples of military applications include aircraft simulators, huge weapons systems, simulators that require teams of operators, and space simulators" (1969, p. iii). Some of the most costly simulators are those with military or NASA applications.

In the military, the word "simulator" is commonly associated with equipment. Expenditures on prototype simulation devices exceed $27 million annually in the United States (Twelker, 1971, p. 135). Comparing this figure with expenditures for instructional simulation in public and professional education should give the reader a glimpse of its
priority in the two different fields.

The applications of this basic simulation concept are extensive in areas other than the military, business and industry. They are found in almost every endeavor: medicine and allied fields, transportation, air pollution control, education, international relations, communications, urban renewal and police work. However, in all these applications, the employer of the term simulation modifies its meaning to fit his own intent.

**Historical Development of Simulation in Education**

The first published work about simulation in education refers to the project known as the Jefferson Township School District (Tansey, 1969, p. 9). A study undertaken at Teachers College, Columbia University, in school administration, developed situational tests and used an adapted form of the "in-basket technique" developed by Fredrickson for studying administrative performance of Air Force officers. Culbertson recalls:

> persons who observed the test situations as well as the principals who experienced the situations frequently expressed the idea that these simulated materials have a great deal of promise for instructing school administrators (1960, p. 5).

Thus was born a new interest in simulated materials, an interest which has expanded greatly.
Simulation is usually employed in any of three to five ways in education (Twelker, 1969, p. 13), (Tansey, 1971, p. 9-14). These can be expressed as simulation in research and development, simulation in classroom instruction, and simulation in pre-service and in-service education.

Simulation in Research and Development

In his extensive classification scheme for simulation, Dillman (1969) describing classification by use, referred to simulation as evaluation or research tools. His examples included: evaluation of alternative solutions to systems problems, heuristics in theory building, computerized advanced design testing of aircraft, election predictions, economic models of a school system. Simulation continues to be a major vehicle for research application. Tansey (1971) mentioned prognostic and diagnostic uses which seem to indicate narrow research and development simulation usage.

In another source, Tansey (1969) indicated two specific research uses of simulation: in business education with the added advantage of reducing cost, and as a forecaster of future performance.

However, Twelker provided a definitive perspective for research and development uses of simulation. After examining many studies from the literature, he concluded: "the simulation was a research tool...used to generate information about an object, process or system" (1969, p. 15). Simula-
tion as development allows an individual to try out a proto-
type design or system, Twelker added, "it even occasions de-
cision making that he (the developer) should know about be-
fore final implementation" (1969, p. 16).

Research and development uses of simulation can provide
information as a means to an end, and use information to
construct and test a prototype as a product.

Bolton (1971) asserted that the development of theory
is a central need for conducting research using simulation
in educational administration.

Simulation in Classroom Instruction

Simulation games for elementary and secondary classroom
use have been receiving a great amount of attention and
developmental work is quite extensive. A recent classroom
guide (Zuckerman & Horn, 1970) listed over 400 simulation
games. Many classroom simulation games abstract from life
some elements of social organization and relationships. As
Boocock described, "such games pluck out of social life
generally (including economic, political and business life)
a circumscribed arena, and attempt to reconstruct the prin-
ciple rules by which behavior in this arena is governed and
the principle rewards that it holds for the participants" (1968, p. 9). Regional geography, international relations,
history, environmental education, social, political and eco-
nomic life are common topics of simulation games for the
classroom. These simulations, according to Smoker (1971),
may be based on a representation of a real world or a possible real world situation, or a representation of a theory or set of theories about a real world or possible real world situation. Many of these simulation games center around a relationship between player and subject matter. The player is usually role playing a contact with either reality, historical, hypothetical or fantasy situations.

Some behavioral science groups, non-profit organizations, profit organizations and many teachers and educational interest groups are active in the development of simulation games. The most active of these have been the Center for the Study of Social Organization at the John Hopkins University, Abt Associates, Western Behavioral Science Institute and the Environmental Protection Agency (Crawford & Twelker, 1969).

In addition to the above simulation games, which are often outgrowths of some branch of social science, non-simulation games seem to be outgrowths of student direct participation in mathematics subject matter. Allen, the well-known exponent of this approach, regards the goal of the games to be "the teaching of the symbol handling skills of logic in a competitive and entertaining atmosphere" (1971, p. 66).

Before leaving the subject of games, it seems important to mention the feature which sets games apart from simulations—competition. Tansey suggested that the competition element, which seems to be so much a part of American cul-
ture, is reflected in classroom simulation games developed in America. In contrast, in Britain, he declares, "the classroom uses of simulation have tended to leave out the competitive element...there is a greater emphasis placed on cooperation" (1971, p. 11). He further added that there are two ways to play games: "Play to win, but when hope of winning has passed they must be played to minimize losses" (Tansey, 1971, p. 12). It is an interesting social commentary as to how one is conditioned by his culture and how it may be reflected in the games developed.

**Simulation in Pre-Service and In-Service Education**

As reported earlier, a grant to the University Council on Educational Administration (UCEA) permitted the development of a research project, "The Development of Criteria of Success in School Administration." Since then, UCEA has been the single most important force in promoting the utilization of simulated materials in preparation of administrators (Cunningham, 1971, p. 26). Using extensive background data materials, and in-basket methods, UCEA extended its simulations from principalship to assistant superintendancy, superintency, community college president, vocational educator, participant in a professional negotiation game and most recently simulations in urban settings for improved educational leadership. Developmental plans include simulation of educational planning problems, "event free" curriculum reform simulation, school of the future simulations, school board
members simulation, and a multi-function simulation in educa-
tional communications (Blough, Culbertson, Martin, Pirtle, 1971). Sage has developed materials to simulate the problem
depotations facing a typical administrator of special educa-
tion (Tweiker, 1971, p. 152).

Cruickshank and Broadbent (1970) reported that a less
complex set of in-basket materials has been produced by
Pharis, Roberts and Wynn entitled Decision Making and the
Elementary School Principal; and in the field of higher edu-
cation, two role simulators using the in-basket method have
been devised; White's simulation for preparing college ad-
ministrators; Rickard's adaption of case study materials in
preparing administrators for work in student personnel.

A simulation of the teacher-selection process described
by Bolton (1971) assumed that the actual experience of selec-
ting, combined with feedback regarding results, was an effec-
tive way of learning how to select teachers.

A simulation for training research and development
project managers was developed by Dillman (1969). This simu-
lation used a team approach in an exercise dealing with spe-
cific project planning and control concepts such as project
definition, networking, time estimation, costing and control.

A recent simulation exercise was developed by Wegenke
(1971) to orient evaluation specialists and administrators to
a comprehensive evaluation and decision making model. This
design includes media, background materials, in-basket meth-
ods, and individual decision making with a group focus.

The other major thrust in professional educational simulation was Kersh's work utilizing simulation in teacher education accomplished at the Teaching Research Laboratory of the Oregon System of Higher Education. The Classroom Simulation, (Kersh, 1962, p. 110), was a replica of a sixth grade classroom and it employed motion picture forms and printed materials. Subsequent training techniques in the field of teacher education have all been affected by his work.

The Learning Systems Institute at Michigan State University developed and researched the Professional Decision Simulator, a sound-film presentation similar in format to Kersh's procedures (Twelker, 1971).

Based on UCEA's original Jefferson Township Simulation is another group of media assisted role simulations developed principally by Cruickshank and Broadbent, "Teaching Problems Laboratory", 1967, and Cruickshank's Inner City Simulation, 1969. Cruickshank and Broadbent (1970) reported on two ambitious integrated simulation systems for elementary and secondary education students which are similar to the Jefferson Township simulation; Project Insite at Indiana University and The Model Elementary Teacher Education Program developed at Teachers College, Columbia University.

Other educational simulations described by Twelker (1971) included a simulation which provides a context for educational counselors to practice responses skills, a dental
emergencies simulation, a media assisted forest service training simulator and a reading method education simulation.

Educational Planning Simulations

Combining role simulations with a simulation of a full system are uncommon in the areas of preparation of education personnel (Cruickshank and Broadbent, 1970). An Educational System Planning Game (Abt, 1970, p. 147-163) developed by Abt Associates, has as its purpose the illumination of some of the important issues in educational planning in order to stimulate discussion of diverse approaches to education. A study reported by Gillin (1969) used simulation materials adapted from "An Educational System Planning Game." The findings of the study indicated that a simulation technique can be a key method in strengthening the possibilities of "community" or "group participative" government as a pattern of organization for a college. She concluded that, "the College faculty, not only were able to expedite their work of re-organizing College planning and decision making policies..., but they also rate simulation as an effective device for promoting change" (Gillin, 1969, p. 97).

Another related team role playing simulation of a full system is the School Planning Game (1970). This exercise simulated the planning of a differentiated staffing prospectus for a high school. Several of the pertinent objectives of this group exercise were to experience the difficulties of group decision making and to develop a training strategy.
The School Crises Simulation Exercise (Meeker, Goodman, 1969), is based on a conflict-resolution model— a set of roles and procedures that were assumed to "facilitate reasonably peaceful and orderly change under trying conditions" (1969, p. 5). The model stresses bargaining and compromise, communication, procedures for seeking and processing information, and the importance of having persons of conflicting points of view orient themselves to a search for shared interests.

RESEARCH ON INSTRUCTIONAL SIMULATION

Initially an important issue in researching instructional simulation is the same issue one would have of any instructional method - what are the learning outcomes and are they congruent with our expectations and intentions?

As broad questions of validity are brought to bear upon the reported laudatory claims for simulation, one may expect research efforts aimed at the similarities between expectations and outcomes.

To orient us to the state of the research in simulation/games, Gordon has stated:

Designers of games are the first to admit that little research of precise kind has been done yet, but they are using hunches, intuition, and subjective observations as hints toward developing a research tool for evaluating the effectiveness of games. Educators are in the ironic situation of having found an answer without knowing the question (Dillman, 1969, p. 34).
Defining validity in terms of instructional simulation complicates the research question. Guetzkow conceives of validity as the correspondence of simulation processes and outcomes (Smoker, 1971). The closer this correspondence, the greater the credibility of simulation-theory. There is a question, however, whether or not simulation is theory in operation. Of the five classes of validity mentioned by Hermann (Smoker, 1971) only one has any usefulness in simulation--face validity. Face validity is a subjective evaluation of how the simulation "feels." While it can be argued that face validity lacks specific criteria and objectivity, there is no doubt that face validity taps an essential dimension of simulation (Smoker, 1971, p. 114).

Viewing the many kinds of instructional simulations one is struck by the likeness simulation has to other forms of instruction. For a good many years educators have tried to determine the "best" method of instruction by comparing one technique with another. This artificial comparison has produced little useful data. It seems to be an inappropriate question. But the concern still lingers. A good example is London's recent comment:

The tests administered to students until now have either ignored or are incapable of gauging certain ramifications of simulation techniques. And as long as this
remains true, testing accomplished to prove or disprove the effectiveness of simulation as a teaching device will prove nothing at all (1970, p. 95).

If the intention of the simulation or game designer is reflected in the purpose and expected learning outcomes of the instruction, the results of the instructional experiences may be assessed with the referrent intention and objectives in mind. This should provide "face" validity—does it do what we expected it to do?

As with other instructional forms, simulation/games may assist learners in doing something or becoming involved. Observable outcomes must be projected by the simulation designer if he is to evaluate learning in any form. Participating in a simulation, like reading a programmed text, does not automatically insure learning a skill any more than participating in a discussion or dissecting a cat insures learning a skill.

The empirical notes on instructional simulation evaluation, other than experimental reports of the effects of different variables, report not only on the amount of substantive material which participants acquired as a result of their experiences but also assesses how teachers may use the methods to achieve teaching objectives. Simulation as an educational tool may be employed to achieve any one of a combination of cognitive, affective or psychomotor learning outcomes.
Learning Outcomes of Instructional Simulation/Games

Affective Outcomes

Perhaps the most important of the outcomes that are visible in simulation research is that of involvement through motivation. Many simulation games so motivate the participants that deep involvement is especially noted.

In a much-quoted review, Cherryholmes reviewed six studies of students involved in simulation compared with students in conventional classroom activities in five areas: student interest, student learning of facts and principles, critical thinking, decision-making skills, and attitude changes. Cherryholmes concluded, "Simulation does produce more student motivation and interest, but there are no consistent or significant differences in learning, retention, critical thinking or attitude change" (Cherryholmes, 1966, p. 6).

Sprague & Shirts (Garvey, 1971, p. 211) tested the feasibility of simulation as a teaching technique in a project involving forty simulation runs in seventeen schools, with thirty teachers and 2,500 students participating. They found a statistically significant percentage of students and teachers reacted favorably to simulation as a teaching technique. In investigating the effects of simulated environments in high school classes, Coleman and Bocock (London,
1970, p. 94), found that student interest remained consistently high during the playing of a game. Increased student interest may promote a positive change in relationships between students and teachers.

According to one teacher, "the pay off for role-playing is a wholesome change of classroom climate in which students drop their artificial facades and meet teachers in more authentic relationships" (Guss, 1966, p. 444). The findings of a recent study by Lee and O'Leary in high school social studies implied that student enjoyment is necessary to achieve more profound kinds of learning objectives addressed by simulation games and further revealed that "simulation can invoke deep and powerful emotional forces which become critically emeshed with the learning process" (1971, p. 344).

Garvey reviewed three kinds of student attitude change and commented about each. He concluded that "it is safe to assume that (students):

1) Attitudes about themselves and their abilities are favorably influenced, even though there is no hard evidence to support the assumption.

2) Use of simulation and games in a classroom apparently alters the attitudes of a majority of students toward...pleasure with the classroom and...class work, even that portion that does not include the use of simulation.

3) On the third attitude variable; students' attitudes toward simulated situations, inconclusive experimental results were presented" (1971, p. 214-215).

In a study in which the effects of a simulation exercise on student teachers was assessed, Cruickshank and Broadbent (1968, p. 102) concluded that, 1) the students became
highly motivated and stimulated during the simulation, 2) after the simulation, attitude change, confidence, teaching behavior and time needed to assume full teaching responsibilities was the same as an equal period of actual student teaching, and 3) fewer teaching problems were reported by simulation-trained students. Bond (1965) reported no significant change when he used simulation techniques of the critical incident type (similar to Kersh & Cruickshank's work) to attempt to change the attitudes of education majors toward professional course objectives.

The hard data are not conclusive as to whether attitude change or shifts (which may be not perceived in testing) have occurred. It is clear that timely affective behavior is at least temporarily influenced. Deep-seated internal feelings are indeed difficult to discern, let alone note a change.

**Cognitive Outcomes**

Past research has focused primarily on factual learning in instruction. Simulation is no exception to instructional methods included in studies dealing with the learning of concrete, factual information.

Mckenney's (1962) own research and review of the literature on the training results of simulation games led him to conclude that there is little evidence to support the superiority of learning through games over such conventional techniques as case studies, role playing lectures and discussions. Similarly, Cherryholmes in his review of six studies of
effectiveness in educational simulations concludes: "Without exception, no evidence was uncovered supporting the contention that participants in a simulation learn more facts or principles than they would by studying in a more conventional manner" (1966, p. 102).

There seems to be no evidence to support a hypothesis that simulation is more effective than any other teaching technique in enabling a student to acquire knowledge. However, as Garvey (1971) pointed out, it is in the realm of demonstrating structure or of requiring a student to develop structure that simulation is believed to be particularly useful. Rote recall of knowledge bits are not enough. Garvey contended that, "the student is compelled to develop some recognition of relationship among the elements of knowledge which are part of the situation" (1971, p. 217). Robinson, et.al. (1966, p. 57), reported results indicating that those students who preferred simulation seemed to do better at learning principles rather than fact mastery. Garvey & Seiler (Garvey, 1971, p. 218) found similar results in that students in an experimental group, participating in an internation simulation, demonstrated a superiority in answering questions designed to test conceptual knowledge, over a control group who performed better in acquisition of factual knowledge. However, Cherryholmes noted that "examination of this data reveals that none of the differences was (sic) statistically significant" (Twelker, 1969, p. 58).
Boocock and Inbar suggested that the learning of winning strategies is an outcome of some simulation games; no data are presented to substantiate this allegation (Twelker, 1969, p. 57). The "learning of winning strategies" is perhaps another way of saying that simulation participants learn to "play the game." This has a definite relationship to earlier cited research results which indicates that structure is a learned response in simulation games. Learning to play the game is perhaps learning the concepts and principles which are indicators of structure.

The learning of factual knowledge is considered by some as a secondary training function of simulation games (Twelker, 1969, p. 58). Cohen (Cunningham, 1971, p. 22) described severe misgivings about political gaming in undergraduate classes in political science. He questioned the investment of time and energy. His chief complaint was with the cumbersome, inefficient nature of political gaming as an instructional method when little or no learning advantages occurred. Likewise, Fern (1960) and Anderson (1967) (Cunningham, 1971, p. 22), focusing on participant problem perception and problem solving behavior, saw little change in the behavior of the participants, acknowledged the limited exposure and urged more attention be given to materials development and appraisal.
Social Skill Outcomes

Content learning is not the crucial objective in simulation game instruction. Beck & Monroe (1969, p. 48) indicated that the simulation method is particularly suited to teaching process, particularly the decision making process.

Increased decision making skills may be one benefit of classroom simulation training. Several studies have shown a definite improvement in students' handling of problems after training, but, little evidence is available to show transfer of this decision making skill to real-life situations.

However, Cherryholmes (1966) found that simulation games do not cause students to acquire more decision making skills than conventional classroom activities.

Although developing social skills as a learning outcome does not appear to be one in which there has been serious scientific investigation, one serious hunch might be the anticipatory value that simulation has in compressing time, establishing differentiated roles and introducing information before the occurrence of the situation in the real world. Thus the process could provide society with people who have experienced and can be more flexible in using social skills.

"Rehearsal" Learning Outcomes

Ohm (1971) saw simulation as a form of social laboratory, a way of structuring experience to achieve desired outcomes that may transfer to real life. Following observation of
students participating in laboratory simulation exercises aimed at acquiring and increasing competence in role-related tasks, Garvey stated, "This writer is convinced of the efficacy of simulation as a means of supplying vicarious experience," and added that his views were "supported by the observations of many others who have used simulation as an educational technique" (1971, p. 220).

One of the major aspects of this function is one of practicing in a non-threatening environment for a "performance." An important concern of this rehearsal is an ability to transfer from the rehearsal to the real life performance. Positive transfer seems to have something to do with "psychological" fidelity as well as "realism" fidelity in the simulation experience.

**Skilled Motor-Perceptual Act Learning Outcomes**

This training function is usually represented by simulated aircraft flying, automobile driving and, more recently, astronaut training applications. There is some data to show that gains result from the use of simulation, although not necessarily in increased proficiency (Twelker, 1969). No other research data was available. These types of "high fidelity" simulations are better suited for learning procedures and maneuvers.

**Issues in Summarizing Simulation Research**

The generally accepted functions of research are to
describe, explain, predict and control the environment. The advantages of simulation for research result in experiments that can be conducted on a model of reality (Bolton, 1971).

The advantages of simulation can be conducted on a model of reality. Most instruction is not designed to be researched. Research has different functions than instruction, although there are informational similarities.

Research in instructional simulation has been frustrated by several factors mentioned by Beck and Monroe (1969). Researchers have inferred educational benefits from the simulation game experience because imprecise or no objectives were stated. As a result of this, criteria to evaluate the experience was also inferred.

Another group of factors relate to the difficulty of executing experimental research designs (which is paralleled by the difficulties encountered in measuring instructional effects in comparison with other instructional methods); setting up experimental and control groups, controlling the behavior of persons administering the game, and the nature of the activity in the control groups (Boocock & Schild, 1968, p. 20-21).

As an issue, more attention to evaluating educational simulation is warranted (Cunningham, 1971, p. 23). After an extensive review of research it was established that simulation was a highly useful technique when employed by teachers with adequate substantive preparation and when carefully in-
corporated into units of instruction for use in conjunction with other techniques (Garvey, 1971, p. 226). In his unpublished dissertation, Dillman (1969) made the same generalization; that is, as an instructional method, simulation can be used more effectively in conjunction with other methods, considering the effect of the orientation and the simulation leader. The point seems simple and obvious: the design of simulations should include stated purposes. Simulations should be constructed and pilot tested in direct reference to learning objectives. If empirical research is one of the objectives then it must be reflected in evaluating not only the learning outcomes of the simulation but contributory factors as well.

The use of the simulation technique in instruction continues to grow despite indecisive research results and a lack of research. But whatever data has been accumulated should be noted by designers and developers of instructional simulations. Empirical issues and generalizations such as the following may be useful in projecting design criteria:

1) The face validity of the simulated setting stimulates interest and motivation and encourages the participant to behave as he might in real life.

2) An extremely useful research medium is presented by simulation, providing the collection of comparative and normative data on behavior, performance and attitude is accomplished in identical situations.
3) Learning outcomes are constrained or affected by external variables such as the instructor, the degree of realism, what part simulation played in the total instructional process, and insights gained through the stimulus situation.

4) The issue of transferability of learning from the simulated situation to others remains one of the least researched but most important outcomes of simulation. Cruickshank asserted that, "... transfer is among the most significant issues posed for investigation by developers of simulations" (1971, p. 199).

Simulation researchers have had to look at everything in trying to empirically develop categories of things which might be learned in instructional simulation. (Cruickshank and Broadbent, 1968, 1970), (Crawford & Twelker, Twelker, 1969), (Garvey, 1971), (Fletcher, 1971). Research on simulation is still in this "shotgun" period, with single studies on specific simulations predominating; each using its own tests to measure different sets of possibly relevant dependent and independent variables.

INSTRUCTIONAL SIMULATION EXERCISES:

DESIGN AND DEVELOPMENT

There seems to be two opinion clusters as to whether devising instructional simulations is an art or a technical
function. It is obviously important that a simulation designer have substantive knowledge about simulation, but as Boocock & Schild pointed out, "Game design is not only not (sic) a science, it is hardly a craft, but rather an *art* in the sense that we have no explicit rules to transmit" (1968, p. 266).

Twelker might represent the technical viewpoint in the statement, "The problem that confronts designers and consumers of simulation alike is that the technique is being exploited faster than the technology can provide workable guidelines for simulation design and use." (Instructional Simulation Newsletter, July, 1968, p. 3).

Klietsch added further to this disparity when he declared that a simulation can best work using the "art and craft of building models so that problems are inherent in the appropriate simulated matter" (1969, p. 9-1).

There is apparently a need for thoughtful design in instructional simulation if one can judge from the increasing numbers of simulations produced for education. The designs can be best classified as informal and formal, intuitive and systematic.

Different kinds of simulations call for differing organizations. Abt Associates, one of the most prolific designers of simulation games in the country, uses a logic design in complex as well as simple game development. Their process, described by Crawford and Twelker, is as follows:
"The system analysis identifies the major actors in a process, their interactions, and their decision rules in responding to each other's actions. (A model is generated) and it remains to translate this analytical model into a human-player simulation, or game" (1969, p. 76).

Very little guidance is given in the literature as to the iterative design process used in developing instructional simulation. Comparing business management decision training games reviewed by Dillman (1969) with instructional simulators and games, the general impression seems to be that instructional simulation games are for the most part a hand craft, artistically designed. There are a few exceptions; those instructional simulations "technically" designed.

Dimensions and Issues Bearing on Technical Simulation Design

One of the more difficult tasks in reviewing instructional simulation has been to discern the familiar threads that run through the fabric of instructional simulation. Fletcher's statement, "the degree to which research finding on one simulation are generalizable to other simulations is unknown" (1971, p. 427), seems to be true also of the components that constitute design factors.

Instructional simulation design viewed as an art will reveal more hunching and intuition and conversely, technical design will reveal some patterns that perhaps are generalizable. Therefore, it is to these systematic developers to whom
we will look for guidance in determining the pertinent issues and dimensions affecting instructional simulation design. A discussion of the more familiar and influencing strands in the fabric of instructional simulation design follows.

**Intentions**

Under the broad umbrella of intent; purpose, goals, objectives and outcomes can be surveyed. The purpose seems to lie within the structure defined by the simulations. It seems significant that great importance has been placed on clarifying purposes in the use of simulation. The structure was defined and constructed by a designer who first decided why and how simulation should be applied. In other words, what the designer intends to do determines what use shall be made of the simulation.

In an earlier section of this chapter, a wide variety of simulation definitions were reviewed. These definitions were ordered originally by the purpose for usage of the materials, set forth by the developer who represented a particular discipline or orientation. Thus it is evident that the purpose for simulation depends on two factors: 1) the use to which it may be put, such as described by Cunningham (1971) for the UCEA materials (practicing leadership skills, diagnosing organizational problems, refining communication skills and acquiring group-process capabilities; and 2) the discipline or orientation of the designer or developing group.

Crawford and Twelker (1969) reviewed how several major
simulation centers looked upon simulation design: The Johns Hopkins Group; well based on the empirical data of sociology; The Nova Group; produced non-simulation and academic games; The Abt Associates Group; emphasized role playing and decision making while using graphic and symbolic material. The Oregon Teaching Research Approach is a systems approach to instructional simulation through "specifying" the learning conditions necessary to bridge gaps between "the learner's initial repertoire and final criterion repertoire" (Crawford and Twelker, 1969, p. 78).

General purposes involved in the development of instructional simulations were listed as: 1) making material relevant by a pre-involvement, decision-making, motivating situation using skills and knowledge; 2) blending theory and practice by providing a setting for practicing the application of principles and knowledge to complex problems. Other purposes mentioned were attempts to mold or shape behavior, assisting the student (participant) in sensing problems and developing a rational, problem-solving approach (Cruickshank & Broadbent, 1970).

The purpose of simulation could be further modified by whether the training aspect or the teaching aspect is exemplified in the instructional simulation. Shubik said:

The major distinction concerns the emphasis placed on the why of the process. There are several quite effective simulation games which can be used to improve an individual's performance (training aspect) without ever going
into the depths of why (teaching aspect) certain methods work (1971, p. 7).

It is not clear in surveying many instructional simulations whether the goals reflect teaching or training. Livingston and Stoll note these differences in goals: "The goal of training is to increase the student's ability to perform in a real situation, the goal of teaching is to increase his knowledge and understanding of it" (1971, p. 14).

Cunningham (1971) and Dillman (1969) asserted that if simulation is to be used in training educators, the designer should specify in some detail the particular behavioral and attitudinal changes they hope to achieve.

Almost without exception, designers of instructional simulations referred to the importance of carefully specifying objectives. Cruickshank and Broadbent criticized their own efforts, as well as others:

Simulations often are guilty of involving participants with little attention given to the outcomes expected. Outcomes, if designated, usually are described only in the grossest fashion (1970, p. 25-26).

Additionally, two other issues relating to the lesser amount of attention given to behavioral outcomes in instructional simulations are clarified by Cruickshank & Broadbent (1970); 1) the complexity and aversion to predicting the effects of one human's behavior on another and, 2) where the parameters, physical setting, characters and events are less well defined, the problem of stating behavioral outcomes becomes more difficult.
One point that many discussants of this topic fail to mention is the hierarchy of purpose which should be a component of instruction. Intention determines the purpose which determines in turn the outcomes or objectives. This is well illustrated by the first four of Crawford and Twelker's (1969) thirteen steps in designing instructional simulation systems:

(1) Define the Instructional Problem (INTENTION)
(2) Describe the Operational Educational System
(3) Relate the Operational System to the Instructional Problem (PURPOSE)
(4) Specify Behavioral Objectives (OUTCOMES)

Operational Specifications

The form and framework of the simulation are part of the important considerations one must make in designing simulations. The question "what should make a simulation work?" (Klietsch, 1969, p. 9-1) seems appropriate here.

Following the determination of the place of simulation in the training process and a careful analysis of the reference system, Cruickshank & Broadbent (1970, p. 3-5), suggested two early decisions; 1) determining whether the simulation will contain elements of competition either interpersonal, intrapersonal, or man-machine; and 2) determining of open or closed loop (participant control of independent variables). Most simulations in education planning need to be closed loop systems. While the issue of competition may be related more to simulation games, interpersonal cooperation or conflict
resolution is more analogous to the investigator's definition of simulation.

Certain effects of competition, even on a personal level, may not be absent from a simulation which has a problem focus.

Klietsch (1969) referred to the nature of feedback and the "closing of behavioral loops" as the difference between an operative and usable simulation or merely role-playing episodes. Simulations require continual updating of position, director, and achievement.

Other operational specifications mentioned by Klietsch (1969, p. 9-2) were: organization of persons within simulation, activation of the simulation including methods used in preparing participants and actual physical arrangements.

The question of structure was answered by Dillman; "probably most simulations should provide a balance in some way between the amount of freedom and the amount of structure" (1969, p. 55). Structuring the simulation additionally requires organizing the participants into roles. A wide variety of role organization can be seen (Dillman, 1969).

The role organization referred to in this paper is one mentioned frequently in business games and occasionally in educational simulations—team interactions.

**Face Validity Boundaries**

The boundaries of simulation exercises refer to the internal dimensions that either make the simulation "appear"
more akin to a natural phenomenon or separate it distinctly. There is a special "face validity" to the role each of the following dimensions play in more or less "making" a simulation.

1) Reality embodiment - It is perhaps too obvious in simulation design that the designer abstract the elements from the real world situation that are important for the success of the simulation. This approach results in omitting other elements of the real life situation.

Twelker, in applying the biogenic rule of "form follows function", described the vital distinction of the reality question as "simulation = (real life elements) + (represented elements of real life)" (1971, p. 134). Thus, the designer must decide what elements of real life to include and what to omit and how to represent real life elements.

Realism can be determined, according to Cruickshank & Broadbent by the expected behavior of the participant; "If real precision of behavior is expected of the participant in an extremely specific environment, then considerable attention to realism is warranted" (1970, p. 21).

The setting for realism may have two facets, physical and psychological. Twelker (1971) specified that simulations need not look like the real-life counterpart, but they must "act" like the real thing. "Acting like the real thing" is referred to by Cruickshank & Broadbent (1970) as the provision of a realistic psychological environment in which the partic-
For certain kinds of simulations, psychological realism may be more important than physical realism.

It is possible that a more realistic simulation exercise will be more complex than one which is simple in scope and action. A common principle, Dillman affirmed, is that an instructional simulation design "should be simple enough to be understood and played without having advanced study of the rules and scenario and yet complex enough to be interesting and challenging to an experienced participant" (1969, p. 51).

The degree and kind of realism or versimilitude is important because of the effect it has on the participants and the nature of their involvement in the simulations.

2) Placement in the total program - A simulation as learning experience may be part of a comprehensive program of education. Using teacher education as a focus, Cruickshank and Broadbent (1970, p. 21-2) discussed placement of the simulation either first or last in the program. Placement of the orientational simulation first in the program enabled participants to make more informed decisions and assisted awareness of the kinds of training needed in order to function adequately in the real world. Placement of the same simulation last in a total program permitted the participant an opportunity to synthesize and apply principles already learned.
3) Duration - Klietsch (1969, p. 9-3) described this dimension as "short term" (brief, easily introduced, usually focused upon a single factor in the simulation) and "long term" (one that cannot be completed within normal time bounds). Dillman (1969, p. 55) noted three separate questions involved with the length and time of the simulation: How long should the individual simulation play periods be? How long should the exercise as a whole last? What is the appropriate amount of time compression that should be used? These questions can be answered specific to the simulation designed, and empirically as the simulation is pilot tested. The length of simulations varies according to the intentions of either the developer or user. (Cruickshank & Broadbent, 1970).

4) Motivational basis - Research has shown that simulation can produce increased participant motivation and interest. Variables influencing the dimension of motivation are: characteristics of effective vs. ineffective participants; the learning style of the participants (Cruickshank & Broadbent, 1970, p. 25); the role, and personality and approach of the simulation director (Cruickshank & Broadbent, 1970), (Twelker, 1969).

Smode introduced the term "motivational similarity" as "that which is concerned with the feeling or attitude of the learner in a simulation experience as compared with a feeling experienced in real life" (Twelker, 1969, p. 51).
Thus we can underscore the psychological and/or physical "realism" mentioned earlier as a factor in motivation of the participants also.

5) Transfer of training - This dimension is not well specified as yet. Most simulations in professional education have not been on the scene long enough to generate research finding about transfer of training (Cruickshank & Broadbent, 1970).

Can we predict what participants will take from the simulation exercise and apply to real life situations? Obviously we have not yet arrived at this level of sophistication. Exact physical duplication does not guarantee maximum positive transfer (Twelker, 1969, p. 50). As intentions move toward higher physical and/or psychological fidelity, the cost factor increases proportionately. One factor that contributes to transfer is subsequent practice under simulated conditions. (Twelker, 1969, p. 49), (Cruickshank & Broadbent, 1970, p. 27).

Information

The information needed in designing a simulation should be a natural outgrowth of the setting: Summarizing Dillman's (1969) five questions about information in a simulation one finds that information or data variables are: how much, to whom, and how presented. Klietsch (1969, p. 9-1), recommended an accurate array of information be provided in chronological, episodic, or evaluative order. Information can be
presented to the likely participant or group of participants in many ways: direct presentation, histories, briefings, reference materials such as statements, reports and memoranda, media, oral feedback and interactive discussions (Dillman, 1969).

Support of Simulation Exercises

Simulation exercises should be supported and facilitated through supervision and guidance by persons familiar with objectives and purposes of the exercise, as well as management parameters, schedules for activities, and forms intended for participant use.

Cost-effectiveness is a final consideration in regard to the support of simulation exercises. This is a much discussed but conclusionless field as yet. We know that as expectations and requirements for higher fidelity face validity increase, costs also increase, sometimes astronomically. Costs may differ for production as well as development. Development costs may be excessive for a simulation exercise produced at low cost. "Trade-offs" must occur as the designer considers both the simulation objectives and development production costs.

As we have seen, the available guidance for instructional simulation design can be deduced from influencing issues and dimensions that are part of the sparse literature concerned with design of instructional simulation exercises.
A second means of collecting information about the fabrication of instructional simulations is through the examination of specific step-by-step procedures for design.

INSTRUCTIONAL SIMULATION:  
FABRICATION GUIDELINES


Other recent available guidelines were reviewed. Dillman (1969) developed an eleven-step flow diagram for simulation exercise development; Wegenke (1971) presented a simulation project operations model. Both models studied were intended for use within a setting and context characterized by specific constraints included in each study's proposal.

Crawford and Twelker's (1969) "Specific Steps in Designing Instructional Simulation Systems" are the most comprehensive treatment of instructional simulation guidance available in a systematic process. However, the steps appear to be an attempt to construct an instructional planning component. Crawford and Twelker state in the introduction, "The guidelines are most appropriately used for curriculum development projects where the designer is interested in, but not committed to, simulation" (1969, p. 80).
Recognizing that the unique qualities of instructional design have given way to a process adopted not adapted from general instructional systems design, Rubeck sensed a need "for a unified and comprehensive guidance which unites both the conceptual issues and the design procedures into an adaptable and usable form" (1972, p. 42).

Following an extensive synthesis from the literature and personal visitations with noted designers of instructional simulations, Frank Broadbent, Donald Cruickshank, Cleo Cherryholmes, Frederick Goodman and Paul Twelker, Rubeck developed and verified state-of-the-art guidelines.

The following step-by-step fabrication guidelines (Rubeck, 1972) represent the available knowledge and most recent guidance in instructional simulation design.

A. Delimit Scope of Treatment
   Select Subject Matter Area
   Define Limits of Desired Competency

B. Identify Learning Needs
   Delineate "Learner-Centered" Needs
   Delineate "Performance-Centered" Needs

C. Express General or Broad Instructional Intentions

D. Specify Learning Objectives
   Identify Desired Behavior
   Identify Performance Level
   Identify Performance Conditions

E. Develop Evaluation
   Specify Developmental Process Measures
   Specify Instructional Product Measures

F. Identify Instructional Resources
   Inventory Available Materials
   Inventory Available Human Potential (Production and Instruction)
   Specify Budget/Time Resources
G. Develop Feasible Instructional Strategies
   (Programmed Instruction, Lecture, Independent Study, Simulation...)

H. Evaluate Strategy/Objectives Coverage

I. Match Strategies with Outcomes
   Specify Predicted Cost/Strategy
   Define Role of Simulation in Total Instructional Design

J. Determine Nature of Simulation Experience Outcomes
   Identify Outcomes as Prescriptive, Descriptive, Circumscrip­tive

K. Develop Appropriate Model
   Build Theoretical Construct (and/or)
   Synthesize Operational Construct (and/or)
   Generate Situational Construct
   Assemble Constructs into Scenarios

L. Check Validity
   Investigate Logical Consistency and Congruency
   Investigate Face Validity of Situations and Operations

M. Identify Learning Stimuli
   Described Desired Sensory Effect
   Utilize Behavior Specification from Objectives
   Produce Learning Stimuli as Instructional Materials

N. Identify Peripheral Stimuli
   Specify Situational Cues Other Than Situational Model
   Arrange or Produce Situational Prompts or Cues

O. Specify Appropriate Learner Responses
   Develop Learner Feedback
   Specify the Type and Nature of Response Feedback
   Produce Feedback Materials

P. Assemble Simulation Prototype
   Sequence and Space Learning Stimuli
   Select a Tryout Audience

Q. Try-Out Simulation
   Collect Learner Performer Data
   Report Necessary Revisions
Summary

This chapter has been concerned with the literature on instructional planning and development and instructional simulation. A number of antecedents of instructional planning and development were first reviewed as were operational definitions.

The relationship of instructional planning and development to the educational change process was considered. Further perspective was obtained by categorizing four broad characteristics of group instructional planning and development. The antecedents and constituents of instructional simulation were examined.

The uses of instructional simulation in education were explored, gradually focusing on instructional simulations in teacher education. An investigation of research on instructional simulation was organized into reports on four learning outcomes and a discussion of research issues.

Literature relating to the design and development of instructional simulation exercises was examined and structured to produce five issues in technical simulations design.

A state-of-the-art summary of simulation fabrication guidelines concluded the chapter.
This chapter presents a description of the process and logic used in redimensioning the symbolic model of instructional planning and development, succeeded by a definition of simulation to meet the model's requirements. The remainder of the chapter describes the simulation design, development, pilot test, and the evaluation methods employed.

A graphic display and discussion of the overall procedures involved in redimensioning conventional instructional development, will put into perspective the notion of using simulation as an introduction and orientational experience prior to real life designing and constructing instruction.

The purpose of Chapter III is to make selective use of the information contained in Chapter II as referents for decisions in redimensioning instructional planning and development.

The problem of this study suggested that educators are more and more frequently being called upon to work together planning and developing materials, methods and media for
instruction. Collaboration, working with others, is a well-accepted fact of life today. We interact with others in countless ways; in group jobs, in social groups, in family groups, and so forth. Team work has been a cherished ideal of democracy and is expressed in the writings of educators and behavioral scientists.

Curriculum, and more recently, instructional development literature, has referred to "planned teamwork." In modern development, patterns of individual invention have largely merged with the more complex efforts of individuals working together.

The trouble is, however, we tend to behave differently in groups than we do as individuals acting independently. Thus, many development models could remain somewhat idealistic and never lead to practical exercise in the real world.

Many educators lack the prerequisite skills and abilities in group interaction in applying unfamiliar techniques of instructional planning and development.

COLLABORATIVE INSTRUCTIONAL PLANNING AND DEVELOPMENT AS A FOUR-PHASED PROCESS.

The collaborative instructional planning and development process is a model for a complete developmental procedure. It is essentially a procedure composed of four identifiable components:

1) **Initiation** (to be enlarged upon and developed in this study)
2) Planning
3) Development
4) Consolidation

A rationale for the initiation and consolidation components will be discussed, while a flow chart will graphically depict the planning and development phases. It is anticipated that the initiation phase would occur first as an orientation, then systematic planning or designing of the development would take place. Development of methods and materials through production, acquisition and further specification, pilot testing and evaluation would be next.

Lastly, consolidation is a condition, a state of mind and a time to take stock of one's growth in light of personal and professional goals. It is a uniting of the positive forces that impels educators in the direction of planned change expressed through systematic instructional planning and development. Consolidation is a realization of desirable educational change inspired through a process of people development and through the more specific activities of encouraging people to interact, share their ideas and perceptions not only about the work task, but also about themselves and others.

I. Initiation: Rationale

Before instruction is designed, what readiness procedures must be defined? What is the awareness and information grasp of the group? We are assuming that people development
will, in the long run, have a more lasting effect than product development. We must begin at some point. Where do we place our priorities for team planning?

It is to this end that the people orientation position lends itself to a group setting within an organization. When speaking of developing people within an organization, a role position becomes highly important.

Many educators feel alone in their work. Teachers and administrators feel responsible for what they do. Tacit cooperation has epitomized many educational projects and programs in the past. Working in groups, educators must learn more positive attitudes toward cooperation.

The ability to cooperate is complex and difficult. Cooperation demands maturity in the individual, understanding of the problems of human interaction and competence in problem resolution. Such qualities may be acquired by experiencing them. Groups can be powerful determiners of productability.

These group forces cannot only produce a product, but may produce individuals whose processes and skills, in instructional planning-developing may be used independently of the group.

Taba defined ways of working groups in developing a curriculum product as:

...planned teamwork, in which each individual concentrates on his own task but also in which a range of needed competen-
cies is combined in such a manner that they can support and supplement each other, is one essential requirement for productivity (p. 472).

Teamwork implies individual responsibility contributing to a successful group effort. If teamwork is to occur, trained awareness of the differing roles individuals assume in the group, dimensions of the role such as decision making, task, and technical skill expectations, and the whole of the group's goals as related to the process for getting there, must be a part of the preparation for working together or pre-planning.

Initiation in group interactions enables the individual role holder to experience and become more sensitive to his own perceptions and to how others in the group perceive the "new activities" engaged in. Thus the individual could internalize an instructional planning and development process which he has helped to create, through a commitment to using and understanding planning and development skills.

II. Planning

Examine context, identify needs and determine discrepancies

a) We need to get here...... but ...... we are here: What should be What is
   Intentions, Requirements, purpose constraints
   requirements costs
Articulate major purpose for development

a) Filling a void in instructional program
b) Overcoming malfunctioning part of program
c) Taking us beyond where we are now
d) Testing new, imaginative concepts for feasibility

Identify discrepancies

Using discrepancies, construct a how-to process to bring the real into closer alignment with what should be

a) Logical procedure called planned development
b) Context information

determine how-to process requirements and
characteristics (objectives) including:

a) Environment, personnel
b) Cost, procedures
c) Sources and resources
d) Determine feasibility through "reality checking" procedures and awareness

Identify Instructional Development Plan

a) Accounts for how-to process within requirements and constraints
b) Is sensitive to en-route constraints which may necessitate formative modification

Identify and analyze substantive domains of instruction

a) What (elements)
b) How (elements)
c) Whether (elements)
List priority elements of instruction

Determine action modifier for each instruction element

Action modifier - appropriate verbs which denote the action to be taken and enable the instruction element to be demonstrated or observed

Example:

<table>
<thead>
<tr>
<th>Action Modifier</th>
<th>Instruction Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>gather</td>
<td>learner data</td>
</tr>
<tr>
<td>define</td>
<td>instructor opinion</td>
</tr>
<tr>
<td>specify</td>
<td>course objectives</td>
</tr>
<tr>
<td>identify</td>
<td>learning objectives</td>
</tr>
<tr>
<td>determine</td>
<td>instructional resource</td>
</tr>
<tr>
<td>develop</td>
<td>instructional materials</td>
</tr>
<tr>
<td>measure</td>
<td>student performance</td>
</tr>
<tr>
<td>etc...</td>
<td>etc...</td>
</tr>
</tbody>
</table>

(determine relationship and combine appropriately)

Construct role holder performance descriptions

a) Analyze general act categories
b) Construct role holder performance descriptions by matching appropriate action modifier and instruction element to Act category for each role holder

Example:

<table>
<thead>
<tr>
<th>Act Category</th>
<th>Team</th>
<th>Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Leader</td>
<td>Member</td>
</tr>
</tbody>
</table>
| work         | Gather & present | ACTION
| act          | learner | ELEMENT |
| data         |        | + |
| Communication| Discuss learner | DEVELOPMENT
| act          | data | |
| Decision     | Approve selected | PERFORMANCE
| making       | learner relevant | DESCRIPTION
| act          | data learner data | |
| data         | data | |
Determine functions for each identified role holder

Identify Subsystems Required
a) Identify subsystems needed
b) Analyze subsystem requirements
c) Select subsystems needed

Group functions into identified subsystems

Produce inter-role structure
Analyze subsystem functions for role holder tasks
Determine role holder tasks from identified subsystem functions
Determine major tasks for each role holder
Order tasks in priority ranking

Reality test inter-role structure and performance outcomes with:
a) Context of real world needs
b) Development purpose
c) Information grasp of development team
d) Resources

III. Development
Implement tasks selected and identified by role holders
Use subsystems and develop proposed units, course, etc.
IV. Consolidation: Rationale

The ideas which taken together, expressed as the consolidation phase of the collaborative instructional planning and development model, are drawn from the following resources: Maslow (1968), Mooney (1962, 1970) and Abedor & Gustafson, (1971).

Fostering positive attitudes and a desire to engage in continued development on the part of team members will have more long term impact on student learning than most instructional products (such as revised courses, units, etc.) which result from initial development efforts. A team that develops fine instructional products but becomes "turned off" in the process is a mishap to avoid. An instructional product, no matter how well developed and validated has a relatively short, useful life compared to individual team members who will be around for a much longer time. Therefore, an individual team member skilled in and committed to instructional
planning and developing principles and processes is likely to make a longer lasting contribution to improving student learning.

Growth of individual team members as developers may facilitate the promotion of instructional planning and development processes and practices. Understanding and applying the dynamics of change toward progressively better states, an individual can grow toward functioning as a self-actualizer, a creative person, living fully in and with each and all of his feelings and reactions. The more deterministic results then, of consolidation, could be persons who accept, live with and determine planned change.

Thus far, we have seen the introducing of a new concept, collaborative instructional planning and development, and a rationale which reviews its purpose. This study will focus operationally only on the initiation phase of the model.

On the basis of what has been said about the initiation state of instructional planning and development, it is evident that this phase should be served by a method of instruction which will allow educators to experience and be oriented to the new roles and responsibilities they will face in planning and development phases.

Using the word "orientation" conjures up the in-service form of teaching teachers with visions of workshops, meetings, and being told "how to" and "why to."
Examination of the basic components of pre-involvement or initiation, role-playing, experiencing in non-threatening setting, and small group interaction, reveals that simulation would be a viable alternative to telling about the behavior expected in team planning and development.

Keeping in mind the ultimate goal of collaborative instructional planning and development, the improvement of student learning through the growth of the individual developer, we assume that instructional simulation is an excellent in-service technique to enable the initiation phase to occur.

**REDIMENSIONING INSTRUCTIONAL PLANNING AND DEVELOPMENT**

Initially it is especially important to note where instructional planning and development exists. The rationale and attendant model of collaborative instructional planning and development and its relationship to simulation must be placed in appropriate existance.

Most of what was suggested and overviewed in Chapter II are ideas and concepts drawn from the world of symbols; ideas, constructs, concepts, opinions, meanings, etc. A model is often used in the abstract dimension of the conceptual, symbolic world. This is the realm of the theory where postulates and hypotheses are of vital interest. As it happens this may be a scientific world, based on investigation and control of data; but often in the behavioral sciences, it is an intuitive artistic world, consisting of opinion,
thoughts, inventions and beliefs.

The coexistence of the direct, sensory world and the subjective, intuitive world is possible and can be expressed in the blending of theory and practice. Demonstrating that coexistence is possible is one of the major purposes of this study.

In order to illustrate and verify this distinction, the following illustration of the redimensioning process is offered (see Figure 5).
Figure 5 - Redimensioning Instructional Planning and Development
Referring to the diagram and this discussion, real world activities produce data and information that has been used to generate some rationales for instructional development. These logical constructs have yielded models in the symbolic world. Often these models were derived from descriptions of heuristics as data which occurred in the real world. We might term this conventional logic derived from real world data, or iteration procedures in the symbolic world. Graphic and symbolic models of planning and instructional development which occur in the symbolic world from rationales and from data in the real world are described.

Determining the appropriateness or suitability of the model for real world application could become a conceptual issue. There would seem to be little value in models that have built in barriers to application in the real world. At some point a model should be checked and tested against reality.

It was not possible to solely use research data from the real world because they lacked consistency. Real world data, observations, reports of subjective feelings and the like were used. From the symbolic world, ideas, concepts and hunches were also used to redimension the conventional instructional development model into a four-phased collaborative instructional planning and development scheme, congruent with the purposes and intentions mentioned as broad goals in
the literature review.

Following the simulation definition, a simulation can be designed to meet the requirements of a particular educational agency. Guidelines may be useful as the designer attempts to meet the diverse requirements of pre-planning in a specific educational organization.

As can be deduced from the diagram, the investigator has attempted to demonstrate the need to leap back and forth between the real and the symbolic world. It is vital that one is cognizant of whence his data is derived; by referring to real and/or symbolic data sources, awareness, appreciation and utility of each source can be discovered.

Defining the Instructional Simulation for Initiation

Now the instructional simulation that would best enhance the kind of learning experience called for by pre-planning of instructional design and development can be explicitly defined.

As will be recalled, one of the basic tenets upon which this study is founded is the exigency of orienting and increasing the positive attitudes and skills of groups ready for planning and developing of instructional procedures through an understanding of individually merged roles and new skills.

For this purpose, an instructional simulation exercise may be designed to provide a means for readiness, for exploring the complexities of new roles, relationships and feelings and for understanding and experiencing these new inter-rela-
tionships. Simulations so designed should extend the natural mode of learning by experience, which is the principal way one learns outside school, even beyond the direct experiences we are likely to have. It is Coleman's (1970) belief that simulations structured around this readiness - experiential-orientational mode represents a natural extension of Dewey's ideas about learning in close conjunction with the community and with life.

Dewey (1938) further described the experiential continuum. He indicated, as end points on the continuum, real...non-real experience. The end of the experiential continuum marked by non-real experience might be well served by instructional simulation.

Significant learning is "experiential" learning according to Rogers; "drawing in from the outside and making that which is drawn in a real part of me" (1967, p. 38). He also referred to trends toward more experiential types of learning as demonstrated in the increased use of simulation in education.

Instructional simulation as an experience in attitudes relating to real life roles, which participants may not, in real life, have had a chance to experience, was pointed out also (Curvey, 1971). Speculating on the utility of instructional simulation, Fattu (1965) remarked that simulation "may help a human decision maker synthesize and infer a good solu-
Experiential simulation should permit participants to engage in serious encounters where they must make decisions and consider the consequences thereof. These encounters are psychologically engaging if the participants are excited and involved as they move toward acceptable alternatives or solutions. Experiential simulation could be effective in promoting group interaction, providing opportunities for improvement of personal skill in group work and in assisting self-evaluation.

Goodlad concluded his study of the education reform movement and the extent to which the schools and people had changed, with several observations pertinent to an experiential definition of simulation:

...the teachers are only exposed to the ideas...and have not yet internalized their full meaning before being on their own with the ideas. (They) have never seen any of these things done well, let alone ever participated in them to the point of getting a 'feel' for them or how to proceed on their own (1970, p. 102).

In discussing in-service refresher training for teachers, Twelker (1971) commented on the fact that teachers could profit from simulation training experiences involving the use of innovative procedures and thus alleviate problems associated with such innovations with the proper training.

The experiential simulation would fulfill the needs of pre-planning, as a readiness for, an opportunity to internalize, and an orientation to differing roles, responsibili-
ties, skills and attitudes. In initiation, through simulation, the participant will be able to experience "this is what it will be like."

DESIGNING THE SIMULATION

Determination of Structure for Initiation Simulation

What major components of collaborative instructional planning and development should be included to give participants an orientation to the components plus experiences with some of the concepts?

Initiation Criteria

1) That individuals gain experience and knowledge of the total collaborative instructional planning and development process.

2) That individuals experience functioning as team members.

3) That team members understand the instructional planning, development and evaluation skills necessary for group and individual contribution to the total effort.

4) That opportunities be made available to the team to apply the skills.

5) That opportunities be made available to the team for group discussion, independent study and individual reflection.

The redimensioned symbolic model was examined to reveal those components whose idea form and activities should be an
appropriate part of the simulation. The components were roughly grouped into the following presumptive structure for initiation simulation:

- **Determine Instructional Planning and Development Purpose**

- **Plan Instructional Development Process**
  
  Examine major planning/development elements
  
  Determine appropriate elements
  
  Team members as role holders determine specific functions
  
  Build development around purpose and major functions of the plan

- **Implement the Development Plan**

- **Operate Sub-systems and Develop a Portion of Course, Unit, Etc.**

- **Evaluate During and After Try-out**

  Often it seems simulations are developed which have little relationship to real needs. Each simulation devised should be based upon a careful study of the educational organization and/or the clients and their system or environment. It should be determined how simulation can meet specific in-service-training-experiential needs which cannot be met more efficiently using other or alternative instructional experiences or methods.

  One assumption of this study is that simulation is the best method for introducing, building readiness, and understanding of skills and positive attitudes in and toward a redimensioned symbolic model of instructional planning and
development. Instead of the group searching for alternatives to accomplish the above goals, the author searched for a group that would be interested in and ready to participate in an initiation experiential simulation of collaborative instructional planning and development.

These three criteria needed to be met: 1) the educator group should have a demonstrated need for participating in teams, planning and developing instruction; 2) be initially willing to devote three to four days to the task; and 3) initially believe that the initiation experiential simulation exercise would, at least partially, fulfill their in-service training needs.

The investigator searched for several months before he found a group of educators who felt they could meet the criteria. Of the groups the investigator contacted, the most frequent rejection was lack of available instructor time to complete the simulation exercise.

The Participant Group

The faculty at the Capital University School of Nursing, Columbus, Ohio, formed the group who met the criteria and who agreed to participate in the simulation experience. The faculty is composed of thirteen full-time and six part-time teachers, all of whom hold nine-month contracts. All of the full-time and four of the part-time faculty are prepared at the master's level. One full-time faculty member (the Dean) holds a doctorate.
Curriculum revision at the School has been in progress for the past four years. The Curriculum Committee is composed of the faculty and student representatives from the three levels in the School of Nursing. A new philosophy and curriculum objectives were accepted during the academic year 1970-71. A new course structure and new courses have evolved through the work of the Curriculum Committee. General course outlines had been written for the new courses. It was clear from our first discussion with the Curriculum Committee that the faculty was indeed ready to begin developing instruction.

The following excerpt from a recent report compiled prior to an accreditation visitation to the Capitol University School of Nursing should provide a description of the participant group and their prior experience in curriculum development:

As the Faculty sought to build a new curriculum the members, with student representatives, organized themselves into numerous, small, constantly changing ad hoc work groups which reported to the Faculty or Curriculum Committee as appropriate for validation and finalization of their work. In this way, the Faculty and students have: 1) revised the Philosophy of School, 2) developed new curriculum objectives, 3) defined behavioral characteristics of the graduate, 4) selected major concepts for formulation of a conceptual frame of reference, and 5) devised models explanatory of these concepts (1971, p. 99).

The intentions and purposes of the College of Nursing staff was clarified by studying the following questions asked by the staff during the investigator's first interview.
1) How will goals and curriculum structure be translated into useful learning experiences?

2) What are some of the problems with phasing out one program and phasing in another as related to:
   - getting all faculty to understand and accept new approaches as their own?
   - reduce faculty anxiety about changes in roles?
   - getting faculty thinking about constant feedback and revision?
   - provide time for faculty to spend in hard consideration of their new roles?
   - what training for the faculty can be provided in new areas as orientation?
   - how much student self-instruction is possible?
   - how can we solve scheduling problems?
   - reduce faculty anxiety about dealing with different levels of students than accustomed?
   - how can we tell when students are learning?
   - how will students contribute?
   - what special training could be made available to faculty to improve instruction?

Out of these expressed intentions and background information came the decision to use the basic initiation simulation experience adapted to meet the specific context of the faculty of the Capitol University School of Nursing.
Initial Decisions

1) The materials should deal with the content of skills and processes to be understood in the context of an immediate real problem.

2) Considering the collaborative instructional planning and development model, it was decided that the materials and learning experiences should be cyclical; introduction; practice-application; review; application. These learning experiences could even extend beyond the time allotted for the simulation.

3) The setting should not be hypothetical but should consist of the participants' own environment. Participants should play their own roles (except for team leader and team members).

4) In connection with the setting, the following items would have to be dealt with: the actual or simulated supportive services of the participants' setting, and selection of personnel for teams.

5) The simulation exercise would permit and require cyclical presentation, self-study and application of the following concepts, planning/development elements, systems approach to planning and development of instruction, group interaction, roles, and functions.

6) The consideration of the specific problem/project to be used in the materials was narrowed to one of real consequence. In summer of 1974, Nursing 24 (Conceptual, Inter-
personal, and Technical Skills in Nursing) is scheduled to be taught. It was decided to use the design and development of this course as the focus for the simulation. In order to use this course, it was necessary for the Curriculum Committee to produce a topical content outline for use by the group.

7) It was further decided that the following items needed to be developed: presentation formats and written materials descriptive of the planning/development elements, and memoranda to direct the activities. It was deemed unnecessary to produce information on student population, cost requirements and budgetary limitations, or school goals as these were already well known to participants.

8) The participant group was to produce an instructional plan, engage in the development of a selected segment of the plan and reality test the plan and development effort through consideration of "so that's what it could be like" assessments of their role, group interaction, and functional tasks performed.

9) They were to be working in small, face-to-face groups in their real setting, essentially playing their own roles, experiencing and working toward the design and development of a product that no one "had" to live with.

10) It was agreed that the simulation was to involve real role players (as participants) concerned with real content and purposes, designing and developing a hypothetical
plan for a real but distant course. Simulation of the setting, materials and roles seemed unnecessary as the individual faculty had previously worked together and, additionally, the School of Nursing Curriculum Committee felt that the expenditure of time deserved the inclusion of as much psychological reality as possible in the experience.

11) It was agreed also that the field test of the initiation simulation experience was to be presented to the faculty as an end-of-the-year in-service workshop and that the consultant fee offered by the School of Nursing should cover the cost of the trial test.

Learning Outcomes

It was concluded that the following learning outcomes would provide a beginning point in stating goals, learning objectives, and evaluation of the simulation experience:

a) Affective outcomes: It was anticipated that intrinsic motivation would occur and be expressed by participants through positive attitudes about themselves and their activities, and confidence in their "new" role.

b) Cognitive outcomes: Factual learning; not recall, but recognition of relationships among the parts, or developing structure; principles or concepts contained in instructional planning and developing.

The initial decisions and learning outcomes enabled
goals and specific objectives for the pre-planning simulation to be produced.

Goals for the Initiation Simulation-Experience

- To provide general experiences in the process of preparing for and engaging in face-to-face instructional planning and development.
- To provide a situational base for collaborative instructional planning and development and a methodology for the analysis of that situational base which will aid participants in understanding the effect of individual behaviors and group interactions on planning and development activity.
- To help the participants understand: 1) context and processes of instructional development; 2) some of what is required to become a skillful developer; 3) beginning understandings of tactics of planning and developing in group settings; and 4) evaluation.

Learning Objectives for the Initiation Simulation-Experience

1) As a result of the simulation experience, participants should show increased evidence of knowledge of collaborative instructional planning and development concepts as measured by the Perceived Competency Rating Scale and questions 1, 2, 3 and 6 on the open end Problem Solving test.

2) As a result of the simulation-experience, participants will demonstrate increased positive attitudes toward:
a) their role in planning and developing instruction; b) the group process of planning and developing instruction; c) the future use of collaborative instructional planning and development by their faculty. This learning objective will be measured by the Attitude Inventory.

3) As a result of the simulation experience, participants will be able to identify correctly the following planning/development elements:

School goals
Course goals
Course objectives
Alternate course approaches
Learning objectives
Learning objective classifications
Learner characteristics and capabilities
Teaching-learning experiences
Instructional resource support
Measuring student learning
Evaluating instructional plans

This learning objective will be measured by the open end Identification of Terms test and matching questions 4 and 5 on the Problem Solving Test.

4) As a result of the simulation-experience, participants will demonstrate increased positive attitudes toward necessary collaborative instructional planning and development components as measured by the C.I.P.D. Attitude Rating Scale.

5) As a result of the simulation experience, participants will show an increased ability to describe the major aspects of team member and team leader roles as measured by the open end Role Description test.
6) As a team member, participants will produce a plan for instructional development and develop a pilot course segment. This objective will be measured by the quality and appropriateness of written materials produced.

From these goals and objectives, evaluation measures, the operational specifications and face validity parameters were determined and derived as indices for planning.

Planning Indices

A word must be said at this point about guidelines for designing instructional simulation. The investigator considers Rubeck's (1972) compilation the best guidance available. The investigator was able to make good use of Rubeck's guidelines by constant reference to them as information was sought and received and decisions made in a systematic way.

Learning Objective Measures

Following an extensive analysis of the intended learning objectives, test instruments were written. These represent measures of participant ability and attitude. In this simulation, evaluation of the instructional plan as a product (learning objective No. 6) is of great importance, but does not fall within the measurable short range effects of the experience. The plans submitted by the teams will be described only following the simulation.
Operational Specifications

The simulation-experience was to be used by the participant group previously described, during a three-day workshop at the end of the Spring quarter. Approximately 16 participants were involved including two students. Three teams were pre-selected by the School of Nursing Curriculum Committee chairperson.

Due to the extensive amount of information that the participants were expected to make use of during the simulation, a cyclical approach was planned for the designing of within-simulation learning experiences.

Thus, it was conceived that participants should be presented information dealing with the systems approach, roles, functions, and planning/development elements; given an opportunity to practice or apply the concepts, receive feedback, re-introduce the planning/development elements and study these more intensively, then apply the elements cognitively through a series of structured but flexible procedures, receiving feedback throughout, then apply the functions personally and finally conclude with a personal and procedural assessment.

These specifications included the use of the investigator and another colleague as consultants to the teams; upon invitation to assist the group process and to provide feedback to the participants concerning the group's tasks.
**Face Validity Boundaries**

A psychological, rather than physical reality, was attempted for this simulation experience. In order for participants to feel and act "as if"; with participants essentially playing their own roles, in their own environment, it was assumed that any physical realia should be perceived as coming from a part of the environment and the needs of the participants. The duration of each part of the three-day simulation experience was arrived at intuitively.

**Development of Simulation Materials**

Consideration of initial decisions, the learning objectives operational specifications, and face validity boundaries led to the suggestion of activities, which were finalized and materials appropriate to each activity were produced. (For further reference, all simulation-materials are included in the Appendix.)

<table>
<thead>
<tr>
<th>Planned Activities</th>
<th>Developed Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A)</strong> Introduce simulation-experience and major concepts to participant teams.</td>
<td><strong>A)</strong> Prepare lecture and overhead transparencies.</td>
</tr>
<tr>
<td><strong>B)</strong> Practice and apply major concepts at introductory level.</td>
<td><strong>B)</strong> Construct group game, COLLABO, which requires application of the major concepts of a collaborative planning/development system.</td>
</tr>
<tr>
<td><strong>C)</strong> Teams receive directive to plan and develop including time guidelines and description of forms to use</td>
<td><strong>C)</strong> Prepare Memo #1 - Directive and Guidelines for Course Planning and Development.</td>
</tr>
</tbody>
</table>
D) Team members independently study the following planning/development modules: Course Information, Learner Characteristics and Capabilities, Learning Objectives and Classes, Designing Teaching-Learning Experiences, Instructional Resources and Support, Evaluation, and Try-out Testing.

E) Teams Chose Elements & Sub-Elements.

F) Teams assemble to receive information and discuss roles, acts, performance statements and functions.

G) Team members individually, then as a group, list role-holder functions and act type.

H) Teams assemble to receive information and discuss instructional design systems.

I) Teams list role holder functions, the completion date of each, and the sub-system to which each function has been assigned.

J) Teams receive directive to develop a selected, small segment of their course plan.

D) Synthesize and produce the 7 modules designed for individual self-study containing the major and sub-elements which form the whole of instructional planning and development. These should include concepts and applications of concepts.


G) Prepare Form B - Role Holder Functions List.

H) Prepare Memo #4, Group Meeting, Instructional Design Systems. Prepare brief lecture, overhead transparency and discussion questions.

I) Prepare Form C, Instructional Development Plan.

J) Prepare Memo #2, Course Development Workshop (information and schedule).

The facilities planned for use by workshop participants were very desirable. A large, carpeted classroom served as
the main conference and assembly room. Three adjacent seminar rooms were utilized as team meeting rooms, while one nearby room was set up as the "Instructional Development Resource Center," (actually a location for many print materials provided for resource and supplementary use) and as a headquarters or office for the investigator and his associate. Across from this area was the teachers' lounge, which made the location convenient.

Pre-testing was accomplished on Wednesday, May 24, 1972. The following tests were administered to the participant group: Perceived Competency Rating Scale, Problem Solving, Identification of Terms, the C.I.P.D. Attitude Rating Scale, and the Role Description.

Table 1 presents the tentative schedule used for the simulation experience workshop showing how each segment fit into the entire schedule.

### TABLE 1
CAPITAL UNIVERSITY SCHOOL OF NURSING
May 31, June 1, June 2, 1972

**SIMULATION SCHEDULE**

**Wednesday, 8:15 A.M.** - Mrs. Duley introduces Schneider and Bradford.

**INTRODUCTION** - Schneider and Bradford introduce workshop as simulation.

1. Informality to prevail.
2. General concepts; intensive experience, produce, hard work expected, etc.
3. Administer Attitude Inventory for the first time.

4. Introduce major concepts; Collaborative Instructional Planning and Development - difference among the 4 phases; simulation as pre-planning or initiation.

Four major keys: roles, functions, systems, group interaction.

5. Give notebooks to participants - Refer to goals, objectives and evaluation of the simulation experience.

6. Describe Schneider and Bradford's roles in simulation experience; facilitation, resource, and help.

7. Describe the Instructional Development Resource Center and the materials available there.

8. Discuss how to use the notebook and materials contained therein.

9. Describe cyclical learning experiences, and the three segments forming major portion of simulation experience.

10. Discuss the participants' roles to be.

11. "The simulation-experience is a process to orient you to collaborative instructional planning and development and give you some
experience with the skills involved."

12. Mrs. Duley assigns teams, gives room assignments and need for team meetings as well as individual work space.

13. Discuss team leader responsibility with the team leaders - leadership, facilitations.

9:00 A.M. 1. Introduce and play COLLABO. Talk through directions. Hand out materials.

10:30 A.M. 1. Game ends; begin discussion.
2. Administer Attitude Inventory for the second time.

11:00 A.M. 1. Distribute Memo #1 - Directive and Guidelines for Course Planning and Development and Form A.

2. Teams adjourn to assigned rooms.

3:00 P.M. 1. Form A (Planning and Development Elements Chosen for Use) due.

3:05 P.M. 1. Distribute Memo #3 (announcement of group meeting--Roles, Acts, Performance Statements, Functions).
2. Teams assemble in conference room.

statement and functions.

3:35 P.M. 1. Teams begin work on task.

2. Distribute Form B (Role Holder Functions List).

Thursday -

11:00 A.M. 1. Form B due.

2. Distribute Memo #4 (announcement of group meeting on Instructional Design Systems)

11:10 A.M. 1. Teams assemble in conference room.

2. Bradford discusses Instructional Design Systems; how system relates to the plan, chart.

   How to fill out Form C.

3. Distribute Form C (Instructional Development Plan).

3:00 P.M. 1. Form C due.

2. Teams assemble in conference room.

3. Administer Attitude Inventory for the third time.

4. Each team reports to group about their system and plan using a chart and notes.

3:45 P.M. 1. Distribute Memo #2 (Information about and schedules of Course Development Workshop).

2. Teams begin work.
Friday

Mr. Ted Fritz (Director of Media Center at Capital University) available to teams for consultation on availability of resource materials and costs.

2:00 P.M.
1. Teams assemble in conference room.
2. Administer Attitude Inventory for the fourth time.
3. Group discussion re: course development segment just concluded.

2:45 P.M.
1. Administer post-tests.
2. Summary, debriefing, strengths and weaknesses of the simulation experience.
3. Directions for the future.....Inez Moore, R. N.

PILOT TEST OF INITIATION SIMULATION EXPERIENCE

A brief synopsis and narrative of the simulation and relative comments is included next to provide a comprehensive perspective of the simulation tryout.

As can be seen from the schedule, the simulation experience itself was sub-divided into three segments: Introduction, Producing a Plan for Development, and Development of Course Plan.
Introduction

During this first stage of the simulation a general introduction to the overall simulation experience was given, as well as introductory statements about the major constituents of the ideas behind the development of the simulation linked to course design and development needs as perceived by the curriculum committee. Notebooks containing goals and objectives of the experience, printed COLLABO game materials, and the seven Planning/Development (self-study) Modules, were given to each participant. The goals, objectives and evaluation procedures of the simulation-experience were explained and discussed. The consultant roles as facilitator, resource and helper were also clarified. The Instructional Development Resource Center was explained.

The teams were specified and COLLABO game materials were given to teams. Included with COLLABO was an abstract of each Planning/Development Module, as well as descriptions of instructional design systems, roles and functions. The idea was that the team members scan these materials and collectively "build" an instructional design system. It was thought that initial exploration of these ideas and concepts combined with group interaction and participation would serve as a motivating preface to working with the new ideas and each other. The three teams played the game in the conference room. Following the game, a discussion was held concerning the concepts inherent in the game as well as the extent of the teams' activities. (The game was designed so that ab-
stract principles were given concrete forms which could be manipulated.)

Producing a Plan for Development

Following the game a memo was handed to team members. The memo directed the teams to produce a plan for a new course and gave as a first requirement, to put together a list of those planning/development elements that they (the team) thought should be part of their effort. The teams then adjourned to their respective seminar rooms to consider what to do.

All of the teams decided to individually study the modules over the next few hours and then reconvene and recommend those planning/development elements they wished to consider for the development of Nursing 24. Later, each team reassembled, discussed and filled out Form A (Planning and Development Elements Chosen for Use). The investigator and his associate, acting as consultants to the teams, were not asked to consult during the discussion following module study. Therefore, the decision was made to "drop in" on the team meetings. This proved successful in that the consultants were able to assist and offer feedback to teams as to their progress, appropriateness of their products and assessment of the group process. This consultant activity seemed to involve a special intuitive skill; i.e. knowing how to answer a question by getting team members to think more diversly about the problem (indirect assistance) or knowing when to leave
the group. Consultant activities will not be further dis­
cussed here except to mention that these "consultant ser­
vices" were offered throughout the remainder of the simu­
ation experience.

The next team activity involved the team members deci­
ding individually of what they thought their performance
statements and those of others should consist. They had
been asked at the 3:15 P.M. general assembly to individually
fill out Form B (Role Holder Functions List) for themselves
and others on the team; then reconvene in the team and gain
consensus with what performance statements were produced.
This was required so that the teams would have some experi­
ence with handling divergency in role perceptions of team
members. This activity was to be performed by adding an
"action" element to a "planning/development element" such as
"gather-learner data." Additionally, the team members were
required to categorize the performance statement as a tech­
nical work act, and/or communication act, and/or decision
making act. Through a simple check, members could use this
approach to categorizing as a further help in gaining consen­
sus. The statements, combined and agreed on by the team were
then listed as "functions" on Form B (Role Holder Functions
List).

The next task was for the team to place the "functions"
just agreed upon into an instructional design system of their
own choosing. Following a short review of the systems ap-
proach to instructional design, the teams met together again for this final planning task.

When the system planning was accomplished, teams met together as a group and presented a short verbal and charted description of their system to the other teams. This had been included so that feedback among and between teams could occur.

**Development of Course Plan**

This final segment of the simulation was signaled by a memo which asked that teams now develop a small part of the Nursing 24 course, using their system and plan. It was the investigator's intention here for team members to get the "feel" of performing some of their functions and to determine, if possible, how their system would work.

After the teams had worked together for several hours, and the consultants, including Mr. Ted Fritz, director of The Capital University Media Center, had worked with all the teams, the participants reassembled for the final session.

During this session each team reported on the workability and "reality" of their plan, and what they had been able to accomplish during the "course development workshop" (as this third segment was termed). Written assessments were not required due to the participants' reluctance to perform additional writing tasks.

After a short break, the group discussion centered on a summary of the strengths and weaknesses of the simulation ex-
periences and activities including ways and means the pre-planning simulation experience and the plans produced by the teams could be utilized in future instructional development efforts of the Capital University School of Nursing.

Means for Evaluation

As indicated earlier, learning outcomes were delineated in several domains, goals and learning objectives were written, and data collection instruments were used to collect information regarding the adequacy of the simulation in producing the intended learnings.

Information was collected before and immediately after the simulation, and also during the simulation experience itself:

<table>
<thead>
<tr>
<th>PRE-TEST</th>
<th>Before</th>
<th>After</th>
<th>After</th>
<th>After</th>
<th>POST-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>One week before simulation Cognitive and Affective measures</td>
<td>Intro-Duction (Collabo game) Affective measures</td>
<td>Produc-ing a Plan for De-velopment Plan-Ament Planning Affective measures</td>
<td>Devel-opment of Course Plan (Devel-opment) Affective measures</td>
<td>Immediately after simulation Cognitive and Affective measures</td>
<td></td>
</tr>
</tbody>
</table>

(same instrument) Attitude Inventory

(same instrument) Cognitive & Affective

Evaluation Design
(For further reference, all data collection instruments used are included in the Appendix.)

Using the first five learning objectives as a framework, a questionnaire to measure affectivity was constructed to gather participant data before and after the simulation experience; similarly a different, short Attitude Inventory was administered before and after the three segments of the simulation. The pre-post Attitude Rating Scale consisted of Likert-type statements and a response mode with a range of 1.00 to 4.00. Possible individual responses to each statement were placed on a continuum from positive (numerical rating of 1.00) to negative (numerical rating of 4.00). A fifth category (0) was reserved for "I don't know" and "unwilling to do" responses and will be reported separately.

The short Attitude Inventory, also consisted of Likert-type statements with a range of 1.00 to 5.00. The continuum in this case was from 1.00 (positive) to 5.00 (negative).

The cognitive section of the pre-post measure was constructed using the first five learning objectives as a basis. This section consisted of nine collaborative instructional planning and development elements to briefly define, six short answer, open ended questions, and two matching questions.

The method of recording data from the instruments designed to measure affective and cognitive outcomes for purposes of analysis was considered. A mean was computed for
each statement/question, pre and post, and for each short answer affective statement given during the simulation. Comparison mean scores were recorded in table form and are graphically displayed in Chapter IV.

**Group Products**

Another technique for assessing the simulation, relating to learning objective No. 6, was through written group products resulting from tasks in the simulation; Form A (Planning and Development Elements Chosen for Use), B (Role Holder Functions List), C (Instructional Development Plan), and plans produced and system design charts. These products were analyzed in relation to meeting learning objective No. 6.

**Feedback Provisions**

Other than interactive feedback that seemed to be a function of the consultant who visited and assisted the teams, letting them know how they were doing; the following method of recording feedback was used. Team reports after the final segment, Development of Course Plan, were tape recorded. The individual comments which summarized the strengths and weaknesses of the simulation as well as comments for methods of using the experience as an orientation for the future were also tape recorded.
Summary

A redimensioned instructional planning and development model was produced, as was a definition of an initiation simulation experience. The simulation was designed and developed, and a pilot test was held following a two-month development period. Group responses of individuals were assessed before and after participation in the simulation. The results of data gathered are analyzed and displayed in the following chapter.
CHAPTER IV

EVALUATION OF THE INITIATION SIMULATION EXPERIENCE

This chapter is concerned with an examination of the results of the study. Evaluative information was gathered in order to determine the usefulness and relevancy of the simulation experience, and as an indirect outcome, the assessment of the collaborative instructional planning and development model itself.

The evaluation design, issues pertinent to it, and expectations for the results will be discussed. Each of the six simulation experience learning objectives will be presented, followed by an interpretation of the test results and supporting data in chart and table form.

Evaluative feedback from the participants will be categorized into two critical questions: 1) Did the simulation-experience do what it was supposed to do? 2) Was the simulation-experience relevant and useful in orienting and training teams of educators in instructional planning and development? The chapter is concluded with a resumé of initiation simulation-experience goal achievements.
As discussed in Chapter III, a pre-test was given one week prior to the simulation-experience workshop for learning objectives 1, 3, 4 and 5 to determine baseline achievement levels for the group. A post-test was administered for learning objectives 1, 3, 4 and 5 to determine achievement levels of the group. As a measure of central tendency, a mean score for the group was computed for each question on both pre-test and post-test.

Campbell and Stanley (1963) refer to this one-group Pre-Test Post-Test design as a pre-experimental design. The basic concept is to determine what students know and feel, exemplified in the objectives, before the treatment; then administer the treatment and retest to determine if gains have occurred. Campbell and Stanley (1963, p. 7-11) state that the following confounding, extraneous variables jeopardize the internal validity of the experimental design by explaining the pre-test post-test difference: 1) history (time lapse), 2) maturation (varies with passage of time), 3) effect of taking the test for a second time, and 4) statistical regression toward the mean.

These variables should be considered when comparing pre-test post-test scores. More supervision over the scheduling of stimuli, through control groups, would have been desirable for a true experimental design. However, this was not possible with the participant group used. The group's size was
too small to generate a control group. This may be a weakness in the pre-post design; but, on the other hand, without a baseline the learning objective would be almost meaningless unless a measure indicative of performance is taken prior to the instructional experience.

Perhaps the ultimate criterion should be the performance. In validation of the simulation exercise it was decided that pre-simulation capability and feelings were required to be measured against post-simulation capabilities and feelings. In short, the question is asked, "does the simulation do what it was supposed to do?"

Two of the confounding variables may limit the achievement results; the effect of test retaking and the apparent statistical regression toward the mean. Two other confounding variables, history and maturation, which could interfere with the validity of the above question, have been discounted because of the short time lapse between pre-post testing.

Two developmental areas were considered in focusing the evaluation of the simulation:

1) degree of achievement of the simulation's learning objectives, and
2) group reports generated as task products by participants.

Instruments used in collecting achievement data included:
A) Nine major design and development elements as listed were briefly described, defined, or identified.

B) Two open ended questions, describing the role of a team member and team leader, were briefly answered.

C) Four open ended questions dealing with learning objectives, alternate course approaches, learner characteristics and capabilities and two matching questions regarding goals, objectives and classification of objectives were briefly answered.

D) Twenty statements all reflecting planning and development activities on a Likert-type scale were rated by participants as to how competent they would be in performing each activity stated. Ratings were based on a scale from most competent to least competent with a separate category for "unwilling to do."

E) Twenty-two positive statements, each concerning a major concept in collaborative instructional planning and development were rated on a Likert-type scale as to their necessity in being accomplished during a limited time period. Rating criteria were listed as absolutely necessary to absolutely unnecessary with a separate category for "I don't know."

F) Three questions relating to role, group process, and the future of team planning and development were each rated on a Likert-type scale with two to three rows of positive to negative statements. The statements were variously
rotated from positive on one end to negative at the same end to encourage more thoughtful responses.

Three types of data-gathering tools were represented by the six instruments:

1) **Rating Scales** (Attitude Inventory, Perceived Competency Rating Scale, and C.I.P.D. Attitude Rating Scale)

Participants choosing each of the five items for each statement were tallied and a mean was computed for each statement.

2) **Matching Statements** (Problem Solving, questions 4 and 5)

The percentage of the total number of participants correctly matching each of four course/goal statements with level indicators and the percentage of participants correctly matching three classifications of learning objectives was computed. (The number used for computing the percentage was based on the post-test number.) Participants had marked their tests, either with initials or numbers, so it was possible to identify the participants' pre-test and post-test forms. For these items, where total number was important, the pre-test forms of those who did not return for post-testing were not included.

3) **Open-end Questions** (Identification of Terms, Role Description and Questions 1, 2, 3, and 6 on Problem Solving)
Those questions proved to be most difficult in assigning values. Several frustrating evaluation methods were used with the hope of obtaining the most unbiased means to assess the correctness of these questions.

At first, an associate wrote pre or post on the back of each form so that the investigator would not know which answers were pre and which were post. This was not acceptable, as it was quite easy to distinguish the pre from post forms by the greater and richer amount of written material on the post-test forms. In order to eliminate "instructor bias", it would have been best to allow several persons independent of the study to grade both pre and post-test answers. However, this would have been too time consuming.

Finally, the investigator decided to match each participant's pre and post-test forms and perform a content analysis of the key words, phrases and ideas. Each answer was rated by the author as either poor, fair, or good. In this way, differences could be noted, but, as is evident, a lack of objectivity may pervade this data.

A continuum from 1.00 (good), 2.00 (fair), 3.00 (poor) was devised to enable a mean for each question to be quantified.

Methods Used in Data Analysis

How much did the group of participants, taken as a whole, gain in its abilities and attitudes over a period of time? The data analysis concentrated on evidence that there was or was not significant change in participant abilities
and attitudes.

The sign test (Siegel, 1956, p. 68-75) was used to answer the question: "how much of the change that occurred as a result of the simulation-experience was attributed to the simulation-experience and not to chance?

Learning objectives 1 through 5 state that the participant group will improve or gains will result from the simulation experience. A positive direction is hypothesized for the participants; it is expected to occur.

A (+) sign was assigned to the means that shifted closer to 1.00; a (-) sign to the means that shifted closer to 3.00, 4.00, or 5.00 and a (0) to the means that showed no increase or decrease. We might expect that if the simulation had no effect, about one-quarter of the participants might have shown improvement by chance, about one-quarter might have shown a decrease by chance, and one-half would have received the same rating or scores.

An examination of the mean pre-test post-test comparisons will reveal, by determining the number of (+) and (-) signs, if performance and attitude did or did not improve. The sign test gives an indication about how much confidence can be placed in the test results. The sign test used was Owen's table (1962), "Confidence Levels for the Sign Test." This direct reference table uses a number for related pairs, in this case pairs of questions. The table, reporting con-
fidence levels, is for two-tailed tests which provides a somewhat more cautious estimate of confidence.

In cases where the N, the number of pairs of questions considered was fewer than 12, a sign test was not performed. This cut-off point was necessary due to the fact that 12 was the minimum N which produced confidence levels at .01, .05, and .10.

The degree of shift from pre-test to post-test is also shown on the mean comparison tables. This should improve discrimination in discussion of specific statements and questions relative to learning objectives. A graphic representation of the information contained in the mean comparison tables was also prepared, so that relationships between pre and post-test means, as well as the relationship from statement to statement, could be presented.

The measures used to gather data on degree of achievement, supporting data and charts and a comprehensive discussion of meaning of the results will be used as a basis for evaluating achievement of simulation-experience learning objectives.

EVALUATION OF TEST RESULTS

Learning Objective No. 1. As a result of the simulation experience, participants should show increased evidence of knowledge of collaborative instructional planning and development concepts as measured by the Perceived Competency Rating Scale and questions 1, 2, 3 and 6 on the open end Prob-
Table 2 shows pre-post mean comparison ratings with respect to perceived competence in performing collaborative instructional planning and development elements (Perceived Competency Rating Scale). The results of Table 2 are clarified in Figure 6, which graphically portrays the relationships between mean ratings. Similarly, Table 3 and Figure 7 provide pre-post mean comparisons of open end cognitive questions from the Problem Solving Test which relate to learning objective No. 1.

A study of Table 2 and Figure 6 indicates that, as a group, participants did increase their feelings of competence in performing collaborative instructional planning and development concepts and skills. The results were found to be significant at the .01 level of confidence.

The most positive gains were made in statements dealing with working within an instructional planning system, gathering cost figures and predicting course effectiveness, studying and classifying learning objectives and deciding about individual learner characteristics that will affect plans for learning.

"Developing or selecting instructional resource media and materials" was of apparent insignificant gain, while "selecting the major topics to be treated in a content area" did not change. A shift to non-competency is noted in No. 8, "develop a pre-test", and in No. 12, "use learning objective." The latter statement may have been confusing to
some participants as they did not experience or even refer to this in their plans or team discussions. It was, however, a major topic of the evaluation module.

During the pre-test, eight participants marked the column headed "unwilling to do", while on the post-test only one participant checked the "unwilling to do" column. This could be interpreted as a positive move also; as participants found out more about the elements, they felt more willing to perform them.

Referring to Table 3 and Figure 7 from the Problem Solving Test, positive gains seem to have also been made from pre to post-testing. These figures may not be as valid due to lack of a confidence level and also the personal bias of the investigator may have interfered with the scoring of the questions.

| Table 2 |
| Mean Pre-Post Test Comparison Ratings |
| Perceived Competency Rating Scale |

<p>| Degree of Shift |
|---|---|---|</p>
<table>
<thead>
<tr>
<th>Pre</th>
<th>Post</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Study learning objective statements and classify them.</td>
<td>2.50</td>
<td>2.08</td>
<td>+</td>
</tr>
<tr>
<td>2. Gather cost figures for alternate courses and predict course effectiveness</td>
<td>3.29</td>
<td>2.75</td>
<td>+</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Pre</th>
<th>Post</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Study and determine several alternate course approaches.</td>
<td>2.38</td>
<td>2.0</td>
<td>+</td>
<td>.38</td>
</tr>
<tr>
<td>4</td>
<td>Write measurable learning objectives.</td>
<td>2.63</td>
<td>2.33</td>
<td>+</td>
<td>.30</td>
</tr>
<tr>
<td>5</td>
<td>Write attainable, relevant, and measurable course objectives.</td>
<td>2.50</td>
<td>2.33</td>
<td>+</td>
<td>.17</td>
</tr>
<tr>
<td>6</td>
<td>Recognize well-stated course and learning objectives.</td>
<td>2.38</td>
<td>2.17</td>
<td>+</td>
<td>.21</td>
</tr>
<tr>
<td>7</td>
<td>With others, determine a course goal.</td>
<td>2.06</td>
<td>1.83</td>
<td>+</td>
<td>.23</td>
</tr>
<tr>
<td>8</td>
<td>Develop a pre-test.</td>
<td>2.43</td>
<td>2.50</td>
<td>-</td>
<td>.07</td>
</tr>
<tr>
<td>9</td>
<td>Select and list with your team, the major topics that should be treated in a content area.</td>
<td>1.75</td>
<td>1.75</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>10</td>
<td>Determine subject matter, as part of a team, for your course.</td>
<td>1.75</td>
<td>1.55</td>
<td>+</td>
<td>.20</td>
</tr>
<tr>
<td>11</td>
<td>Write tests for learning objectives before instruction begins.</td>
<td>2.60</td>
<td>2.55</td>
<td>+</td>
<td>.05</td>
</tr>
<tr>
<td>12</td>
<td>Use learning objectives classification to write a test item for each learning objective.</td>
<td>2.53</td>
<td>2.83</td>
<td>-</td>
<td>.30</td>
</tr>
<tr>
<td>13</td>
<td>Determine prerequisites for a course.</td>
<td>2.06</td>
<td>1.91</td>
<td>+</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Sign</td>
<td>Degree of Shift</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>14. With other team members, decide on individual student characteristics that will affect plans for their learning.</td>
<td>2.50</td>
<td>2.08</td>
<td>+</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>15. Decide, with team consensus, upon teaching-learning communication strategies.</td>
<td>2.06</td>
<td>1.91</td>
<td>+</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>16. Contribute to evaluating the team's plan for developing instruction.</td>
<td>2.31</td>
<td>1.91</td>
<td>+</td>
<td>.40</td>
<td></td>
</tr>
<tr>
<td>17. Name the important support services that will affect instructional plans.</td>
<td>2.27</td>
<td>2.10</td>
<td>+</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>18. Select or determine teaching-learning experiences appropriate for learner group or individuals.</td>
<td>2.25</td>
<td>1.90</td>
<td>+</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>19. Develop or select, with team consensus, appropriate and effective instructional resource media and materials</td>
<td>2.31</td>
<td>2.28</td>
<td>+</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>20. Work within an instructional planning development system.</td>
<td>2.47</td>
<td>1.90</td>
<td>+</td>
<td>.57</td>
<td></td>
</tr>
</tbody>
</table>

N = 16   N = 13

Significant at the .01 level of confidence (greater than 16 (+) out of 19 (+)).
Figure 6
GRAPHIC REPRESENTATION OF TABLE 2
PERCEIVED COMPETENCY RATING SCALE

1.0 .5 2.0 .5 3.0 .5 4.0

Most Competent Competent Not Competent Least Competent

1.
2.
3.
4. Pre-Test
5. Post-Test
6.
7.
8.
9.
10.
11.
FIGURE 6 (continued)
GRAPHIC REPRESENTATION OF TABLE 2
PERCEIVED COMPETENCE RATING SCALE

Most Competent

Competent

Not Competent

Least Competent

12.
13.
14.
15. Pre-Test
16. Post-Test
17.
18.
19.
20.
Table 3

Mean comparison of open end cognitive questions from problem solving test

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.08</td>
<td>1.17</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>2.23</td>
<td>1.62</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>2.77</td>
<td>2.00</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>2.23</td>
<td>1.38</td>
<td>+</td>
</tr>
</tbody>
</table>
Figure 7
GRAPHIC REPRESENTATION OF TABLE 3
FOR COGNITIVE OPEN END QUESTIONS FROM THE
PROBLEM SOLVING TEST

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Good | Fair | Poor
1.0  | 2.0  | 3.0
Learning Objective No. 2

As a result of the simulation-experience, participants will demonstrate increased positive attitudes toward: a) their role in planning and developing instruction; b) the group process of planning and developing instruction; c) the future use of collaborative instructional planning and development by their faculty. This learning objective will be measured by the Attitude Inventory.

The Attitude Inventory was used before and after the COLLABO game (Introductory Segment), after the planning segment, and after the development segment to assess the participants' feelings toward the three constituents mentioned in the learning objective.

Table 4 shows the mean comparison ratings of the Attitude Inventory in its four administrations with sign and shift indicated. Figure 8 gives a graphic picture of the relationship within the time periods and items on the question.

It was assumed that the results of the Attitude Inventory could provide data on the effect of each segment on participants' feelings about role, the group process and future use of collaborative instructional planning and development. It was not possible to perform a sign test for confidence due to having less than the minimum number of questions for use of the confidence level table.

The most dramatic shift occurred in 1.a - a great
amount of "comfortability" was gained through the introductory COLLABO game and a slight gain through the other two segments. "Excitement" increased somewhat after COLLABO, but decreased after the plan preparation segment. (This may have been due to the sharp increase of perceived "work" that is needed to put together an instructional plan). Participants seemed to become increasingly motivated, "turned on", from start to finish. As expected, role was a personal thing but the one general trend that can be found is that the participants seemed to be less sure of their role during the middle segments; but at the end, they seemed somewhat more confident of role than before the simulation.

Concerning planning and developing instruction as a group process, initial expectations decreased slightly from "it will work" to "it may work", as participants experienced the activities. Group process attitudes moved in a positive direction most strongly from "successful" to "very successful" and from "confident" to "very confident" throughout the three segments.

Little shift can be noted in the third question dealing with future faculty use of the collaborative instructional planning and development concepts. Generally, the group of participants felt only slightly more positive about future use after the simulation than before.

Seven "don't knows" were recorded before the simulation and three after, which may indicate some reinforcement for
those who felt more positive about future use of collaborative instructional planning and development concepts.

Although confidence in the above assumptions may be overgenerous because of inability to be as confident as one would like to be about the question, "What caused the shifts?"; it can at least be assumed that a major contributing factor was the simulation: the Attitude Inventory was short and was administered immediately before and after the segments to the full group.
### Table 4

**MEAN COMPARISON RATINGS**

**ATTITUDE INVENTORY**

<table>
<thead>
<tr>
<th>Question</th>
<th>Before Segment One</th>
<th>After Segment One</th>
<th>After Segment Two</th>
<th>After Segment Three</th>
<th>Sign</th>
<th>Degree of Shift From 1 to 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>2.71</td>
<td>2.00</td>
<td>1.69</td>
<td>1.60</td>
<td>+</td>
<td>1.11</td>
</tr>
<tr>
<td>b.</td>
<td>2.35</td>
<td>2.18</td>
<td>2.77</td>
<td>2.36</td>
<td>-</td>
<td>.01</td>
</tr>
<tr>
<td>c.</td>
<td>2.56</td>
<td>2.47</td>
<td>2.46</td>
<td>2.36</td>
<td>+</td>
<td>.20</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>1.41</td>
<td>1.65</td>
<td>1.46</td>
<td>1.53</td>
<td>-</td>
<td>.12</td>
</tr>
<tr>
<td>b.</td>
<td>2.10</td>
<td>2.12</td>
<td>1.85</td>
<td>1.80</td>
<td>+</td>
<td>.38</td>
</tr>
<tr>
<td>c.</td>
<td>2.29</td>
<td>2.24</td>
<td>2.08</td>
<td>1.93</td>
<td>+</td>
<td>.36</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>1.93</td>
<td>1.88</td>
<td>2.08</td>
<td>1.85</td>
<td>+</td>
<td>.08</td>
</tr>
<tr>
<td>b.</td>
<td>2.15</td>
<td>2.20</td>
<td>2.00</td>
<td>2.00</td>
<td>+</td>
<td>.15</td>
</tr>
</tbody>
</table>
1. How do you perceive your role as a team member in planning and developing instruction?

<table>
<thead>
<tr>
<th>1.0</th>
<th>2.0</th>
<th>3.0</th>
<th>4.0</th>
<th>5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>very comfortable</td>
<td>slightly comfortable</td>
<td>neither comfortable nor uncomfortable</td>
<td>slightly uncomfortable</td>
<td>uncomfortable</td>
</tr>
<tr>
<td>very exciting</td>
<td>exciting</td>
<td>neither exciting nor boring</td>
<td>boring</td>
<td>very boring</td>
</tr>
<tr>
<td>completely &quot;turned on&quot;</td>
<td>&quot;turned on&quot;</td>
<td>ambivalent</td>
<td>&quot;turned off&quot;</td>
<td>completely &quot;turned off&quot;</td>
</tr>
</tbody>
</table>

Before Segment No. 1

After Segment No. 1

After Segment No. 2

After Segment No. 3
Figure B (continued)

GRAPHIC REPRESENTATION OF TABLE 4
MEAN COMPARISON RATINGS - ATTITUDE INVENTORY

2. How do you perceive planning and developing instruction as a group process?

Before Segment No. 1

After Segment No. 1

After Segment No. 2

After Segment No. 3
Figure 8 (continued)

GRAPHIC REPRESENTATION OF TABLE 4
MEAN COMPARISON RATINGS - ATTITUDE INVENTORY

3. How will team planning and development be perceived after the simulation?

<table>
<thead>
<tr>
<th>1.0</th>
<th>.5</th>
<th>2.0</th>
<th>.5</th>
<th>3.0</th>
<th>.5</th>
<th>4.0</th>
<th>5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants will use all knowledge gained</td>
<td>Participants will use some knowledge gained</td>
<td>Participants will use little knowledge gained</td>
<td>Participants will not use any knowledge gained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Planning and development will be very well organized | Planning and development will be organized | Planning and development will be slightly organized | Planning and development will not be organized |

Before Segment No. 1 | After Segment No. 2 | After Segment No. 3
As a result of the simulation experience, participants will be able to identify correctly the following planning/development elements: school goals, course goals, course objectives, alternate course approaches, learning objectives, learning objective classifications, learner characteristics and capabilities, teaching-learning experiences, instructional resource support, measuring student learning, evaluating instructional plans. This learning objective will be measured by the open end Identification of Terms test and matching questions 4 and 5 on the Problem Solving Test.

Table 5 shows a pre and post-test comparison of a percentage of the total number who correctly answered questions 4 and 5 on the Problem Solving Test. Table 6 demonstrates the pre-post mean test comparison for the Identification of Terms Test. These two tables were combined to produce an acceptable number of items to yield a confidence level for the group of questions. Figure 9 pictorially represents pre-post test mean relationships on the Identification of Terms Test.

A study of the results shown for learning objective No. 3 indicates that participants increased in their ability to correctly identify typical planning/development elements. Significance of the results was at the .01 level of confidence.
Referring to Table 5, question No. 4, it is interesting to note that while the greatest percentage increase concerns a learning objective, an increase is shown in the percentage of those participants incorrectly matching with a school goal. The investigator feels that in working with the groups and the data, it is reasonable to assert that the materials or the experience confused some participants.

Also noted is (C) question No. 4; the percentage correctly matching stayed the same. Examination of the results shows, however, that several of these participants who were correct on the pre-test, marked it incorrect on the post-test—again indicating some confusion.

This was not the case with question No. 5. Participants increased their ratio of correct to incorrect over the pre-test post-test period. This is an average 36% increase from pre to post-test.

Referring now to Table 6, the greatest degree of shift from fair to good (based on content analysis) occurred in the elements "Learning Objectives", "Learning Characteristics and Capabilities", "Instructional Resource Support", and "Evaluating Instructional Plans." The least shift took place in the elements, "Measuring Student Learning", "Alternative Course Approaches", and "Teaching-Learning Experiences." This may be interpreted to mean that of the latter elements, fewer were correctly identified, and of the former, more were correctly identified. Overall, however, there was a decided
positive increase in correctly identifying planning/development elements.
Table 5

COMPARISON PRE-POST TEST PERCENTAGE CORRECT - QUESTIONS 4, 5 on PROBLEM SOLVING TEST

<table>
<thead>
<tr>
<th>Percentage Correct</th>
<th>Sign</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.
(Read each statement and describe the level where it may be useful: school goal, course goal, course objective, learning objective.)

(a) Given the names of ten current local, state, and federal representatives from the area, describe the office held by each representative.

(b) All graduates shall be well-informed and possess knowledge about the structures, processes, and forms of government.

(c) Students will be able to function adequately in assuming a role in a mock or simulated legislature.

(d) Students will understand the legislative process of a democratic form of government.

5.
(Classify each learning objective as cognitive, affective, or psychomotor.)

(a) The student voluntarily looks for instances of good art where shading, perspective, color, and design have been well used.
Table 5 (continued)

COMPARISON PRE-POST TEST PERCENTAGE CORRECT - QUESTIONS 4, 5 on PROBLEM SOLVING TEST

(b) Following instruction in human physiology, a human skeleton, and opportunity to study and practice, the student will explain flexor and extensor muscular actions of the knee joint.

(c) The student will perform an acceptable backward dive of his choice from the diving board into the pool.

<table>
<thead>
<tr>
<th>Percentage Correct</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Pre-Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>54%</td>
<td>92%</td>
</tr>
<tr>
<td></td>
<td>69%</td>
<td>100%</td>
</tr>
<tr>
<td>Post-Test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 13
## Table 6

**PRE-TEST - POST-TEST**

**MEAN COMPARISON - IDENTIFICATION OF TERMS TEST**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Course goals</td>
<td>1.92</td>
<td>1.39</td>
<td>+</td>
<td>.53</td>
</tr>
<tr>
<td>2. Course objectives</td>
<td>2.39</td>
<td>1.85</td>
<td>+</td>
<td>.54</td>
</tr>
<tr>
<td>3. Alternative Course Approaches</td>
<td>2.17</td>
<td>1.77</td>
<td>+</td>
<td>.40</td>
</tr>
<tr>
<td>4. Learning Objectives</td>
<td>2.42</td>
<td>1.42</td>
<td>+</td>
<td>.100</td>
</tr>
<tr>
<td>5. Learner Characteristics and Capabilities</td>
<td>2.25</td>
<td>1.31</td>
<td>+</td>
<td>.94</td>
</tr>
<tr>
<td>6. Teaching-Learning Experiences</td>
<td>2.15</td>
<td>1.75</td>
<td>+</td>
<td>.40</td>
</tr>
<tr>
<td>7. Instructional Resource Support</td>
<td>2.42</td>
<td>1.58</td>
<td>+</td>
<td>.84</td>
</tr>
<tr>
<td>8. Measuring Student Learning</td>
<td>1.69</td>
<td>1.58</td>
<td>+</td>
<td>.11</td>
</tr>
<tr>
<td>9. Evaluating Instructional Plans</td>
<td>2.17</td>
<td>1.25</td>
<td>+</td>
<td>.92</td>
</tr>
</tbody>
</table>

Significant at the .01 level of confidence (greater than 13 (+) out of 15 (+) combining questions)
Figure 9

GRAPHIC REPRESENTATION OF TABLE 6
IDENTIFICATION OF TERMS TEST - PRE-POST TEST COMPARISON

Pre test - • Post test -

1. 2. 3. 4. 5. 6. 7. 8. 9.
Learning Objective No. 4

As a result of the simulation-experience, participants will demonstrate increased positive attitudes toward necessary collaborative instructional planning and development components as measured by the C.I.P.D. Attitude Rating Scale.

Table 7 displays the mean comparison ratings of participants' attitudes toward necessary collaborative instructional planning and development (C.I.P.D. Attitude Rating Scale) and Figure 10 depicts the pre-post relationships among the 22 statements on the test.

Initially, it should be noted that with 17 (+) out of the total of 22 participants, this data produced a lower confidence level (.05) than the other mean comparisons (.01). There may be more chance factors influencing this test.

First, those statements which caused an increased shift toward the negative (unnecessary) end of the scale will be reviewed. No.'s 9 and 18 were seen as being less necessary for accomplishment during a limited development period: "team member and leader understanding his own expectations and those of others before formal planning and development activities" and "instructors should reflect on the interactive, sharing aspect of team membership." These were two of the three statements on the test which directly referred to the collaborative, personal elements of working together. It might be inferred that some participants felt this personal self-development aspect should be less a part of the
"necessary" planning and developing activities than other activities. This was also apparent in observed team interactions and will be discussed in the summary.

Other less-than-positive shifts included: "major teaching-learning experiences should be determined by the team", "learning objectives should be classified", and "course goals should be developed by team." Again, it can be assumed that when some participants became acquainted with these elements (classifying learning objectives and team determination of course goals and teaching-learning experiences), they felt more strongly that these were not as necessary as some of the other elements and concepts in planning and developing instruction.

The most dramatic shifts towards necessary were revealed by "Guidelines should be used for selecting media", and "Topics within subject matter should be grouped and identified", "instructional support services and coordination of planned programs", "learning objectives written", "alternate course approaches developed", and "subject matter content decided upon."

Extremely modest change was attributed to "evaluation", "team should be oriented to P/D concepts", "P/D skills should be understood by team ", "course objectives written by team members", and the last of three statements dealing with the personal nature of working together.
Slight positive change can be detected in two statements reflecting the need for planning and development elements as readiness and skills. One other statement about need for planning and developing was supported more strongly.

Finally, it should be noted that there were seven "I don't know's" on the pre-test while the post-test contained only one "I don't know", which may be indicative of greater reinforcement for positive gains.
### TABLE 7

**MEAN COMPARISON RATINGS - C.I.P.D.**

**ATTITUDE RATING SCALE**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using your developed course with a small group of students to try it out.</td>
<td>3.13</td>
<td>2.92</td>
<td>+</td>
<td>.21</td>
</tr>
<tr>
<td>2. Developing criterion tests to measure student learning.</td>
<td>1.75</td>
<td>1.62</td>
<td>+</td>
<td>.13</td>
</tr>
<tr>
<td>3. A means should be worked out to evaluate the instructional plan produced by your team.</td>
<td>1.75</td>
<td>1.69</td>
<td>+</td>
<td>.06</td>
</tr>
<tr>
<td>4. The team should be oriented to planning and development concepts.</td>
<td>1.50</td>
<td>1.46</td>
<td>+</td>
<td>.04</td>
</tr>
<tr>
<td>5. Consideration of instructional support services and coordination of planned programs.</td>
<td>1.93</td>
<td>1.50</td>
<td>+</td>
<td>.43</td>
</tr>
<tr>
<td>6. Guidelines should be used for selecting media.</td>
<td>2.38</td>
<td>1.75</td>
<td>+</td>
<td>.63</td>
</tr>
<tr>
<td>7. Planning and development skills should be understood by team.</td>
<td>1.50</td>
<td>1.46</td>
<td>+</td>
<td>.04</td>
</tr>
<tr>
<td>8. Teaching-learning experiences should be selected and developed.</td>
<td>1.63</td>
<td>1.31</td>
<td>+</td>
<td>.32</td>
</tr>
</tbody>
</table>
9. Each team member and leader should understand his own expectations and those of others before formal planning and development activities.

10. Major teaching-learning experiences should be determined by the team.

11. Student capabilities in and out of the subject matter content area should be pretested.

12. Appropriate characteristics of the learners should be determined as they apply to subject matter to be learned and learning objectives.

13. Learning objectives should be classified.

14. Before planning and developing, the team should experience an interactive planning and development process.

15. Learning objectives should be written by team members.
<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td>Alternate course approaches should be developed and proposed.</td>
<td>2.38</td>
<td>1.92</td>
<td>+</td>
</tr>
<tr>
<td>17.</td>
<td>Course objectives should be written by team members.</td>
<td>1.56</td>
<td>1.54</td>
<td>+</td>
</tr>
<tr>
<td>18.</td>
<td>Instructors should reflect on the interactive, sharing aspect of team members.</td>
<td>1.75</td>
<td>2.08</td>
<td>-</td>
</tr>
<tr>
<td>19.</td>
<td>Subject matter content should be decided upon.</td>
<td>1.73</td>
<td>1.30</td>
<td>+</td>
</tr>
<tr>
<td>20.</td>
<td>Topics within the subject matter should be grouped and arranged.</td>
<td>1.94</td>
<td>1.38</td>
<td>+</td>
</tr>
<tr>
<td>21.</td>
<td>Course goals should be developed by team.</td>
<td>1.44</td>
<td>1.54</td>
<td>-</td>
</tr>
<tr>
<td>22.</td>
<td>The dynamics of the group interaction should determine to a great extent the success of planning and development.</td>
<td>2.13</td>
<td>2.07</td>
<td>+</td>
</tr>
</tbody>
</table>

Significant at the .05 level of confidence (17 (+) out of 22 participants).
Figure 10
GRAPHIC REPRESENTATION OF TABLE 7
MEAN COMPARISON RATINGS - C.I.P.D. ATTITUDE RATING SCALE

1.0  .5  2.0  .5  3.0  .5  4.0

Absolutely
Necessary

Necessary

Nice But
Not Necessary

Absolutely
Unnecessary

Pre test -

Post test -
Figure 10 (continued)

GRAPHIC REPRESENTATION OF TABLE 7
MEAN COMPARISON RATINGS - C.I.P.D. ATTITUDE RATING SCALE

12. Absolutely Necessary
13. Necessary
14. Nice But Not Necessary
15. Absolutely Unnecessary
16. Pre-Test
17. Post-Test
Learning Objective No. 5

As a result of the simulation experience, participants will show an increased ability to describe the major aspects of team member and team leader roles as measured by the open end Role Description Test.

Table 8 presents mean comparison scores and Figure 11 represents Table 8 graphically. Due to the small number of questions and possible personal bias of the investigator, there is a possibility of greater chance factors influencing the results. It would be expected that following a three-day experience with others, interacting in a close team relationship, a participant would be able to articulate more factors about team membership and leadership than prior to this experience. Thus the result of this objective is almost redundant in nature. In retrospect, this objective is very weak and probably should be rewritten to demand a higher level of cognition.
TABLE 8
MEAN COMPARISON SCORES
ROLE DESCRIPTION TEST

<table>
<thead>
<tr>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.83</td>
<td>1.25</td>
<td>+</td>
<td>.58</td>
</tr>
</tbody>
</table>

1. Describe major aspects of the role of team members in planning and developing instruction.

<table>
<thead>
<tr>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Sign</th>
<th>Degree of Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.92</td>
<td>1.42</td>
<td>+</td>
<td>.50</td>
</tr>
</tbody>
</table>

2. Describe major aspects of the role of team leaders in planning and developing instruction.
Figure 11

GRAPHIC REPRESENTATION OF TABLE 8

MEAN COMPARISON SCORES - ROLE DESCRIPTION TEST

1.0  2.0  3.0
Good  Fair  Poor

Team Member

Pre-Test

Post-Test

Team Leader
Learning Objective No. 6

As a team member, participants will produce a plan for instructional development, and develop a pilot course segment. This objective will be measured by the quality and appropriateness of written materials produced.

In attempting to relate tasks and materials produced to this learning objective, it was first necessary to determine the criteria for what should constitute the plan and pilot course segment and secondly to comment on the efforts of each team in producing a plan and pilot course segment.

The criteria for plan development was contained in the three forms, A.(Planning Development Elements Chosen for Use), B (Role Holder Functions List), and C (Instructional Development Plan). Successful completion of C depended on B, and B upon A. A careful review of the forms submitted by each team indicates that all three teams produced acceptable plans. The major differences lay in the quantity and quality of the "plans" produced. Where Team II developed a comprehensive instructional development plan (Form C), Team I produced a detailed flow chart showing relationships of subsystems to each other. Team III did not produce the more detailed plans and forms, seemed less task motivated than the other teams, and preferred to devote team meeting time to discussion about the topics and planning/development elements.

The pilot course development segment proved to be quite
involving for all three teams. Using the consultant available, Team I worked as a group to write course objectives and learning objectives, while Team II worked on defining instructional resources and support. Team III discussed, developed and produced a paper which attempted to spell out in detail the learner characteristics and capabilities needed for Nursing 24. None of the team members worked on individual tasks (as the listed functions would indicate), but instead all three teams labored together on common rather than separate functions.

**EVALUATION FEEDBACK AND GOAL ACHIEVEMENT**

A close scrutiny of the evaluative feedback from the initiation simulation-experience should provide some answers as to the adequacy of the collaborative instructional planning and development model and the relevancy and usefulness of the simulation as an abstraction of the model.

Two major questions must be addressed as the results of the simulation exercise and its ramifications are discussed: 1) "Did the simulation experience do what it was supposed to do?" 2) "Was the simulation experience relevant and useful in orienting and training teams of educators in instructional planning and development?"

Did the Simulation Experience Do What it was Supposed To Do?

Five of the actual design components (from purposes of the study No. 3) will be reviewed and supplemented by par-
Candidates' comments following the simulation in this summary section:

a) Gain an understanding of the development process.

The three segments were designed to improve understanding on an introductory, then depth, approach. Some of the comments about COLLABO were:

"good means for having us scan quickly through the contents of the notebooks so we got the general idea."

Beginning with COLLABO, the teams had to use terms and concepts relative to planning. Another comment was:

"I think this will have longer lasting benefits."

A comment pertinent to understanding was:

"I'm concerned about actually preparing a course and when I think of how much time it took us in the team..."

b) Try out interacting with others and confronting issues in planning and developing instruction.

This purpose was met through the design of the simulation experience in structuring face-to-face interaction with the planning and developing concepts. Some of the participants expressed the feeling that the simulation exercise was purposefully structured, "It was all there in the memos and notebook—all we had to do was interact." A suggestion was made several times that the participants should have had the planning/development modules for study prior to the workshop.
"We were able to set our own limits with­in the limits set by the deadlines— we could move at our own pace, too; this got us much more involved."

One of the comments made about the simulation exercise was "don't you think it helped us in assessing each other?"

c) Exercise Planning and Development Skills.

One of the participants reported that she felt that the course development segment was "the most important of all."

"We spent quite a while haggling over what is a course goal, objectives, etc.; I feel better able to make that delineation now--I don't have to struggle so; these ideas can be accelerated by use, as part of the process."

In answer to the question, "How can you use this experience", one participant said:

"This was an organized, sure way to get at course planning. I know better what to look for now. This simulation experience has given me more concrete useful stuff than I got in curriculum courses in graduate school."

Another said:

"I hope we will be able to utilize the techniques we learned here."

d) Identify Important Obstacles and Problems.

It cannot be known how much was internalized and not reported in group discussion about this objective. However, several comments hint at this area:
"I think we can use the information from this simulation to better evaluate our courses—something we have not been doing."

Speaking of the plan development (second segment), the following comments were heard:

"That was a frustrating experience, I think. I feel like we had an awful lot to do in a short period of time. If we had just a few sections to do; but I felt that we had to do it all."

(Others agreed with her here)

"I felt a lot of pressure on us."

This, of course, was what the design intended; to extend the feeling that instructional planning and development could be frustrating and complicated.

Many of the teams felt that they had to accomplish or include all of the elements. Hopefully, more discrimination would be shown during actual development. This may well be a weakness in the simulation design. Participants were given deadlines; they had to produce. It was felt that with limited time, elements considered less important would not be included in their plans. This did not happen; instead, participants wanted to use all elements.

e) Create and evaluate an instructional development role for themselves.

In connection with Form B (Role Holder Functions List) participants were asked to determine role holder functions for themselves and others on the team. This activity was
conceived so that team members would have some experience in trying to perceive what other members' roles should be, and to bring these out in the open for discussion. When this was explained to team members (during the simulation) many of them balked at individually determining others' roles. Many wanted to do this as a group. However, the investigator stood firm on this point and asked that team members perform this task individually rather than as a group.

Comments about this issue were: "It was repetitive, with our group knowing each other's strengths and weaknesses so well; we could just as easily do it on a face-to-face basis." The suggestion was made to "perform a detailed analysis of our own role and critique it with the group", as an alternative to perceiving others' roles. Another mentioned: "We kind of superficially talked about role playing and assigning roles, but we didn't really get down to real roles."

These statements and the comments about roles seem to the investigator an avoidance of the personal aspects of role holding. Participants appeared wary of discussing the personal attributes of individuals in connection with what role holder functions would be best for another. The group expressed upon many occasions during the three days how closely they worked together, but it is doubted that the group has ever worked together on a personal level where one's needs, personality and other internal, human behavior
and beliefs are discussed openly and honestly in connection with group tasks and group "life".

Reflecting the role perception aspect, one participant remarked, "this (part of the simulation) was not a good simulation for me because if someone else was really deciding my role, I would have been much more emotional; I would have really cared and fought tooth and nail."

Another participant found that discrimination among kinds of behavioral acts for role holders was of assistance to her:

"One of the most helpful things on that (Form B, Role Holder Functions List) was the decisions on Technical Work Acts, Decision Making Acts and Communication Acts. I enjoyed working with that area; it gave me considerable direction."

As this study seems to indicate, the use of simulation as a method of orientation and the initiation-readiness provision seems well suited to the intentions of the model and to the intentions of the educational group. Closed loop operational specifications were appropriate to the simulation.

The face validity of the simulation seemed to be in a constant state of flux between the real and non-real world. The investigator has the impression that while participants were directly involved in the activities, it was real to them.

The role perception directive was seen as unreal by
some participants. The duration of three days seemed to fit the circumstances presented by the School of Nursing.

The modules, containing information for the participants should have been presented to participants before the simulation experience. This would have given them an opportunity to become familiar with the ideas and would have extended the cyclical learning approach.

There is no sure answer to, "did the simulation do what it was supposed to do?" After reviewing the taped comments, the investigator was somewhat uneasy. It is true that most of the verbal comments were positive; but it is to be expected that there were unexpressed negative feelings. If one can believe non-verbal expressions, not all the participants were as positive as the above comments indicate.

The question above is answerable in group terms, as yes, it did do what it was expected or designed to do.

Was the simulation experience relevant and useful in orienting and training teams of educators in instructional planning and development?

The learning implied in this question consisted of both cognitive and affective outcomes.

Cognitive Outcomes

Learning objectives 1, 3 and 5, and the tests devised to measure achievement of these objectives (Problem Solving, Identification of Terms, Perceived Competency Rating Scale, and Role Description) were planned to assess group gain
through examination of group mean pre and post-test scores. The learning objectives assumed a positive gain would be made by the group in cognitive outcomes. Results of the evaluation data from tests of learning objectives 1 and 3 clearly indicate a decided positive gain by the group significant at the .01 level of confidence.

In reconsidering learning objective No. 5, it is apparent that the objective and accompanying test is too weak and simplistic to be good evaluation data. It is useful as supplementary information, but should not be taken seriously.

The cognitive outcomes were achieved. It was noted on the C.I.P.D. Attitude Rating Scale and Perceived Competency Rating Scale that negative shifts (both affective) took place when referring to "classifying learning objectives" but when asked to actually classify learning objectives (No. 5 on the Problem Solving Test), an average .36 positive gain was achieved. This seems to point out the overlapping differences between cognitive and affective domains of learning and serves to reinforce the occasions when it must be realized that it is indeed difficult to separate the two as learning outcomes.

Affective Outcomes

Learning objectives 2 and 4 and the tests devised to measure achievement of these objectives, the Attitude Inventory, and the C.I.P.D. Attitude Rating Scale, were planned to evaluate group gain through an examination of pre-test and post-test ratings. Less positive gains are noted on the
attitudinal measures in comparison with cognitive measures.

However, the general impression is that positive gains were scored by the group. These gains were not as significant nor as strong as the cognitive gains. Two insights may be associated with this lesser positive gain.

1) By being more selective about which planning/development components were more and less necessary, participants were acting on the basis of the "experience" they had had and as such were being more selective. Consequently, there is probably a more positive gain than is testable.

2) Participants indicated they felt much more comfortable, and somewhat more excited, turned on, and successful at the termination of the simulation, but were less sure of the simulation experiences' eventual impact (negative gain or "it may work") and slight gains on the "future" of collaborative instructional planning and development.

Very simply, it can be said that the learning objectives were achieved by the participants. For the group selected, the pilot of the initiation simulation experience was relevant and useful as demonstrated by the achievement of the learning objectives.

The overriding need was for participants to develop a process, a procedure, that provided the experience, "This is what it may be like."

Participants in the simulation experience were able to generally gain an understanding of a total development pro-
cess, try out interacting and confronting issues and exercise planning and development skills. It was felt that identifying important obstacles and problems and creating and evaluating an instructional development role for themselves as purposes were only partially achieved.

It may be unrealistic to assume that, in addition to orientation and skill development, participants will also have time to formally identify important obstacles and problems. Intuitively, these concerns become recognizable as experiences occur. As a formal purpose, though, expectations for such observations are probably not warranted.

Resume of Goal Achievement

Using the evaluative information in this chapter, it can be concluded that some of the initiation simulation-experience goals were achieved and some were not. The congruency between data describing specific group learning outcomes and the goals for the simulation-experience were examined. If agreement is reached upon performance achievement, agreement will ascertain attainment also of the goal (Mager, 1972, p. 11).

Following is a resume of goal achievement:

1) Achieved: General experiences were provided for preparing and engaging in interactive instructional planning and development by the initiation simulation-experience as was the provision of a situational base for collaborative instructional planning and development.

The simulation participants were helped to: understand
the context and processes of instructional development, experience some of what may be required to become a skillful developer and begin an understanding of tactics of planning and developing in group settings.

2) **Not Achieved**: A methodology for the analysis of the situational base within the initiation simulation experience which was supposed to aid participants in understanding the effect of individual behavior and group interaction on planning and development activity. In addition, the simulation participants were not helped to understand evaluation.

**Summary**

This chapter has presented the evaluation design and pertinent issues and expectations for the results. An interpretation of the test results that supported each learning objective was discussed with additional data in chart and table form. Evaluative feedback from the simulation participants was categorized to address two questions: 1) Did the simulation-experience do what it was supposed to do? and 2) Was the simulation useful and relevant in orienting and training teams of educators in instructional planning and development. The chapter concluded with a resume of initiation simulation experience goal achievement.
SUMMARY AND DISCUSSION OF THE FINDINGS

SUMMARY OF THE STUDY

This study originated out of the need for realistically orienting and training educators in group instructional planning and development. The orientation and training of educators in planning and evolving instruction with others has only recently been seriously attempted (Jung, Pino, Emory, 1970). Many reasons for this prevail but two are immediately current: 1) Traditionally and procedurally teachers have often worked unassisted in preparing instruction, and 2) an adaptive but well-defined sharing experience for designing and evolving instruction meaningful to differing educator groups is not in general use. Simulation, as a means of orientation and training was seen as a way to involve educators with what could become their own problems, while working with others in planning and developing instruction.

Although the major intention of this study was to develop and substantiate a simulation-exercise for use in orienting and training educator groups in instructional planning and
development, further purposes necessitated the following objectives: to define and prepare a model of collaborative instructional planning and development; to construct an adaptive simulation-exercise of collaborative instructional planning and development which would enable the participants to gain an understanding of the total development process; try out interacting with others and confronting design and development issues; exercise planning and development skills; identify important obstacles and problems; and create an instructional development role for themselves and to obtain evaluative feedback to be employed in determining the relevancy and usefulness of the simulation-exercise and the adequacy of the collaborative instructional planning and development model.

A review of the literature provided a state-of-the-art definition of instructional planning and development relative to the change process in educational development. An approach to educational change was suggested through the description of collaborative instructional planning and development as a human process, and through its substantive and group dimensions.

An examination of related simulation literature provided a perspective on instructional simulation through a gradually narrowing focus on definitions, use of simulation in education, simulation in pre-service and in-service education, research on instructional simulation learning out-
comes and, finally, dimensions and issues of technical simulation design.

Since instructional planning and development was found to exist mostly in the symbolic world, the overall procedures involved in redimensioning conventional instructional development were discussed. These methods included an examination of the following factors occurring in the real or symbolic world: Real world activities produce data and instructional development rationales which in turn have produced symbolic models of instructional development.

Because of the inappropriateness of the conventional instructional development symbolic models in fitting the intentions and purposes of educational systems, a redimensioned symbolic model, collaborative instructional planning and development was devised. Collaborative Instructional Planning and Development as a four-phased process was described: 1) Initiation, 2) Planning, 3) Development, 4) Consolidation. A rationale for the collaborative instructional planning and development was viewed as more consistent with common intentions and purposes expressed by educators.

In order to discuss collaborative instructional planning and development as a redimensioned symbolic model, the initiation phase of collaborative instructional planning and development, containing the major elements of team planning and development, was selected to be designed and
developed as a simulation experience introducing and orient­
ing educator teams to planning and development prior to this "new" accomplishment in real life.

The redimensioned symbolic model was examined and those components whose idea form and activities should be a part of the initiation simulation were chosen. A participant group was found and the collaborative instructional planning and development components were carefully interwoven with the specific in-service training intentions of the client group through a comprehensive simulation design.

Performance objectives and accompanying criterion test items were written. Materials were developed for the simulation experience, which took place over a three-day period. Sixteen participants were involved. A cyclical approach (introduction, practice, application, feedback, re-introduction, study, application, assessment) was used to structure the internal simulation learning experiences. The simulation experience itself was sub-divided into three segments: Introduction, Producing a Plan for Development, and Development of Course Plan.

A pre-test for both cognitive and affective learning objectives was administered to determine the baseline achievement levels of the group one week prior to the simulation experience. A post-test was administered immediately after the simulation to ascertain achievement of the group. In addition, a short attitude questionnaire, consisting of
three questions with 2 to 3 statements each dealing with role, group process and future faculty use of planning and development was given before the simulation and after each segment of the simulation.

A mean score for the group was computed for each question on both pre and post-tests, and all four administrations of the attitude questionnaire. Mean comparisons were made visually, numerically, and statistically, using the sign test for setting a confidence level. Since the learning objectives assumed an improvement in performance and attitude, a positive gain criterion was used.

Results of the evaluation disclosed overall positive gains or improvement, indicating that each learning objective was achieved.

In considering the question, "did the simulation-experience do what it was supposed to do", participants' comments were positive concerning the following purposes: gaining an understanding of the planning-development process, try-out interacting with others and confront issues in planning and developing instruction and exercise planning and development skills. Participants were not able to positively articulate an evaluation of their "new" role in planning and development. Analysis of role holder functions of others by others was resisted by participants and was the least successful of the simulation experiences.

In answering the question, "was the simulation experi-
ence relevant and useful", both cognitive and affective measures indicated positive gain toward achievement of the stated objectives. Attitudinal outcomes gained were not as significant nor as strong as cognitive outcomes gained.

These achievements are indicative of learning which has occurred through means of the initiation simulation experience, and thus authenticates the collaborative instructional development model not only in the symbolic world, but in the real world as well.

**DISCUSSION OF THE FINDINGS**

The problem, at which the efforts of this study were aimed, consisted of an attempt to fill an essential need in the experiences of educators called upon to plan and develop instruction through application of group instructional planning and development activities and procedures. It was thought that these needs could be best met through a simulation-exercise necessitating group interaction around a focus of instructional designing and developing.

The process of instructional planning and development is an emerging, growing field at present. A state-of-the-art review revealed models, rationales, and program implementations which were the most current in instructional development.

A classification of the constituent characteristics of instructional design and development seemed to be called
It was found that instructional planning and development is:

1) A human process, infused with human purpose and intent, using systematic organization for maximizing effectiveness;

2) Substantively dimensioned, consisting of what to instruct, how to instruct, and whether expectations were achieved;

3) Put together like a composite, it is differentiated by a mixture of intentions, context and selection of the substantive elements by those who are responsible for developing;

4) Often the result of team efforts; the planning and creating of instructional methods and materials is a function of group interaction.

The parameters of instructional planning and development are bounded by these four characteristic constituents.

One of the purposes of the study was to define a model of collaborative instructional planning and development. A model restructured and newly dimensioned was created to interrelate the scattered knowledge of instructional development. Through classifying its primary traits, the organization of instructional planning and development was an important first step toward attempting to define or label the field. The recognition of the blending of the characteristics is a means for the interactions and behavior of people
working together to emerge as a process.

The Initiation Issue

Substantively, the designing, developing and piloting of the Initiation or orientation phase as a pre-condition for real group planning and developing of instruction was one of the main tasks of this study. Reports in the literature indicated that the pre-involvement orientation function of instructional simulations is expected but understated as a task of the simulation experience. The following researchers have emphasized the pre-involvement or initiation function of a simulation: Ohm (1971), Garvey (1971), and Twelker seem to champion the transfer of training approach (from the simulated to the real experience), whereas the work of Cruickshank and Broadbent (1970) in teacher education and use of the UCEA materials in administrator education (Blough, et.al., 1971) supports directly the concept of initiation as a simulation task.

Initiation, or involvement in collaborative instructional planning and development, as a pre-condition, was validated in this study. Findings revealed that the three stated purposes related to initiation (gaining an understanding of the development process, trying interacting with others and confronting issues in planning and developing instruction) and exercising planning and developing skills were met by the great number of positive verbal comments about these purposes. Examination of the instructional plans and
course segments produced by the group evidenced a direct cognitive experience. More discrimination in selecting "necessary" instructional planning and development components was shown by participants during the post-test.

The investigator's observations also indicated that initiation was accomplished. Simulation participants had been involved, felt oriented after the simulation, and had grasped some of the knowledge necessary for planning and developing instruction. However, they were not trained in the sense that they possessed all the skills necessary to design and create instructional materials and methods with others.

Revisions of the initiation simulation experience and further attempts to substantiate the collaborative instructional planning and development model could result in the following improved design:

1) Pre-test control and experimental groups.
2) Give planning and development modules to experimental group participants before the simulation.
3) Revise simulation over a longer period of time, but with shorter periods of scheduled interaction (a two or three week period, four or five hours a day).
4) After the simulation ends, plans should be readied for actual instructional planning and development.
5) Post-test control and experimental groups.
6) Both groups should become involved in real instructional designing and developing in small groups.

7) Continue comparison testing of both groups throughout the Planning, Development and Consolidation phases of the model as applied to the actual activities of the groups.

Through long range evaluation, the essential appropriateness and usefulness of the initiation simulation experience may be seen in detailed retrospect. Process and product evaluation, measuring knowledge and attitudes affecting self, the group, the learners and the instructional products devised, are necessary in determining the eventual effect of the pre-involvement initiation experience.

The Psychological Reality Issue

Two kinds of reality settings, physical and/or psychological, are necessary for simulations to "act like the real thing" (Twelker, 1969), (Cruickshank & Broadbent, 1970). Physical and psychological reality can be manipulated by simulation developers. Most often physical reality is manipulated (Twelker, 1969). In this study, psychological reality was emphasized. The participants were close to a real situation by being themselves in their own environment; however, they were not ultimately responsible for a real product.
The simulation environment was induced through a minimum of physical realia and a maximum emphasis on the "real" situation. The course which the participants were asked to develop was one which had to be developed sooner or later. Participants were familiar with the subject matter content of the "course" to be developed. Other participants and the environment were well-known to participants.

Meeker speaks of varying psychological reality as "changing the rules of the real world" (1969, p. 7). If this is true, then for the initiation simulation experience the rules were slightly rearranged. When rule change occurs, the responsibility influence is altered. These opinions were concurred with through the findings of this study.

The results of the study demonstrated that the experience had parallel mental fidelity as simulation participants seemed to move in and out of psychological reality, feeling needs and pressures to "get it done" at times; and, at other times, balking at deadlines (physical reality) or suggestions from the investigator (non-simulation reality).

Little research has been attempted in dealing with the issues presented by psychological reality. This is evident by the findings of this study which agrees, although conversely, with Cruickshank and Broadbent's (1970) method of determining realism. This was simply accomplished by paying less attention to producing realism when less precise behavior of participants is expected. While actual description
of what psychological reality is was not found in this study, nor in the literature, the investigator feels that this study demonstrated the feasibility of planning for, employing and finding evidence of reality which were not physical, but subjective in nature.

A vital need exists for the use of simulations, rooted in psychological realism, such as described in the RUPS in-service materials (Jung, Pino, Emory, 1970), which could enable educators to come to grips with understanding relationships that can occur between themselves and others. This form of simulation could lead to discussions and encounters emphasizing personal growth and individual development and improvement of interpersonal communication. With the focus on the work task, understanding of and ability to use interpersonal processes becomes primary.

The Role Issue

It was one of the purposes of the simulation experience to allow role differentiation to occur through participants "creating and evaluating an instructional development role for themselves." The investigator observed that some participants "played" the role of developer with some reluctance, whereas others seemed to enjoy it. A trend was found which indicated that participants seemed to be less sure of their role during the middle segments of the simulation experience, but at the end they seemed more confident of "role"
than before the simulation.

However, Havelock (1971), puts into perspective the concept growing out of role differentiation role holding by referring to the interactive aspect of holding a role: "functions maintained by shared expectations about the role holder and the manner in which the role is to be acted" (Havelock, 1971, p. 2-25).

The findings on the C.I.P.D. Attitude Rating Scale indicated negative feelings on two out of the three items dealing with role holding as the personal nature of working together.

The investigator observed that most of the members of the teams in the simulation avoided discussion of the personal aspects of role during group activities. This evidence seemed to add to Twelker's (1969) assertion that transfer from the simulation situation to the real life situation has a different sort of effect on those whose simulation role is the same in real life than those who are role adopters. Activities related to the personal aspects of role holding was an experience in the simulation when the psychological reality became too real for participants to accept.

Creating and evaluating a "new" role for themselves should occupy a greater expenditure of time and activities within a revised initiation simulation experience. Since many of the participants tended to avoid these personal encounters, more pre-involvement personal encounters should be
built-in as part of the simulation experience. The investigator believes that "experiencing" should reflect more effect than was demonstrated in this pilot study.

A method of building in more feeling experiences might be used initially to simulate role differentiation and perception of others' roles by participants viewing filmed episodes or reading narrations and then assigning functions to the fictitious persons. Participants could then list functions he could best accomplish in the simulated situation and lastly list functions for others on his team.

This procedure could provide a better base for group discussion of the personal aspects of role holding encountered in feeling states.

The In-Service Issue

The application of simulation experiences in the in-service training of educators has been described by Blough, et.al., (1971) Cruickshank (1971), Twelker (1971), and Wegenke (1971). Similarly, simulation techniques were used in the present study as an in-service training experience. However, the simulation techniques applied in this study differed from those used by the investigators previously mentioned in one significant way. Support materials for the simulations mentioned above set the stage for physical realism, whereas the present study attempted to deal with psychological realism. Positive gains on all the learn-
ing objectives of the simulation experience supported evi-
dence reported elsewhere that simulation is a viable
instructional tool in the process of in-service education.

In planning and developing the simulation experience,
the investigator used simulation fabrication guidelines not
in a step-by-step fashion, but as one might use a map.
Having experienced the procedure of designing an instruc-
tional simulation, the investigator is certain that guide-
lines are helpful if one does not attempt to meet every
requirement stated in the procedural steps, but is flexible
and creative in his use of the suggested procedures.

The Design Issue

A few instructional simulations noted in the literature,
Dillman (1969), Cruickshank (1970), Wegenke (1971), used
performance expectations as evaluation criteria. However,
not one study was found in which learning ob-
jectives functioned as signs of achievement of learning
outcomes. Although performance objectives were listed for
these studies, they were typically not applied as measure-
ment indices when the simulation was evaluated.

In the present study, the investigator used a pre-test
to set measurement baselines indicative of the expected
learnings expressed by learning objectives. Following the
simulation pilot test, post-test measures were obtained. A
greater amount of confidence could have been placed in the
results had an experimental control group design been adopted for this study.

The investigator assumes that since the process of designing and developing the initiation simulation experience for a specific educator group was successful, pursuing a similar development process would provide almost any faculty with a successful simulation experience. The development process is as follows: Prior to simulation design general initiation simulation criteria was written. Next, components whose idea form and activities are an important part of the simulation were abstracted from the collaborative planning and development model and grouped into a presumptive structure. A careful study of the selected faculty, their environment and intentions and purposes was accomplished. Meshing the initiation simulation criteria and the presumptive structure with faculty needs and expressed purposes produced initial decisions upon which the simulation was planned.

Each initiation simulation experience should be custom designed for the specific educators, administrators and teachers, associated with a particular school or institution. In redesigning the simulation experience for other educator groups one important criterion is necessary. The educational institution should have progressed through curriculum development, so that school goals, and a tentative course or unit scope and sequence, outline, or summaries of
past courses are available to the person who would rewrite the materials used to give face validity to the simulation experience. The materials should be rewritten to reflect specific group environments, names, dates, references to courses, etc. The forms need not be revised.

It may not be wise to use the collaborative instructional planning and development initiation simulation experience with educators from schools that have not revised curriculum or engaged in recent curriculum development. Goal setting and curriculum development and planning usually precedes instructional development. Teachers who most often participate in instructional development do not always share in curriculum development or revision activities.

Simulation shares some commonalities with other mediums of instruction. Two of these factors are: 1) simulation, like other forms of instruction, can be designed to produce research data, and 2) most instruction is not designed to be researched. Research and instruction have differing objectives, which are often difficult to resolve. The investigator shares with Cunningham (1971) and Beck & Monroe (1969) the opinion that more attention to evaluating educational simulation is needed. As implied earlier, measurement of expected learning outcomes would greatly assist research on instructional simulation; this opinion was substantiated by this study.

In the simulation exercise, by examining team instruc-
tional plans and observing team work sessions, the investiga-
gator found that the teams using systematic approaches to
designing and developing seemed better able to communicate
their intentions, plans and procedures to each other and to
the group, seemed more secure in discussing and reporting
their efforts, and seemed to have deeper group consensus
than the group that unconsciously rejected the use of sys-
tems techniques.

This evidence seems to recognize the enhancement of
the human factor in systems technology alluded to by Hamreus
(1968) and Kemp (1971). Systems methodology, emphasizing
interrelationships among parts, can expose the hidden chan-
nels of communication, thus contributing to greater human
understanding of task related messages.

Other Issues

The results of a short attitude inventory administered
before, during, and after the simulation, reported that par-
ticipants exhibited a positive trend in becoming more enthu-
siastic, confident and comfortable about planning and devel-
opng instruction as a group process.

Simulation literature literally abounds with related
findings (Cherryholmes, 1966), (Lee and O'Leary, 1971),
(Garvey, 1971), (Twelker, 1969), (Cruickshank & Broadbent,
1970). Little help is available from the research litera-
ture, however, when one attempts to discover how these
Positive attitudes are used to affect later real world performance. No follow-up studies have been reported.

Positive increases in cognitive outcomes were also noted in this study. One follow-up study was conducted by Gaffga (Cruickshank, 1971). He found that participant behavior in the simulation was consistent with later behavior.

The increase in positive feelings and knowledge reported could be capitalized upon by beginning real instructional planning and development with the simulation participants soon after the Initiation phase (the simulation). If a lengthy span of time separates the simulation experience from real planning and development activities, much of the eagerness and optimism about the process will have been blunted.

Diffusion of innovations is part of the change process in education (Havelock, 1971), (Rogers & Svenning, 1969), (Lippitt, 1965), (Guba, 1968). Communication greatly assists the diffusion of new ideas and skills (Rogers and Svenning, 1969). In the opinion of the investigator, as a method in the diffusion of innovations, the initiation simulation experience offers the potential power to be effective.

The heart of the diffusion process is human interaction, coincidental with the initiation simulation experience, in which new ideas are communicated. The dimension of time, as applied in the simulation experience herein reported could assist the diffusion process. Time is required
for an individual to pass through a decision making process, from knowledge through adoption or rejection or adoption or rejection of parts of the innovation. Human interaction, new ideas, communication and time are found in the simulation experience and might produce the effect of orienting the staff to innovative approaches.

The Personal Issue

As a final comment, the investigator affirms that he has enjoyed a kind of self-growth through the experiences of designing and developing the collaborative instructional planning and development model and simulation exercise. Within this study, the development of a development has taken place. Since the initiation phase of the collaborative instructional planning and development model was designed to be exemplary of the total process, it is evident that the collaborative instructional planning and development process is viable and can exist not only in the symbolic world but in the real world as well. Through a micro-version of the redimensioned model, the investigator contends that he has moved a model of a process from the symbolic world into an application in the real world.

In accomplishing this task, the investigator feels as though he has journeyed rapidly through his own four stages. Using Guba's (1968) development rationale, the investigator accomplished the following: depicted the state of affairs,
identified needs and problems, created potential problem solutions, fabricated part of the problem solution, and tested the problem solution in a real situation. Traveling intellectually and interacting with his ideas and those of others, the investigator has progressed to the consolidation phase of collaborative instructional planning and development by understanding and applying the force of words and actions as change dynamics. He invested his time, talents, resources, and, through the process of development, became a developer. Through this evolutionary process, the developer developed a product, not only symbolic, but real, as he came closer to knowing his own feelings, with a purpose for becoming.

RECOMMENDATIONS FOR FURTHER RESEARCH

This study uncovered some problems which need to be pursued by further research. The most urgent and demanding of these are listed below.

1) The problem of needed research on defining, developing and predicting expected outcomes of learner behavior. This is necessary before a real measure of specificity can be stated in learning objectives by developers of instructional simulations.

2) The problem of temporary positive shifts in feeling states during and after a simulation experience.

3) The problem of the effect of initiation as a pre-
condition on three variables mentioned in the collaborative instructional planning and development rationale: a) the instructional materials and methods produced by individual team members, b) the personal self-growth experienced by teacher-developers, and c) the degree and kind of learning improvement attained by students.

4) The problem of determining the relationship of the kind of psychological reality experienced to the amount of positive transfer from the simulation to the real performance. Follow-up studies are needed during related post-simulation periods.

5) The problem of experimentally determining the place of simulation as an initiation experience in the training of persons called upon to plan and develop instruction, compared with other instructional methods.

6) The problems associated with dynamics of group interaction in simulation experiences such as, blocking of group ideation by one or two participants, the effect of non-directive behavior as a method of handling conflict by group members, domination of the group by several members, and the varying degrees of involvement of persons on simulation teams compared with later, real world planning and development group behavior.

7) The problem of determining the differential learning outcomes of individuals following simulation experiences.

8) The problem of how to increase emphasis on an in-
individual's personhood as a group member while involved in a simulation experience.

9) The effect of accountability in instructional planning and development. Instructional planning and development should not be in a position to pass judgment on itself and yet it cannot operate in isolation from the organizational setting.

10) The problem of measuring role holder performance functions of instructional planning and development in order to comprehend, predict and modify the behavior of team members and team leaders.

11) The problem of preventing collaborative instructional planning and development from becoming "theorizing". Research is needed to ascertain the generalizability and usefulness of the collaborative instructional planning and development model in other educational settings and levels.

12) The problem of experimentally determining whether any prepared faculty or educator groups could profitably use the collaborative instructional planning and development model.

13) The problem of experimentally determining whether the initiation phase is necessary to perform or predict any one or all of the following collaborative instructional planning and development activities mentioned in the rationale for collaborative instructional planning and development.

a) Facilitate increased group direction and harmony.
b) Evolve more motivated developers who create relevant instructional methods and materials.

c) Improve student learning and enhance the developer's own personal and professional life.

IN RETROSPECT

The groupness trend is a fact of life today and in education it seems to be assuming huge proportions. Will the need for involvement and groupness bring with it faceless monolithic teacher organizations? Or will concerned small groups deal realistically with each other and the consequences produced by newly perceived local issues? Or will improved collegial relationships in coordinating communication in designing and evolving instruction result from the individual's growth as a developer?

We must continue the search for the medium for face-to-face personal confrontation; the affective, as well as the cognitive growth of the individual learner and teacher. Collaborative instructional planning and development may provide the means for this sort of encounter.

Change occurs over time. There is a consolidation period for most experiences. How this reflective period is handled by others significant to the individual determines how the person will feel about the experience later. If positive "vibrations" are present, future development and
change may occur. It was interesting to note in the study just concluded how the positive learning objective gains clashed with the up-tight future predicted use of planning and development ideas. It was as if the participant group was saying, "this is fine now, but the future is uncertain."

There is no doubt that slow, evolutionary change in education will continue. It is evident from the results of this study that the designing and developing of instruction can be a shared experience in which people change.

It is hoped that what was accomplished in this study was the illumination of an uncertain new area in education. With the brightening of the dark corners, perhaps developers to come will be able to see in the future the promise of improving and facilitating student learning through the growth of the individual developer.
APPENDIX A
SIMULATION MATERIALS
MEMO

To: Nursing 24 - Teaching Team  
Re: Course Planning and Development  
From: Inez Moore, R.N.

Date: May 31, 1972

As you know, one of the courses in the new curriculum, Nursing 24 (Conceptual, Interpersonal and Technical Skills in Nursing) has been assigned to you to plan and develop as a team.

An outline of the subject matter content topics is attached. You will need to gather subject matter resource materials for your use prior to course development.

To help assure orderly progress toward summer, 1974, when the course is to be taught for the first time, the curriculum committee has decided on these broad guidelines for your team to follow:

- Complete preparation of Instructional Plan
- Complete written assessment of Course Development Workshop
- Teaching Team assessment report to faculty
- Complete Course development
- Complete pilot test of course, and evaluation of results
- Complete course revisions and be ready to teach

To help you meet your first deadline, I further suggest that you try to complete each of the activities listed below by the date shown.

CAPITAL UNIVERSITY - COLUMBUS, OHIO 43200
MEMO

To Nursing 2A, Teaching Team  
From Inez Moore, R.N.  

Date May 31, 1971

Course Planning and Development

2 October, 1972

Submit to the Instructional Development Center, Form "A" showing the Development Elements and Sub-elements that you as a team have agreed to deal with in your Plan and subsequent development. Of course, it is understood that these may change some as you proceed. Because some concepts and skills in instructional planning and developing will be new to you, a notebook has been provided for your reference as you work on this course. The major planning/development elements as well as sub-elements are discussed in each module in the notebook. (3:00 pm Wednesday, May 31, 1972)

6 November, 1972

Submit to the Instructional Development Center, Form "B" showing the Functions of each Role Holder on your team. This must be accomplished by each team member (and team leader) first filling out Form "B" for themselves and for other members of the team. These forms should be brought to a team meeting. Using and considering each individual team member's Form "B", the team should come up with a group consensus regarding role holder functions which will be recorded on a Form "B" and submitted. (11:00 am Thursday, 1 June)

8 January, 1973

Report to the Faculty on the development system and plan that you have devised. The system may be presented on large chart paper; Form "C" is provided for your plan. You will have fifteen minutes for this report. (3:00 pm Thursday, 2 June)

Included with this memo you will find a few copies of each form, and an example of how each is to be used. You will probably need additional copies; these are available in the Instructional Development Center.

CAPITAL UNIVERSITY - COLUMBUS, OHIO 43209
MEMO

From: Inez Moore, R.N.
Date: February 8, 1973

To: Nursing 24 - Teaching Team

I want to complement the Nursing 24 Teaching Team on the excellent plan you have devised. In order to best carry out your development system, and in response to your requests, beginning 13 February through 15 February the Nursing 24 Teaching Team will be provided released time from your normal teaching duties to participate in a Course Development Workshop.

Those three days will be yours to use your plan to develop a selected, small segment of your course. Developing a small part of your course should provide a good opportunity for team members to try out their functions and for consultant assistance and evaluation. Please do not hesitate to ask the Instructional Development Center for help at any time during the Workshop.

One of the most important things you can try out, as a team and as individuals during the Workshop, is how well your system will work.

As a result of your efforts, please submit to me a written assessment of the extent to which your plan and system "worked out". (This does not need to be formal; just a list of strengths and weaknesses you found will be fine!) This process should help focus your experiences for discussion at the Faculty Meeting to be held on 20 February at 3:00 pm in the conference room.

Please do not forget the following important dates!!

15 February - Assessment due following Course Development Workshop (2:00 pm Friday, 2 June)
20 February - Report to faculty (3:00 pm Friday, 2 June)

GOOD LUCK!!!
MEMO

To: Nursing 24 - Teaching Team
Date: 4 October 1972

Re: ROLES, ACTS, PERFORMANCE
   STATEMENTS AND FUNCTION

From: Inez Moore, R.N.

#3

I have sensed among the faculty some questions about the concepts and processes involved in identifying the functions of each role holder on your team (in completing Form "B" for the next deadline).

For this reason, I have asked Dr. James Bradford and Mr. John Schnoeder, from the Ohio State University, College of Education to consult with us for a short time tomorrow afternoon at 3:30 pm. They will explain the major ideas and answer our questions (hopefully).

Remember, tomorrow, Thursday, October 5 in the conference room.
(That is, right now, please!)

P.S. Here is some information I thought you should have to read over before the meeting.

"Organizational role is a set of behavioral acts that comprise an integral part of a long chain or sequence of differentiated actions, that are taken to accomplish the immediate and long range objectives of an educational system."

Three main categories of behavioral acts can be assigned to organizational roles:

- Technical work acts - produce the end product of the system.
- Communication acts - relay between-role information about the status and progress of work contributing to the end product.
- Decision making acts - coordinate technical work acts and communication acts.
MEMO

To Nursing 2A - Teaching Team  Date: 6 November, 1972
Re: Instructional Design Systems  From: Inez Moore, R.N.

To bring us all up to date on what is involved in developing an instructional design system from the functions we have identified, I have asked Dr. Bradford and Mr. Schneider to spend a few minutes with us on Wednesday, November 8.

CAPITAL UNIVERSITY - COLUMBUS, OHIO 43209
MEMO

To: Instructional Development Center
Date: 2 October, 1972

Re: Form "A"  From: ____________________________

Page: 1 of ______

PLANNING/DEVELOPMENT ELEMENTS CHOSEN FOR USE
(enter as many or as few elements and sub-elements as you choose; use 2nd sheet if nec.)

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CAPITAL UNIVERSITY - COLUMBUS, OHIO 43209
MEMO
To: Instructional Development Center
Date: 6 November, 1972
Re: Form "U"
From: ____________
Page ____________

**ROLE HOLDER FUNCTIONS**

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CAPITAL UNIVERSITY - COLUMBUS, OHIO 43205
MEMO
To: Instructional Development Center
Date: 8 January 1975

Re: Form "C"
From:

INSTRUCTIONAL DEVELOPMENT PLAN

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CAPITAL UNIVERSITY - COLUMBUS, OHIO 43209
## MEMO

**To: Instruction Development Center Date: 2 October, 1972**

**From: Teaching Team Z**

**Page:**

### EXAMPLE

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CAPITAL UNIVERSITY - COLUMBUS, OHIO 43209
APPENDIX B
WORKSHOP SUPPORT MATERIALS
A WORKSHOP IN
INSTRUCTIONAL
PLANNING AND DEVELOPMENT

WORKSHOP RESOURCE MODULES

JOHN E. SCHNEIDER

FOR USE OF WORKSHOP PARTICIPANTS ONLY
The materials in this notebook are the primary resources for you to use during this instructional planning and development workshop. You will find that there are some concepts discussed with which you are already quite familiar, while others may be new to you. You will have to be selective in both the breadth and depth of study you do in each module, for it is unlikely that as an individual you will be able to study and put to use everything here in the time available.

If you are particularly interested in an aspect of instructional planning and/or development, and would like to go beyond the material in the modules, a number of additional resources are available for your perusal.

The materials in this notebook have been adapted from the following: Jerrold E. Kemp, *Instructional Design*, Fearon Publishers, 1971; John B. Hough and James K. Duncan, *Teaching: Description and Analysis*; Daniel Stufflebeam, *Educational Evaluation and Decision Making*; and workshop materials produced by The Center for Improved Education, Battelle Memorial Institute, Columbus, Ohio.
A Workshop in Instructional Planning and Development

GOALS

To provide general experiences in the process of preparing for and engaging in face-to-face instructional planning and development.

To provide a situational base for collaborative instructional planning and development and a methodology for the analysis of that situational base which will aid participants in understanding the effect of individual behaviors and group interactions on planning and development activity.

To help the participants understand: 1) context and processes of instructional development; 2) some of what is required to become a skillful developer; 3) beginning understanding of tactics of planning and developing in group settings; and 4) evaluation.

OBJECTIVES

As a result of the simulation experience, participants should show increased evidence of knowledge of collaborative instructional planning and development concepts.

As a result of the simulation experience, participants will demonstrate increased positive attitudes toward a) their role in planning and developing instruction; b) the group process of planning and developing instruction; c) the future use of collaborative instructional planning and development by the faculty.

As a result of the simulation experience, participants will be able to identify correctly the following planning/development elements: school goals, course goals, course objectives, alternate course approaches, learning objectives, learning objective classifications, learner characteristics and capabilities, teaching-learning experiences, instructional resource support, measuring student learning, and evaluating instructional plans.

As a result of the simulation experience, participants will demonstrate increased positive attitudes toward necessary collaborative instructional planning and development components.
OBJECTIVES (Continued)

As a result of the simulation experience, participants will show an increased ability to describe the major aspects of team member and team leader roles.

As a team member, participants will produce a plan for instructional development and develop a pilot course segment.
CONTENTS

Collabo—a group game designed to acquaint you with the major concepts of a collaborative planning/development system.

Course Information -- Module One

Learner Characteristics and Capabilities -- Module Two

Learning Objectives/Classes -- Module Three

Designing Teaching/Learning Experiences -- Module Four

Instructional Resources and Support -- Module Five

Evaluation in Instructional Planning and Development -- Module Six

Try-out Testing/Summary -- Module Seven
COllabo

A group game designed to acquaint you with the major concepts of a collaborative planning-development system.

The objective: to produce an instructional system composed of subsystems which enclose functions.

The game materials:

<table>
<thead>
<tr>
<th>Item</th>
<th>Game term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wooden block with label</td>
<td>function</td>
</tr>
<tr>
<td>yellow loop</td>
<td>role subset</td>
</tr>
<tr>
<td>black loop</td>
<td>subsystem</td>
</tr>
</tbody>
</table>

Briefly the game works like this. You are going to put together an instructional system. Choose a team of 3 members to play the game. Be sure to have a large space in which to work.

Read the next section; Instructional Design Systems.

Instructional Design Systems

In the past, plans for curriculum and student instruction have been made intuitively and have often been based upon ambiguous purposes and casual subjective judgments. Not that this was wrong, but recently new knowledge about learning, development of new instructional materials and potential flexibilities for broadening teaching/learning methods have encouraged educators to explore new approaches for improving planning and development.

The instructional process is complex. It is composed of many interrelated functions that must operate in a coherent manner in order to achieve successful results.

Planning and development based on the systems concept is receiving increased attention. System procedures sometime seem more appropriate to the
requirements of industrial job training than they do the humanizing needs of academic education. However several positive things must be said for an instructional systems concept.

1) The technological basis of the systems approach means more than machines. It is essentially a process that establishes and organizes a way to examine instructional problems and sets a procedure for solving them.

2) The systems approach contains many elements that can assist in making the instructional process more manageable.

We do not advocate the total application of the system concept to planning and developing instruction; that perhaps belongs more appropriately at the administrative level.

One of the elements we can borrow from systems thinking is that activities need to be organized so the team will know when, if and how, activities are accomplished.

Read the next section:

Functions

A function is an activity that will be performed in planning for or developing some aspect of instruction.

For example, let's say that our team was called together to revise and make more relevant an introductory course in social science. The content of the course will include not only history and geography, but economics, anthropology and behavioral science. You should also take into consideration the fact that this is a required course for all entering freshmen.

What planning development elements should you, as a team, consider in revising this course? Read and get to know what each planning-development element means.
PLANNING/DEVELOPMENT ELEMENTS
What information is necessary to influence the determination of courses?

1) Information that is derived from stated school goals, subject content, and topics. This usually information that may be available to you.

2) Information that is derived from topics, course goals, course objectives and learning objectives. This information may need to be developed by your planning team.

3) Information that is obtained from considering alternative course approaches.

To put these information bits into perspective it will be necessary for you to consider a "goal-objective hierarchy". The hierarchy has several levels; the upper levels will be broad in scope while lower levels apply to specific programs, courses and expectations for individual learners.

(See the "hierarchy tree" and the definitions which follow it)
Persons who develop instruction should be aware of and/or participate in various stages and levels of this hierarchy. First, let's look briefly at each stage or level.

A) **Goals**

Goals should provide a stimulus to directed action as well as a guide for development for specific objectives. The goals of an educational system, whether stated explicitly or assumed, will shape and mold the content of the curriculum.

**Goal example:** graduates should develop abilities and skills in ways of acquiring and transmitting knowledge.

B) **Subject Content**

Subject matter areas are implied by goals. In our example above communication skills, reading and interpretation, and study abilities are implied.

C) **Grouped Topics**

Examination of the subject matter content area will reveal topics that can be grouped.

**Example:** Topic - Reading

D) **Course Goals**

The course goals state in general terms what teachers will do to help students accomplish course objectives:

**Example:** **English Course Goal**

Make enough books, articles and other materials available so all students can choose five titles during the term.

E) **Course Objectives**

These are competencies which result from learner involvement in curricula or courses of study (such as an English course).

**Example:** Students will be able to read different types of materials e.g., literature, news articles, scientific articles, business forms, etc., with speed and correct interpretation.
F) **Learning Objectives**

These are statements which describe, tell student and teacher how they will know when learning has taken place.

**Example:** Given a daily newspaper, the student will analyze three of the front page stories, describing factual content, hearsay, and opinions according to criteria provided by the teacher.

When course objectives have been written, it is wise to consider alternative course approaches. In this case, an alternative might be organizational arrangements (such as individualized instruction, smallgroup/large, etc.), or differing time periods (such as flexible scheduling) and space (carrels, study at home, clinical arrangements, etc.). The planning team should consider these alternatives before instruction is arrived at. Descriptions of course alternatives should include information regarding:

* organizational arrangements
* different time periods
* use of space
* limitations imposed by each alternative course
* resources needed for alternate courses
* costs for each alternative course
* predict the effectiveness of each alternative

As you can see, you may need to generate, uncover and determine much of the course information that is initially provided by the school's goals and resulting subject matter.
LEARNER CHARACTERISTICS AND CAPABILITIES

Often the selection of student learning experiences and instructional materials in planning is influenced by your background knowledge of the learner and his preparation for studying the topic.

Your background knowledge of the learner is dependent on: the different ways that different students learn (visual, verbal, physical - and combinations), the time it takes for accomplishing a given task (which varies for each individual). Student characteristics and student environment may affect your decisions concerning the selection of objectives, level at which to start a topic, depth of treatment, and extent and kind of learning activities to be planned.

Characteristics such as: age, background and motivation for studying the topic, I.Q., previous experience, achievement or grades, study time available, interests, etc.

Another aspect of students that we are interested in is the information that students may have acquired that relates to the topics to be studied. We want to know:

1) To what extent each student has acquired the necessary prerequisites for studying the topic, and 2) what the student may have already mastered about the subject to be studied

Why? - should the learner already know some of the information, should you present it again?

This means that you may want to pretest your potential students. This is the key question you should ask:

Does each student have the background preparation to study this topic and may he already be proficient in what will be taught?
If the answer to the first question is "what background preparation does it take to study this topic?" and to the second, "I don't know".

You may wish to examine the learning objectives and supportive subject content and ask again:

1. Are the students prepared to study the topic or unit?
2. Have the students already achieved some of the stated objectives?
Learning Objectives/Classes

Learning objectives are statements that tell the instructor and the student how they will be able to tell when learning is successfully completed. They are distinguished from system goals, and course goals and objectives by the fact that they pertain to specific learning experiences rather than curricula or courses.

To help define the kinds of learning to which objectives refer, they may be classified into three major and several minor categories:

Cognitive Domain
   Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation

Affective Domain
   Receiving, Responding, Valuing, Organization, Characterization

Psychomotor Domain

Writing extremely detailed learning objectives is a very difficult task, and requires much of an instructor's time. In addition, objectives tend to develop best over a period of time with systematic review and refinement. For these reasons, it is often most practical to begin with simple objectives consisting of:

1. An action verb
2. A content reference
3. A performance standard

Such objectives can be written quite easily with practice, and serve their function well for both instructor and student.

Because one function of objectives is to let students know what they are to learn, and how they will show they have learned, objectives should always be made available to students. In fact, in some cases, it is desirable to let students help formulate objectives.

The other major function of objectives is to provide a basis for evaluation of students. It is therefore important to carefully relate all measurement of student progress to objectives.
DESIGNING TEACHING - LEARNING EXPERIENCES

The consideration of certain factors will assist you in selecting teaching activities and student learning experiences that will enable the largest possible number of students in your course to master the learning objectives at an acceptable level in a reasonable amount of time.

There is no formula for matching activities and experiences to objectives. What works for one teacher and a group of students may be unsatisfactory to others. The strengths and weaknesses of alternate learning experiences should be known so that you can make your selection in terms of factors that will best serve the students in light of the learning objectives.

Three aspects of the design need to be studied; the kinds of learning, instructional communication patterns, and learning experience forms.

1. Kinds of Learning
   a) When a student is first introduced to, or introduces himself, or becomes interested in "learns about"
   b) When a student works with a set of ideas, concepts, principles or skills "is learning"
   c) When a student confirms mastery of an objective, examines his competence in something, achieves or masters a skill or knowledge "learned?"

2. Instructional Communication Patterns
   There are four groups of instructional communication patterns:

   Direct Presentation    (S = student, T = teacher)

   ![Diagram of Direct Presentation]

   [Diagram showing the flow of communication from teacher to student with silent responses and presentation]

   Collaborate 4
Questioning Communication

Asks questions
Responds to clarification
Seeks clarification
Gives feedback

Yes, no, accepts, judges

T or S

Responds to questions
Seeks clarification
Responds to clarification
Seeks clarification

Interactive Group Communication

Two kinds of group interactions may be seen:

T seeks clarification
accepts
processes the discussion

S presents information
asks questions
responds to questions and
clarification
seeks clarification

Independent Communication

The student works independently with his own ideas or with instructional materials that he manipulates to facilitate his own independent learning.

S

Instructional Materials
3) **Major Learning Experience Forms**

- Initial overview of topic or area
- Practice
- Feedback

**Specific Learning Experience Forms**
- Personal Independent Study
- Laboratories
- Autotutorial
- Clinical Experiences
- Small group meetings
- Reading Assignments

The learning experience form encompasses media, organizational patterns, and teaching methods. The learning experience form gives a planning team or teacher a central focusing point for considering organizational patterns, methods and media within a communication pattern framework.

**Summary**

The process of selecting or designing teaching-learning experiences involves a consideration of **all three** in thinking through the designing or selecting of teaching activity and learner experiences that will be most effective for the student and efficient for the school. Teachers and planning teams should be more interested in the process of how these three elements fit together than a ready made recipe or model that **tells how**.  

Collabo 4
INSTRUCTIONAL RESOURCES AND SUPPORT

The selection of instructional resources and consideration of support for these resources are closely related to the design of teaching and learning experiences.

Two questions will be answered by studying instructional resources and support:

* What media should be selected??

* What support will be needed to implement our plan??

Instructional Resources

These are the necessary materials that can motivate students and serve as effective ways to explain and illustrate subject content and related information. These resources include:

- objects and specimens
- community resources
- demonstrations
- gaming devices
- filmstrips
- slides
- overhead transparencies
- slides with tape recordings
- slides with transparencies
- filmstrips with tape or disc recordings
- still pictures with motion pictures

- guest speakers
- disc-tape recordings
- displays and exhibits
- charts, graphs, and posters
- flat pictures
- motion pictures (silent, sound)
- television programs and recordings

Much of the research into learning with audiovisual materials has been inconclusive. What has resulted is evidence that certain learning experiences may be accomplished equally well by any of a number of media.
Media Criteria

1. Presentation to group, or independent study?
2. Visual form - still pictures or motion pictures?
3. Sound needed?
4. What is available now?

Three general questions should indicate broad directions for instructional resources are derived from the learning objectives and course objectives:

* What kind of teaching and/or student learning experiences are indicated?

* What instructional communication patterns (direct presentation, questioning, group interaction, independent) are indicated?

* Which learning experience forms (large group, small group, auto-tutorial, clinical, personal study, etc.) combinations or alternatives are appropriate for the objective and the nature of the group or individual?

* Which category of learning experiencing (direct, realistic experience, verbal, printed abstractions, or vicarious sensory experience) is most suitable?

Instructional Support

It's a simple fact - materials and time cost money in education and in most other activities of life. All new and revised courses require funds with which to get started.

Financial support, which was considered broadly in terms of alternative course approaches and costs in another place, may provide guidance for studying budgeting for planning, developing and implementing instructional procedures.

Collabo 5
Financial support may be necessary for:

+ **Planning Phase** (planning time for teachers, team, consultant services)

+ **Development Phase** (staff time; construction, purchase, printing, testing devices, consultant and technical services, try-outs, in-service education, administrative services)

+ **Implementation Phase** (staff salaries, replacement, maintenance, time and materials for revision)

Hidden costs are often involved in the above areas:

- **Personnel** - teaching staff, planning teams, development specialists, consultants and secretaries.

- **Time and Schedules** - finding time to work on initial planning proposal, staff and clerical assistance in locating and preparing materials, support services for adapting facilities and equipment installation, scheduling try-out pilot phase, and work schedule for students, teachers, aides, etc. in implementation phase.

- **Equipment** - requirements for use with the materials in the course- (motion picture films needs projector, autotutorial unit needs slide projector and audio-tape player, etc.)

- **Facilities** - large space for groups, small spaces for individual study and small groups; provisions for equipment in spaces, resource center, staff meeting rooms and workrooms; available spaces which can be used now and with modification.
Planning and Development and Operating Costs

Predicting costs may be a difficult step, but it is necessary. The cost structure could consist of two parts; 1) development costs of planning, developing and pilot try-outs, and 2) operational costs anticipated for actual implementation.

Development Costs

Planning time, staff time, supplies and materials, outside services for preparing and purchasing materials, construction and renovation of facilities, equipment installation, testing, evaluation, redesign, reproduction, in-service education, overhead costs, etc.

Operating Costs

Administrative and faculty salaries, replacement, maintenance, repair, depreciation of equipment, overhead, and evaluating and updating materials costs.

Collabo 5
EVALUATION IN INSTRUCTIONAL PLANNING AND DEVELOPMENT

Evaluation can be defined as the activity of judging how well what is done corresponds to expectations as expressed by criteria. In other words, evaluation is comparing anticipated outcomes (of instructional planning and development, e.g.) with actual outcomes, and making judgements about quality, quantity and time differences between the two.

Two major aspects of instructional evaluation must be considered during planning and development: 1) evaluating the development plan, 2) evaluating student learning.

Evaluating the development plan involves three areas: effectiveness, efficiency, and subjective evaluation. Evaluation of effectiveness tells us how well the development plan works when it is applied in a real course situation. Efficiency involves comparisons of student performance against instructional time, and course effectiveness against cost. In addition to these, there are several more subjective, but often as valid approaches to evaluating the instructional plan. These include inferences from student test data, follow-up studies of students, and questionnaires.

Evaluation of student learning is a complex and sometimes frustrating activity. It is made much simpler if well written objectives are available to serve as criteria for evaluation judgements. Student evaluation should be a day-to-day activity that provides feedback to both student and instructor, not a once or twice per course affair.

Instructors should consider both validity and reliability when constructing and revising classroom tests. Validity asks the question,
"Does the test measure what it is supposed to measure?" One way to help ensure validity is to test for mastery of specific objectives, being sure the test items and procedures reflect the classes of learning involved (cognitive/affective/psychomotor). Records and analysis of test items over a period of time help increase assurance of reliability.

A number of possible testing situations can be considered including: observation of student performance, samples of student work, self-reporting devices, essay tests, objective tests, tests using audiovisual materials.

Finally, some instructors have tried to tie the whole area of student evaluation together by letting the student decide which areas he wants to emphasize and deemphasize by "contracting" with the instructor to complete selected objectives leading to a predetermined grade. This process is called student performance contracting.

Collabo 6
TRY-OUT TESTING

One important method for evaluating the instructional planning and development process is pilot testing. The developed plan should be used with a representative group of students. The pilot should provide opportunity to consider not only objectives, subject matter suitability, learning experiences and so forth, but also roles of personnel, resources and support levels, and the like. In short, all factors that affect learner performance in achieving objectives should be considered.

Information gained from pilot testing, of course, is used to revise the plan and/or development for subsequent implementation, or perhaps a second pilot test.

Collabo 7
Now start at the beginning to construct your functions.

a) Select the planning-development elements to be accomplished first. (Let's suppose you chose Instructional Resources and Support.)

b) Scan the list of action elements. What action element combined with your chosen planning development element will perform a function you believe is necessary?
(For example - you chose Instructional Resources and Support as a P/D element; Suppose you chose "specify" as an action element. This means that "specify Instructional Resources and Support" is a function that the team feels is of the first importance in revising the course.)

c) As the team determines which action elements should be combined with which planning-development elements, write it on the label of the wooden playing pieces provided.

d) Try to make the functions reflect real needs as perceived by the team, not unknown combinations.

e) Use all the playing pieces.

f) You may use any combination of action elements and planning-development elements. You may use any element more than once.

g) If you change your mind later, and wish to write a different function, attach a new label to the piece and write new function.

Read the next section:

Role

As you well know teams have different members. Your team is no exception. In our game team members are called role holders. Your team may be composed of any of the following role holders:
Team Leader
Team Member
Student
Administrator
Learning Resource Specialist - This team member could be a consultant with special skills in programmed instruction, media or content areas.

No explanation necessary

a) Lay out the functions (the wooden labeled pieces) on the floor or table.

b) The yellow loops will become role holders. Each yellow loop may be considered a role holder. Place a label inside the loop to indicate its role.

c) Decide which functions will be performed by which role holder (represented by yellow loop). Enclose within each yellow loop all the functions that should be performed by that role holder.

d) Decide what to do if functions are to be performed by more than one role holder.

e) Use all the loops!

Now you are ready to form your instructional system. Each black loop represents the following subsystems:

**Planning Subsystem:** Activities involved in preparing a plan for instructional development.

**Development Subsystem:** Activities involved in implementing the development plan for the course to be taught.

**In-service Subsystem:** Designing the activities for which it will be necessary to train role holders.

**Management Subsystem:** Activities that contribute to the proper functioning of the design system, involving an interface with other systems for supportive services.
Now:

a) Decide which functions should be a part of each subsystem.

b) Arrange the black loops so that functions decided upon for each subsystem will be enclosed by the black loop for that subsystem.

c) Lay the black loops over the yellow and label each subsystem.

d) Arrange pieces (functions) loops (roles and subsystems) and labels in some organized fashion.

e) Place the instructional system label at the top.

Playing time is ___ minutes.

If you have any questions please ask the simulation director.

Following the game a short discussion will be held.
ACTION ELEMENTS

choose, define, identify,
indicate, list, locate,
match, name, specify

classify, compare, describe,
estimate, explain, interpret,
measure, order, summarize
compute, sort

construct, make, differentiate,
discuss, use, collect,
information about, perform, plan
predict, prepare, present,

analyze, determine, differentiate
conclusions, organize, outline.

design, develop, produce, write

compare, make a decision, evaluate
COURSE INFORMATION

Our major purpose in this module is to acquaint you with information that influences the determination of courses. It will be necessary to review the goal-objective hierarchy in order to understand how course information helps to provide considerations and data in planning and developing instruction.*

I. Introduction

Much of the information about courses evolves from a perspective that includes a review of the goal-objective hierarchy as it may exist.

The accomplishments of any organization are affected by the perception of its goals by its leaders and members. Goals pertain to broad, general statements of the long-range purposes of an organization, and objectives apply to narrower, specific statements of the shorter-range purposes. Any organization that seriously attempts to define its goals and objectives probably will find that they form a hierarchy which has several levels. The upper levels will be broad and systemwide in scope, while lower levels will apply to specific programs, course, and expectations for individual learners.

*Learning objectives are covered in another module.
A "HIERARCHY" TREE
Persons who develop instruction should be aware of and/or participate in various stages and levels of this hierarchy. First, let's look briefly at each stage or level. Then we will return to each level to discover how course information is derived, as well as its usefulness in planning and developing instruction.

A) Goals

Goals should provide a stimulus to directed action as well as a guide for development for specific objectives. The goals of an educational system, whether stated explicitly or assumed, will shape and mold the content of the curriculum, priorities for funds and many other matters which affect the subject matter and instruction procedures within the school. Goals should be stated clearly and kept current so that priorities and use of funds will be consistent with needs and the emphasis on educational courses will be a result of societal, community, student and teacher preferences.

Goal example: graduates should develop abilities and skills in ways of acquiring and transmitting knowledge.

B) Subject Content

Subject matter areas are implied by goals. In our example above communication skills, reading and interpretation, and study abilities are implied.

C) Grouped Topics

Examination of the subject matter content area will reveal topics that can be grouped. These topics will be related in some way which will allow for organization of the content areas. Topics may be grouped or organized by subjects, broad fields, areas of living, needs, experiences, activities, focusing ideas, etc.

Example: Topic - Reading
D) Course Goals

The course goals state in general terms what teachers will do to help students accomplish course objectives:

Example: English Course Goal
Make enough books, articles and other materials available so all students can choose five titles during the term.

E) Course Objectives

These are competencies which result from learner involvement in curricula or courses of study (such as an English course). They consist of the knowledge, skills and attitudes directly related to particular grouped subject matter and content.

Example: Students will be able to read different types of materials e.g., literature, news articles, scientific articles, business forms, etc., with speed and correct interpretation.

F) Learning Objectives

These are statements which describe, tell student and teacher how they will know when learning has taken place.

Example: Given a daily newspaper, the student will analyze three of the front page stories, describing factual content, hearsay, and opinions according to criteria provided by the teacher.

To be sure that you are familiar with this hierarchy concept, label each statement below with one of the following designations: A) Goal, B) Course Goal, C) Course Objective, D) Learning Objective
1. Within 6 months after graduation at least 95% of the graduates will be accepted for higher education or employment in a field for which they were trained.

2. Upon termination students should be prepared for and select a vocation.

3. Given the description of a job opening for which he may seem qualified, the student will be able to write an acceptable application letter. (qualities of "acceptable" to be spelled out in advance)

4. To develop in each student an understanding of career alternatives and the skills and motivation to make a rational choice of his own future

---

Answers: (Turn upside down) 1 - C  2 - A  3 - D  4 - E  5 -  

How did you do? If you did well please continue. If not, go back through the hierarchy concept to be sure you understand it.
II. Selecting Subject Content

Educational programs are based on broadly stated goals. These may be societal-determined goals such as "good citizenship," "vocational competence," or "desirable leisure-time interests." Philosophical and ethical considerations that are derived from the wishes or demands of the community, the nature of the institution, or other direction-establishing elements that control the educational program, contribute to goals.

After the goals have been established, they may be surveyed for subject matter content and a curriculum group may select, list, and group the major topics that should be treated within the content area. These topics become the scope of the course or the program. For a science course on meteorology such topics as air masses, weather fronts, weather symbols, weather maps, and forecasting may be the selected topics. They provide a general basis for the instructional program. Although they are not directly useful for teaching and learning as stated, they give direction and emphasis to instructional planning.

At this point it becomes necessary to decide how many topics should be treated and to what depth. We must take into account such factors as the date by which the program must be ready for use, the possibility of correlating the content with that of another course, and any restrictions that may be set by student characteristics, budget, facilities, resources, and personnel.

Write 5 factors that you may wish to consider in grouping the subject matter content topics.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________
4. ____________________________________________
5. ____________________________________________
III. Determining Course Goals

Curriculum development ends, and planning for instruction begins with teacher oriented statements of purposes; within the topical course framework, list general purposes that you or the members of the planning team wish to accomplish with the students in order to serve each topic. The purposes are broad statements that describe the desired teaching outcomes for each topic, and we shall call these the goals of the course. They are usually the teacher's or the team's or the team's own aims or purposes for the topic or unit. Course goals are written in terms of what the teacher wants to accomplish - to have students appreciate or understand, to make students aware of, or to get students to know about, and so forth. Again, these are statements of general purpose, not objectives. Eventually such statements must be translated into more detailed course objectives.

At the outset of planning, it is often unrealistic to ask a teacher or a team to state meaningful course objectives. This is a difficult task, and may even discourage enthusiasm for following a systematic planning procedure. Therefore, constructing course goals should be the starting point for your planning.

STOP

Of what does a course goal consist? (Write your answer)
IV. Development of Course Instructional Objectives

Course instructional objectives are derived from and support course goals. The objectives of a course are specific statements of its purposes and are often relatively short range in nature.

It is suggested that the development of course objectives may be approached by answering the following questions:

- What is the desired nature of performance for each objective?
- What is the target group for each objective?
- What unit(s) of measurement should be used as indicators of effectiveness?
- What performance standard is desired, i.e., what level of effectiveness should be accomplished?
- What conditions of measurement should be imposed?
- What is the desired time of achievement?

Answers to these questions will assist you in producing course instructional objectives. Let's not kid ourselves at this juncture; writing course objectives is not easy. Each course objective should be measurable, relevant, and attainable. That is, it must be feasible to obtain data for determination of whether the performance standard has been met; the course objectives must be relevant in that they support the course goals; and it must be possible to attain the course objectives, although it may be difficult. The entire set of objectives for a particular course must be comprehensive and nonredundant. - and that's a large order! It should be recognized that we should work toward producing course objectives that are measurable, relevant, and attainable as criteria for well stated course objectives rather than hard and fast rules.

The first characteristics of a well-stated course objective is measurability, which is based on whether the measurement can actually be performed, that is, whether the measurement is feasible. Application of this
criterion may be illustrated by the following example of an objective:

"Students who complete the driver education course are not to incur violations of traffic regulations, in the first year after licensing, at a rate greater than half the rate of the local driving population. The unit of measurement for this objective may be inferred to be average number of violations per driver per year. However, the feasibility of measuring the rate of traffic violations is not at all clear from the statement of the objective. To determine the measurability of this objective, it would be necessary to investigate, with the local police department or the state motor vehicle bureau, the availability of data on traffic violations for the general public. It would also be necessary to establish methods for collecting follow-up data on traffic violations for students who took the course during the first year after they received a license. The question of whether objectives satisfy the measurability criterion can be determined objectively. However, the remaining criteria must be applied subjectively to a large extent.

The 2nd criterion is relevance, which means that an objective must support a higher level goal or objective. An example of an objective which is not relevant might be one which states "All students who complete the course are to drive at least 10,000 miles in the first year after obtaining a license". If the goals for the driver training course relate only to developing in the students the ability to drive a car safely, a responsible attitude toward driving and traffic safety, and the necessary knowledge and skills to pass the driver's license examination, then the objective relating to miles driven in 1 year is not relevant.

The third criterion is attainability, which requires a determination of whether the objective can be achieved. Objectives should present a challenge, but they should not be so difficult that attainment is impossible.

Below are listed two courses with their respective goals and selected objectives. For each objective decide whether or not it is measurable, relevant and attainable and write your comments on the line.
1) General Mathematics Course

Course Goal: To develop in all students in the program a proficiency with numerical skills and an understanding of mathematical concepts, qualifying them for the demands of modern industrial society.

Course Objective: To raise the average achievement level of the students enrolled in the course to the 60th percentile or better on the Fundamental Mathematics Achievement Test, by the end of the program.

Measurable??

Relevant??

Attainable??

2) Driver Education Course

Course Goal: To develop in all students the ability to drive cars safely.

Course Objective: At least 95 percent of the students who complete the driver education course with a passing grade are to pass the state licensing examination on the first attempt, and at least 98 percent are to pass it by the second attempt.

Measurable??

Relevant??

Attainable??
Following this course goal, write a course objective which, reflecting the goal, is measurable, relevant, and attainable.

Course Goal: To introduce the student to the profession of nursing and to provide opportunities to acquire knowledge and skills related to the fundamentals of patient care and to medical-surgical nursing.

Course Objective:

V. Development of Alternative Course Approaches

One of the saddest songs we have ever heard is sung by teachers and planning teams who meticulously construct a course, replete with course objectives, learning objectives, lists of activities, etc. They then decide to use individualized instructional methods and materials and someone (usually an administrator!) realistically says "Sorry, can't individualize, not enough staff time and funds!"

This same song and situation is repeated often. We often wait until after subject matter course objectives are determined and sequenced to think about how the students will learn the material.

What we are saying is this; let's consider:

- organizational arrangements, time periods, and space
- limitations
- required resources
- costs
- effectiveness

....... after we write our course objectives and before we go any further.
We should determine and select a limited number of realistic and effective
course alternatives for analysis before we make decisions about organizational arrangements, different time periods and use of space and other variables. The design or selection of a limited number of effective and realistic course alternatives for analysis requires inventiveness and creativity on the part of instructional planners. All of the viable alternatives which merit serious consideration, should be discussed and described. The descriptions of course alternatives should include information regarding organizational arrangements, different time periods, use of space, limitations, required resources, costs, and effectiveness.

Next, we will examine a case study with full descriptions of goals, objectives, limitations, alternatives, predicted effectiveness estimates for alternatives, resource requirements and estimated costs for alternatives, and long range cost estimates for alternatives.

This would be more properly termed a course, a course for 2,000 pupils. During your reading of this case study you will notice the sections marked (*). These are study questions and thoughts which you may wish to ponder. Study this case study carefully in order to obtain a clear idea of what information is needed to consider course alternatives. Look for the organizational patterns and relationships between the various elements as they contribute to a series of alternatives for instruction.
DISCUSSION OF CASE STUDY

1. **Note the goals and objectives.** They are measurable, relevant, and attainable. As an example, you should consider the objectives as statements you may or may not want to make specific.

2. **Note the alternatives.** Well thought out, the alternatives are based on differing organizational patterns for the students and use of time and space. Many times these are the only variables open for alternatives.

3. **Consult the predicted effectiveness chart.** Note that it is founded mostly on best guesses and hunches. Some data is given. Very often no data is available but again, the concept is to consider alternatives even with subjective criteria.

4. **Consult the resource requirement and estimated costs chart.** All costs listed here are financial. Other costs to be considered may be time, and political costs. Support and resources are a most important consideration. Time and financial costs can make or break a course.

5. **Consult the long range cost estimate chart.** Often financial costs are greater the first year of an alternative program but may tend to decrease after the first year. Sometimes and most often, costs increase each year. A long range prediction gives a more realistic financial cost picture.
Course Description

"Introduction to the Social Studies" is a required course for all seventh-grade students in the Parma School System's five junior high schools. Approximately 2,000 students are involved in this program. Currently, classes meet daily for 36 weeks and provide one unit of credit.

This course introduces the student to all of the social sciences and has specific units in the following discipline areas: anthropology, economics, geography, political science, psychology, and sociology.

Each of these disciplines stands independent of the others, although they are sometimes covered in an inter-disciplinary manner. Emphasis in the course is not so much on factual coverage as it is on the "process of learning". Other features include wide use of multimedia materials and student involvement.

Course Goals and Objectives

The goals for the seventh-grade program are compatible with and reinforce the goals for the systemwide Social Studies Program K-12 and the school district's overall goals.

More than one course objective was developed for each course goal. The majority of the objectives include reference to currently nonexistent measurement instruments. One of the major difficulties in developing measurable objectives for a social studies course is the lack of nationally normed, standardized tests to measure cognitive and affective learnings in this area. Therefore, the expected measurements for this course are almost entirely dependent upon the use of measurement instruments which must ultimately be developed by the staff.

Goal 1

To develop student understanding and interest in social studies disciplines.
Objective 1. 70 percent of the class will achieve a score of at least 90 percent on a test designed to measure understanding of the various social-science disciplines.

Objective 2. An anonymous student survey will be administered to determine the amount of time spent volitionally on extra, unassigned work in each unit. 50 percent of the class will have been motivated to spend 1 hour or more on such work on each unit.

Goal 2

To develop in each student the skills to understand and appreciate the interdependence of man.

Objective 1. 70 percent of the students will achieve a score of at least 90 percent on a test designed to measure understanding of the interdependence of man.

Objective 2. All students will successfully complete, as determined by teacher evaluation, a project activity designed to demonstrate their ability to combine concepts, principles, and generalizations regarding the interdependence of man.

Objective 3. 70 percent of the students will improve their attitudes as measured by a pre- and post-attitudinal test designed to assess how students perceive the interdependence of man.

Goal 3

To help each student recognize the dignity and worth of all people.

Objective 1. All students will develop a functional definition of a culture which will contain at least three basic elements of a culture.

Objective 2. All students by forming generalizations will demonstrate their ability to perceive at least ten reasons for cultural differences among peoples of the world.

Objective 3. 70 percent of the students will achieve a score of at least 90 percent on a teacher-designed test which will measure their understanding of the contributing factors which cause people to be intolerant.
Objective 4. 70 percent of the students will gain a greater understanding of their own self-worth through a series of activities (e.g., self-analysis inventory, role playing, peer group influence test, etc.) designed to measure their own attitudes about themselves and their relationship to their fellow man.

Objective 5. 70 percent of the students will improve their attitudes as measured by a pre-and post-attitudinal test designed to assess how students perceive the dignity and worth of all people.

Goal 4

To develop in each student the ability to evaluate the effects of social and technological change on mankind.

Objective 1. All students, by forming generalizations, will develop and test a functional hypothesis regarding the effects of differing levels of technologies on three cultures.

Objective 2. 70 percent of the students will achieve a score of at least 90 percent on a teacher-designed instrument which will measure their understanding of the process of social and technological diffusion.

Goal 5

To develop in each student a greater commitment to the democratic form of government.

Objective 1. Given statements about three different forms of government (authoritarian, aristocratic, and democratic), each student will identify the form of government.

Objective 2. Each student will be able to list at least five advantages and five disadvantages of the three different forms of government.

Objective 3. Each student will be able to list eight rights and eight responsibilities of citizenship in a democratic society.

Objective 4. To measure the students' ability to apply their understanding of the rights of citizens in a democratic society to real life situations, 70 percent of the students will pass the National Citizenship Test with a score of at least 90 percent.
Program Alternatives and Limitations

Four course alternatives were identified. Several other course alternatives were considered (e.g., the use of closed circuit television for some presentations, and the "parkway" or "community" school concept, etc.); however, these alternatives were not formally developed since known local limitations greatly restricted their feasibility.

A list of limitations was developed for each alternative. Several of the constraints were common to all alternatives. (For example, teacher background is generally weak in areas of anthropology, sociology, psychology, and to some extent, economics; and the existing schedule of 40-minute periods restricts certain types of learning experiences).

The four course alternatives with their corresponding limitations are as follows:

Alternative 1. The Current Course

To implement this alternative the following would be necessary:

1. Special consultant services to help the staff design tests which would measure student performance for all objectives requiring performance measurement.

2. The design of performance measurement instruments.

3. In-service training for all 7th grade social-studies teachers to review the proposed program. In-service training would emphasize goals, objectives, and evaluation criteria.

Limitations for Alternative 1:

1. The course is presently taught in conventional classrooms which greatly restrict flexibility. For example, there frequently is need for the class to have access to additional space where part of the students may work independent of the regular class. Such space is not currently available.

2. Modular scheduling would be desirable for some units, particularly where longer blocks of time are needed in some units to complete some of the learning experiences. The present 40-minute period makes completion of some learning experiences difficult.
Alternative 2. Current Program
With Modified Units

Specified units in the present program would be rewritten to more fully achieve the goals and objectives. To implement this alternative, it would be necessary to:

1. Form a summer writing team to rewrite lessons in selected units
2. Secure new instructional materials to support the revised units.
3. Employ special consultant services to help the staff design tests which measure student performance for certain objectives requiring measurement by such tests.
4. Design performance measurement instruments
5. Provide in-service training for all 7th grade social-studies teachers to review the proposed program. In-service training would emphasize goals, objectives, and evaluation criteria.

Limitation for Alternative 2 are the same as those listed for Alternative 1.

Alternative 3. Individualized Instruction

Each of the units in the program would be supplemented with appropriate supportive materials programmed for individualized instruction. In addition to the regular classroom activity, supplementary lessons would be designed so that the student could progress at his own rate. These lessons would be designed to achieve the program goals and objectives. The program itself would be structured to give the student three days of group instruction and approximately 2 days each week for the student to work at his own speed.

To restructure the program as suggested in this alternative, it would be necessary to:

1. Remodel one classroom in each building to accommodate this activity. Work areas, shelving, etc. would be needed around the perimeter of the room. The classroom itself would contain tables rather than student desks to allow for maximum flexibility. In buildings where more than one section meets during the same period, it would be necessary for teachers to share use of the rooms so that the students could use the programmed materials at different times.
2. Provide individualized programmed material and equipment in this room, including filmstrip projectors, tape recorders, slide projectors, cassette play-back equipment, etc.

3. Assemble a writing team of teachers to restructure the program in the direction of individualized instruction. Preliminary emphasis in the revision would be in designing programming materials so that the student could progress at his own rate of learning.

4. Employ special consultant services to help the staff design tests which will measure student performance for certain objectives requiring measurement by such tests.

5. Design performance measurement instruments.

6. Provide in-service training for all 7th grade social studies teachers to review the proposed program. In-service training would emphasize goals, objectives, and evaluation criteria.

Limitations for Alternative 3

In addition to the constraints indicated for Alternative 1, few teachers have previous experiences in providing diagnosis, direction, and monitoring to individualized learning programs.

Alternative 4. Modified Large-Group/Small-Group Instruction

This alternative proposes that all students in the 7th grade program meet 2 days per week for large-group instruction and 3 days per week for small-group discussion. The 7th grade enrollment at each individual junior high school would be divided into three equal groups for the large-group instruction. One staff member, for each team, would be designated "team leader". The unique abilities of staff members would be utilized through the large-group, small-group organization. To implement this alternative, it would be necessary to:

1. Assemble a writing team of teachers to restructure the program for large-group/small-group instruction.
2. Provide facilities to accommodate large-group instruction, as none exists in four of the five junior high schools.
3. Employ special consultant services to help the staff design tests.
4. Design performance measurement instruments.
5. Provide in-service training for all 7th-grade social-studies teachers to review the proposed program. In-service training would emphasize goals, objectives, and evaluation criteria.

Limitations for Alternative 4:

1. There is a lack of large-group facilities in all of the buildings. Only one junior high school (Schaaf) has an auditorium which could be adapted to this purpose, but even this facility would not be optimal for large-group instruction.
2. The large groups (110-170 students) may not be appropriate for effective learning for all 7th grade students.
3. Staffing for large-group presentation would be a problem in some buildings. An unusually dynamic personality would be needed to hold the attention of 110-170 students.

In what ways does each alternative differ from another alternative?

Predicted Effectiveness for Alternatives

Predictions of effectiveness were made for each objective and for each alternative.

Since many of the measurements of effectiveness are dependent upon test instruments yet to be developed, there is a considerable amount of subjectivity in these estimates. Only after test instruments have been developed and validated can more realistic estimates be made. The predictions of effectiveness for objectives and alternatives are given in Table 14-1.
### Table 14-1. Predicted Effectiveness for Alternatives

<table>
<thead>
<tr>
<th>Goal</th>
<th>Objective</th>
<th>Effectiveness Measures</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
<th>Alt. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Performance Test: Social Science Disciplines</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Student Survey, Volitional Extra Work on Each Unit</td>
<td>50% of students 1 hr/unit</td>
<td>50% of students 1 hr/unit</td>
<td>70% of students 1 hr/unit</td>
<td>60% of students 1 hr/unit</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Performance Test: Knowledge of Interdependence of Man</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Project: Interdependence of Man</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Attitudinal Test: Interdependence of Man</td>
<td>50% of students improve 20%</td>
<td>60% of students improve 20%</td>
<td>70% of students improve 20%</td>
<td>80% of students improve 20%</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Develop Functional Definition of Culture</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>From Generalization Incorporating 10 Reasons for Cultural Differences</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Test on Understanding of Factors in Intolerance</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Exercises to Measure Students Concepts of Self-Worth and Relations to Fellow-Man</td>
<td>40% of students improve 20%</td>
<td>50% of students improve 20%</td>
<td>70% of students improve 20%</td>
<td>50% of students improve 20%</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Attitudinal Test: Dignity and Worth of All People</td>
<td>50% of students improve 20%</td>
<td>70% of students improve 20%</td>
<td>80% of students improve 20%</td>
<td>75% of students improve 20%</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Formulation of Hypothesis on Technological and Social Change in Three Cultures</td>
<td>70% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Test to Measure Understanding of Social and Technological Diffusion</td>
<td>70% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>90% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Definition of Different Kinds of Government</td>
<td>75% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Listing of Advantages and Disadvantages of Three Different Kinds of Government</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>List Eight Rights and Responsibilities of Citizenship</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>80% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>National Citizenship Test</td>
<td>70% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
<td>85% of students score 90% or better</td>
<td>75% of students score 90% or better</td>
</tr>
</tbody>
</table>
Taking into consideration the fact that the effectiveness measure tests have been projected and not developed, considering the descriptions of each alternative, and considering the limitations each alternative seems to have .... is it possible to predict effectiveness for each alternative? You may say YES! or NO! It is highly subjective, but on the other hand, there seems to be quite a lot of information brought to each alternative.
Resource Requirements and Estimated Costs

Budget estimates were made for each alternative and these appear in Table 14-2. Information which provided the basis for the estimates was prepared by the School District Budget Coordinator. The resource requirements were itemized by appropriation account numbers for 1971. The "capital-recovery factor" was used to arrive at equivalent annual costs for the capital costs for the fiscal year. For example, Alternative 4 includes building addition estimates to five junior high school buildings for the purpose of accommodating large-group instruction. Each addition was estimated to cost $100,000 or a total of $500,000 for the five additions. The planned life for each addition was estimated to be 50 years. It was estimated that the borrowing costs would be 5 percent.

Long range cost estimates for alternative courses appear in Table 14-3.

This is a most important consideration so it is vitally important that reliable and accurate support estimates be given. It is unfortunate but true that new or revised programs require funds with which to operate.

It is wise to consider, as was accomplished in the alternative program descriptions, development phase expenditures such as in-service training, special consultant services, etc. and implementing phase expenditures such as facilities and salaries.
TABLE 14.2. RESOURCE REQUIREMENTS AND ESTIMATED COSTS FOR ALTERNATIVES - 7TH GRADE SOCIAL STUDIES

<table>
<thead>
<tr>
<th>Year: 1971</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Appropriation Account</th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>116.02</td>
<td>Classroom Teachers (at $9,927 per year)</td>
<td>12</td>
<td>$119,124</td>
<td>12</td>
<td>$119,124</td>
</tr>
<tr>
<td>116.02</td>
<td>Teacher Design of Performance Measurements</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>116.02</td>
<td>Teachers for Summer Curriculum Revision ($129 each per week + 45%)</td>
<td>4</td>
<td>3,650</td>
<td>6</td>
<td>5,475</td>
</tr>
<tr>
<td>115.00</td>
<td>Typist (Curriculum Revision)</td>
<td>1,440</td>
<td>1,440</td>
<td>1,440</td>
<td>1,440</td>
</tr>
<tr>
<td>116.04</td>
<td>Teachers -- Substitute</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>135.00</td>
<td>Special Services: Consultant for 10 days</td>
<td>200</td>
<td>1,000</td>
<td>500</td>
<td>2,500</td>
</tr>
<tr>
<td>204.14</td>
<td>Textbooks (Replacements and/or Additional)</td>
<td>200</td>
<td>1,000</td>
<td>500</td>
<td>2,500</td>
</tr>
<tr>
<td>135.01</td>
<td>In-Service Training of Staff</td>
<td>12</td>
<td>1,080</td>
<td>12</td>
<td>1,080</td>
</tr>
<tr>
<td>605.00</td>
<td>Teacher Retirement (13%)</td>
<td>15,673</td>
<td>15,673</td>
<td>15,673</td>
<td>13,845</td>
</tr>
<tr>
<td>605.01</td>
<td>Workmen's Compensation (.1%)</td>
<td>121</td>
<td>121</td>
<td>121</td>
<td>105</td>
</tr>
<tr>
<td>607.03</td>
<td>Teacher Hospitalization (2.9%)</td>
<td>3,496</td>
<td>3,496</td>
<td>3,496</td>
<td>2,023</td>
</tr>
<tr>
<td></td>
<td>Subtotal -- operating costs</td>
<td>143,934</td>
<td>149,684</td>
<td>152,509</td>
<td>130,801</td>
</tr>
<tr>
<td>803.00</td>
<td>Classroom Remodeling</td>
<td>5 Rooms @ $700 per Room</td>
<td>337(e)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>804.00</td>
<td>Building Additions (large group instruction facility at 5 buildings)</td>
<td>27,390(b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>805.43</td>
<td>Equipment (Tables &amp; Chairs)</td>
<td>515(e)</td>
<td>1,155(e)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>805.45</td>
<td>Equipment A.V.</td>
<td>143,934</td>
<td>149,684</td>
<td>154,519</td>
<td>159,356</td>
</tr>
</tbody>
</table>

(a) Planned life 15 years; 5 percent interest; equivalent annual cost is .00634 x $5,000 = $317.
(b) Planned life 50 years; 5 percent interest; equivalent annual cost is .05478 x $500,000 = $27,390.
(c) Planned life 10 years; 5 percent interest; equivalent annual cost is .12950 x $1,000 = $1,295.
(d) Planned life 10 years; 5 percent interest; equivalent annual cost is .12950 x $9,000 = $1,165.
(e) Planned life 5 years; 5 percent interest; equivalent annual cost is .23097 x $5,000 = $1,155.

(Decimal multiplier is capital recovery factor; dollar multiplier is capital investment.)
### TABLE 14-3. LONG-RANGE COST ESTIMATES FOR ALTERNATIVES -- PROGRAM: 7TH GRADE SOCIAL STUDIES

<table>
<thead>
<tr>
<th>Year</th>
<th>Operating Costs 1</th>
<th>Capital Costs 1</th>
<th>Operating Costs 2</th>
<th>Capital Costs 2</th>
<th>Operating Costs 3</th>
<th>Capital Costs 3</th>
<th>Operating Costs 4</th>
<th>Capital Costs 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>145,094</td>
<td>149,584</td>
<td>152,109</td>
<td>2,010</td>
<td>130,501</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>156,348</td>
<td>156,348</td>
<td>156,348</td>
<td>2,010</td>
<td>137,053</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>173,546</td>
<td>173,546</td>
<td>173,546</td>
<td>2,010</td>
<td>151,029</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>192,636</td>
<td>192,636</td>
<td>192,636</td>
<td>2,010</td>
<td>167,642</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>213,826</td>
<td>213,826</td>
<td>213,826</td>
<td>2,010</td>
<td>186,083</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>237,347</td>
<td>237,347</td>
<td>237,347</td>
<td>855</td>
<td>206,552</td>
<td>28,555</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Capital costs are based on equivalent annual costs of capital investments.

With all of this information, someone has to make a decision on which alternative to choose! Suppose you are a decision maker in the school district. Taking into account each of the following: goals, objectives, alternative course descriptions and limitations, predicted effectiveness, resource requirements and costs for alternatives and long range cost estimates. Rank each alternative course and justify your ranking in one sentence.

**Rank 1st**

**Rank 2nd**

**Rank 3rd**

**Rank 4th**
SUMMARY

You, as a teacher or member of a planning team may not be responsible for all the activities in the whole process of developing alternative course approaches. You may or may not have the time to develop the detailed king of alternative course approaches that we reviewed in the case study; but it involves important considerations that shouldn't be overlooked.

Let's summarize what course information should be available, uncovered or developed by the teacher or planning team as a preliminary step in planning instruction.

Philosophy, school goals, subject content should be available

Topics, course goals, Course objectives, Learning objectives, Alternate course approaches may be available or may need to be grouped constructed, or developed

Provides information you will need for instructional planning and development. You may need to uncover and construct some of the information depending on your own situation.
Module No. 2

LEARNER CHARACTERISTICS AND CAPABILITIES

We are moving toward course patterns in which students can actively pursue much of their learning at their own pace and on their own time. In some cases, students can participate in the selection of their learning experiences and instructional materials. You may plan for all students to study the same subject content and use the materials in the same sequential order. Or you can possible make two, three, or more paths available to students with the choice for each student based on background knowledge of him and on his preparation for studying the topic as determined by pre-test results.

STOP

What are three course patterns that you could plan for students?
1. __________________________________________
2. __________________________________________
3. __________________________________________

Whether you are interested in designing instruction for students on an individual study basis or in following a more traditional classroom procedure, it is essential that you become informed about the characteristics and capabilities of individual students and of the nature of the group.

We recognize that different students learn in different ways and that some students find certain methods more appealing and effective than others. Although no one has yet clearly defined the individual learning styles, it is known that some students profit more from a visual (picture-centered) approach; others from verbal (listening and reading) experiences; and still others from physical activities and the manipulation of objects. Many students benefit from combinations of these three approaches. Also, the time required for accomplishing a given task varies from individual to individual. It also varies for the same person engaging in different though related tasks. Therefore, it is understandable why a variety of methods, resources, and paths should be provided for different students to attain a particular objective.
Individual learning style is a learner ……….

What are the three approaches mentioned here that students may profit more from - in combination and varying from individual to individual.

1. __________________________________________

2. __________________________________________

3. __________________________________________

Students are different. We have said that in attaining particular objectives we may provide different ………, ………, and ……….

It has been suggested that in an individualized learning program at least three separate approaches be designed for students in order to take different learning styles into account. Each student may then be permitted to select those activities and materials he would prefer to use to accomplish a given objective.

We like to think that instruction is "learner oriented".

In a course that is less individualized and more group oriented, do you need to consider learner characteristics? Why or Why not?
Student characteristics will affect your decisions concerning the selection of objectives, level at which to start a topic, depth of treatment, and variety and extent of learning objectives to be planned. Such factors as the following might be taken into consideration:

- Background in and motivation for studying the subject.
- Personality
- Previous experience in subject field
- Age
- I.Q. or other measure of intelligence
- Etc.

You also may wish to consider the contextual environment of the learner.

- Living or dormitory arrangements
- Study time available
- Free time
- Social peer pressures
- Socio-economic home conditions

If you do wish to use information concerning student characteristics - where can you obtain it? - usually from student records and reports, consulting with other staff members, counselors and advisors, right? But how about asking the student? The students themselves are often overlooked as potential sources of information about themselves. Student questionnaires and pre-tests will also help you with your specific planning decisions relative to student characteristics.
As we have discussed, course patterns could range from the student's selecting their own learning experiences and materials; to making alternative paths available to students; to instructor selection of one path. A learning experiences and materials continuum might look like this:

<table>
<thead>
<tr>
<th>Students</th>
<th>Alternate Path</th>
<th>Instructor Selects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Select</td>
<td>Made Available</td>
<td></td>
</tr>
</tbody>
</table>

All planned instruction will fall somewhere on this continuum. List some learning experiences that best fall into each of these categories:

**STUDENTS SELF SELECT**

**ALTERNATE PATHS**

**INSTRUCTOR SELECTS**

What would you consider as important student characteristics and student environment conditions which would affect your planning in courses you are responsible for?

Below is a list of characteristics and conditions. Rank each characteristic or condition as you see its importance.
Circle the appropriate number following each characteristic or condition.

1. Age 1 2 3 4 5
2. Maturity, Attention, Interest 1 2 3 4 5
3. I.Q., ability-capability 1 2 3 4 5
4. Personality 1 2 3 4 5
5. Biographical information 1 2 3 4 5
6. Previous grades 1 2 3 4 5
7. Achievement, Aptitude Test Results 1 2 3 4 5
8. Background in subject 1 2 3 4 5
9. Motivation for studying the subject 1 2 3 4 5
10. Reading level 1 2 3 4 5
11. Study habits 1 2 3 4 5
12. Living or dorm arrangements 1 2 3 4 5
13. Study time available 1 2 3 4 5
14. Social Peer Pressure 1 2 3 4 5
15. Socio-economic home conditions 1 2 3 4 5
16. Handicaps 1 2 3 4 5
17. Talents 1 2 3 4 5
Now that you have completed the ranking, did you find that some characteristics were important and some not, some could be considered important no matter what learning experiences and material patterns were chosen, and some were just not important at all?

If you compared your list with someone else on your team would it be the same?

To summarize, in actual planning it is vital to:

- Make a list of all pertinent data about students and keep it before you for reference as you proceed to plan instruction.

Let's suppose that you have now acquired general background knowledge about individual students. In order to plan learning activities for which the student is prepared and at the same time to ensure that the learner does not waste his time on things he already knows, it is important to find out specifically:

1) to what extent each student has acquired the necessary prerequisites for studying the topic, and
2) what the student may have already mastered about the subject to be studied.

This information can be obtained by pre-testing the learner. Do we want students to waste time on things they already know? __________

What two kinds of learner capability information do we need to plan learning activities and experiences that will be meaningful?

1. ____________________________________________________________________________________

2. ____________________________________________________________________________________

Yes, two kinds of tests are required. The first,

A prerequisite test, determines if the student has the appropriate background preparation for the topic - for example, can the student perform basic arithmetic at a level that qualifies him to start learning algebra? It is useful to prepare a complete list of
of competencies in order to establish the basis for constructing the prerequisite test. This test can be the paper-and-pencil kind, or, if it is more appropriate, some other measuring method might be used.

What does the prerequisite test determine?

The results of this prerequisite test will indicate which students are fully ready for the topic, which ones need some remedial work, and which students are not ready and should therefore start at a lower level.

Prerequisite test results should indicate students that are for the subject, students that need some work and those students that are ________________________________.

One of the biggest problems in constructing a prerequisite test may be: (Check correct answer)

a) getting students motivated for the test
b) deciding on a testing method to be used
c) putting together a list of competencies to establish a basis for the test
d) determining if the student has the appropriate background.
The second reason for pre-testing is to decide which of the learners' capabilities have already been achieved in relation to the learning objectives. This is a pre-test of the topics in the course that is being planned. It may be possible to select or adopt questions and problems from the measurement instruments which might be already developed for the learning objectives.

Some authorities recommend pre-testing learners by using the actual evaluation tests for both pre-testing and final evaluation. In the same sense, the measurement test (which is sometimes called a post-test) for one topic could serve as a prerequisite test for the next, related topic to be studied.

Another pre-test method, a pre-topic questionnaire, or even an informal oral pre-test by asking questions of the class ("How many of you have ever used a sphygmomanometer?") and having the students reply by a show of hands can be used to determine student experience with a topic. A questionnaire, in which each student indicates his level of skill or knowledge for all items to be studied, may even go further than the few questions of a pre-test in determining levels of competence and readiness for upcoming instruction.

Pre-testing of the topics in a course may be accomplished by ____________________________ or ____________________________

For more traditional instructional situations in which students move together through all teacher-sequenced experiences, pre-testing may be of little value. But if you plan to individualize instruction, then both the prerequisite test and the pre-test are of particular importance for determining student readiness and the proper level at which a student should start the program. The pre-test results enable the teacher to organize and schedule students with maximum efficiency. Pre-tests also weed out those students who are not ready for the course as well as those who are already familiar with the material.
If you are planning to provide alternative paths for learners in the course, or if you intend to contract with students for certain learning experiences or if you are going to make the course more individualized, what value does pre-testing and prerequisite have?

(Answers - determining learner readiness, and appropriate level at which he may begin the instructional sequence, organizing and scheduling students efficiently and selecting out students)

There is another purpose that may be served by the pre-test, although some educators consider it to be secondary and controversial. When students read pre-test questions or otherwise experience the things they will be learning, their interest in the topic may be aroused. On the other hand, their interest may be sharply reduced. Motivation and interest are often fickle. Therefore, be quite sure that students understand the purpose of pre-testing. Taking a test is often a traumatic experience for students and when they must reply to questions, problems, or situations with which they have little, if any, knowledge or experience, they may experience considerable frustration. Students should be told that the tests in no way count toward grades.

Finally, the results of pre-testing may also affect instructional planning. It may be necessary to eliminate, modify, or add objectives to the program after the pre-test results are analyzed.
To sum up, we have discussed learner characteristics and capabilities, why and how instructional planning is affected by consideration of individual learner variables.

In order to avoid frustration, you may wish to consider the principle of trade-off - you may wish to provide for individual differences by allowing each learner to select his own program - BUT; this may not be feasible or possible because of time, cost and other constraints. So, you should consider those characteristics and capabilities that relate to your intentions which have been modified by reality.

References:
LEARNING OBJECTIVES/CLASSES
Module No. 3

What should students know, be able to do, or in what ways should they behave differently after studying this topic?

Before beginning to read this module, refer to the self-test quizzes on pages 7, 8, 15. If you complete any of them successfully, you should not need to study the sections to which they refer.

We speak of learning objectives because our concern is with learning as the outcome of instruction. Learning requires active effort by the learner. Thus, all objectives must be stated in terms of activities that will best permit student learning.

Writing objectives is a developmental activity that requires refinements, changes, and additions as the writer considers subsequent planning steps. For some teachers, objectives become evident only after subject content is outlined. Sometimes it is not until learning activities are being selected that the "real" objectives for a topic become clear. Therefore, expect to start with loosely worded objectives, move ahead in the planning sequence, and then return to spell out the objectives in detail as each one becomes more evident.

The important point here is that fairly precise behavioral objectives are essential before learning activities can be selected. It is only after stating measurable objectives that we know specifically what it is that we want to teach and can determine whether we have accomplished it.
Learning Objectives/ System Goals, Course Goals, Course Objectives

Learning objectives should not be confused with overall system goals, course goals or course objectives. The latter three are discussed as part of "course information" (Module 1), and are generally considered as part of the input for instructional development. System and course goals express the teaching aims for each of those levels, and course objectives express learner aims for the course as a whole. Learning objectives, as we have seen, express learner aims for particular learning experiences.

Indicate by the letters SG, CG, CO, or LO whether each of the following statements is a system goal, a course goal, a course objective or a learning objective:

1. To be satisfactorily assisting patients in the ward to meet their basic physical needs at the time of nine out of ten observations by the instructor.

2. To provide opportunities to acquire knowledge and skills related to the fundamentals of nursing patient care.

3. To train and educate students so they take responsible roles in the health community as medical technologists, physical therapists, dieticians, occupational therapists, or x-ray technicians.

4. To exhibit a satisfactory understanding of medical-surgical nursing concepts by regularly applying them in practical situations to the satisfaction of each of the supervising instructors.

5. To expand the student's base of knowledge and skills in the care of medical-surgical health problems through study of basic pharmacology and pathology.

6. To perform surgical aseptic techniques satisfactorily in three randomly chosen practice sessions and in at least two actual surgical settings under supervision.

If you marked the above statements as follows, you are able to differentiate learning objectives well enough to go on with this module: 1-LO; 2-CG; 3-SG; 4-CO; 5-CG; 6-LO. If you did not answer all of the above correctly, you may wish to review the module on Course Information.
Writing Objectives

One reason that many of us shy away from stating precise objectives is that a demanding mental effort is required to formulate them. Each objective must be an unambiguous statement. It must mean the same thing to other teachers and to all students who will use it.

The detailed consideration of what the student should learn that is necessary in writing useful objectives can be disturbing and frustrating. However, the difficulties and frustrations soon are taken in stride because the individual gradually develops a habit and pattern for expressing the desired outcomes for student learning.

An objective is a precise statement that answers the question: "What does the student have to do in order to show that he has learned what you want him to learn?" Ask yourself this question each time you start to formulate an objective. To answer this question satisfactorily, you should write objectives that consist of three essential parts:

1. Start with an action verb that describes a specific behavior or activity by the learner:
   - identify
   - differentiate
   - demonstrate
   - apply

2. Follow the action verb with the content reference that describes the subject being treated:
   - Identify selected theorists in the field and differentiate between their theories
   - Demonstrate intellectual curiosity
   - Apply knowledge of research methods

3. End with the performance standard that indicates the minimum acceptable accomplishment in measurable terms:
   - Identify all selected theorists in the field by stating the major benefits of their theories as stated in class and differentiate between theories by concisely comparing the various elements to the satisfaction of the instructor.
Demonstrate intellectual curiosity by independently seeking and reading at least two books or articles contributory to a deeper understanding of the subject.

Apply knowledge of research methods to plan, conduct, and evaluate one research project during the year that meets school standards for acceptable projects.

Selecting the "Action" Verb

The selection of the appropriate action verb that describes the required student behavior often is the most difficult part of objective writing. Here is a general list of action verbs often used:

- apply
- arrange
- build
- compare
- contrast
- define
- demonstrate
- distinguish
- duplicate
- explain
- identify
- list
- make
- name
- order
- recall
- repeat
- show
- solve
- state
- tell
- write

Some writers have offered groupings of these terms in order to simplify the choice of words. Ely and Garlach categorize five key verbs as representative of most activities in the cognitive (knowledge) category. Their list, together with a partial listing of verbs for which they substitute, are as follows:

- identify - select, distinguish between, discriminate between, mark, match, point out, clarify
- name - label, list
- describe - tell why, define, tell what happens when
- construct - prepare, draw, make, build
- order - alphabetize, rank, arrange in order, list in order, sequence

Romey suggests that objectives can be classified according to levels of behavior. Some action verbs describe relatively simple, more or less mechanical kinds of behavior. Others refer to a complicated chain of mental operations that demonstrate a clear grasp of a major concept. Verbs like recall, define, list, explain, and state are on the lowest level of cognitive learning. Verbs like find, make, compute, identify, and recognize all indicate a second level of behavioral objectives. The third level, which
requires the application of more complex mental operations may include these verbs: prove, analyze, compare, contrast, relate, justify, interpret. Finally, such verbs as infer, predict, discover, reorganize, generalize, and discuss are on a level of original thought. When students are able to perform on this level they demonstrate a firm grasp of a major concept.

Giving the Content Reference

Certainly the teacher of teams of teachers is well equipped to state the content reference in the objective. It is worthwhile, however, to remember two things:

1. The content reference must relate to one or more subject content categories as well as the course goals and objectives. These should be made ready reference whenever writing learning objectives.

2. Be as concise and explicit as possible. One reason for writing learning objectives is to communicate with students. Always examine the assumptions you make about the student's understanding of vocabulary, context and relationships.
Setting Performance Standards

Usually the performance standard you choose will be based largely on your experience or intuition about the objective and what it takes for students to really learn it. If you are inexperienced in teaching a given area you will want to consult authors or others on your team.

It will help structure your thinking about performance standards if you think of them in terms of quality, quantity and time. Quality of performance has to do with the accuracy of a student's response. Is he to perform at 90%, 95%, 80% level? Quantity indicates the completeness of the response. Must he list all the theories pertinent to the subject, or any three? Time, of course, simply gauges the speed with which a response is given. Time can be important for some kinds of objectives, but, you should be careful not to artificially set time limits where they are not necessary, because individuals learn and respond at different rates.

It is important to remember that in most cases, unless you specify differently, you are implying "100%", or "all" or "every" as your standard.

Rate each of the following learning objectives as follows:

<table>
<thead>
<tr>
<th>Action Verb</th>
<th>None</th>
<th>Poor</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Reference</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Performance Standard</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Minimum points = 0  Maximum points = 6

1. The student will be able to comprehend thoroughly the ways in which our constitution permeates our everyday life.

2. When presented with a list of nouns and pronouns, the student will be able to label each word correctly.

3. Student will be able to see the value of reading the "classics" in his leisure time.

4. The student will be able to write an essay employing one of three logical organizations given in class which exhibits no grammatical errors.

5. The student will be able to learn the number of voters in his precinct.
6. The student will be able to list those articles in the constitution which relate to "due process of law."

7. Students will realize the importance of knowing the approximate date at which a given literary work was produced.

8. The teacher will cover the key tools of the chemistry lab, that is, the Bunsen burner and various types of test tubes.

9. Given a list of 10 actual municipal court decisions, the student will be able to select the six which violate key tenets of the constitution and subsequently write an essay briefly explaining the nature of these violations.

10. The student will orally recite the names of six chemical compounds containing three or more elements.

11. The student will be able to cite some of the literary "classics" and briefly describe in an essay those features which give them universal appeal.

12. The student will grasp the significance of civic responsibility.
The author rated the above objectives as follows:
1-2; 2-6; 3-2; 4-5; 5-2; 6-5; 7-2; 8-0; 9-6; 10-5; 11-3; 12-2.

The Student and His Objectives

Plan to inform the learner of the objectives he is to pursue. Such knowledge is instructive and also motivational. The student should know specifically what is expected of him and against what standard he will be evaluated.

Students often question the merits of much of what they are directed to study, and we owe it to them to state why it is important for him to study a particular objective. One approach is to include a statement of justification explaining why the learner should study the content supporting the objective and where it fits within the topic. This approach may not be necessary when the reason for an objective is obvious, but for many objectives, a statement of justification has real value. Formulating a statement of justification may also serve as a check on the logical sequencing of your objectives.

At some time in the future mature students may undertake on their own, or share with teachers, the decisions about what they will learn instead of having it all done for them by teachers and curriculum planning groups. In this way, students will be able to decide on topics they wish to study and select the objectives they want to achieve.

Limitations of Objectives

The suggestions offered here should facilitate the specifying of measurable learning objectives, particularly in the cognitive and motor-skills areas. These objectives generally relate to short-term goals attainable in one semester or one school year. Some, however, may contribute to long-term goals, such as the development of research, analytical, or decision-making abilities over which you have little or no control. These high-level
objectives may not be fully measurable until years later in schooling
or until the individual becomes an active member of society and is in
his profession or vocation.

When we turn to the affective area, for example, we do find it more
difficult to specify objectives in clearly observable and measurable terms.
Some behaviors in this area are hard to identify, let alone to name and
measure. How, for instance, do you measure an attitude toward becoming
a good citizen, or an appreciation of poetry? This must be done indirectly
from secondary clues. For example, to measure good citizenship, observe
how the student treats other members of the class. Find out if he participates
actively in student government or shows other manifestations of practicing
the democratic process. For appreciating poetry, find out if the student
voluntarily selects poetry books from the library. Does he ever write
poetry when given an optional assignment in his English class?

Admittedly, these are only indications of the possible successful
fulfillment of an attitudinal objective and are not direct measures of it.
But such evidence does suggest that objectives in the affective area can
be stated in a way that will enable the teacher to measure the outcome
to some degree.

You should be aware that in any program there may be times when objectives
need modification as the unit or course proceeds. You may have misjudged
student preparation and readiness for pursuing an objective, or you may
discover a new area of importance during discussion or student study that
should be investigated. In either case, be flexible. Revise an objective
or add a new one as student needs indicate.

Finally, there is often a concern that when the exact learning outcomes
expected from students are precisely stated, we are mechanizing instruction
and in so doing we eliminate the unknown or unpredictable outcome that may
be as important as the stated, anticipated results. This is not a valid
argument against the pre-planning of objectives.

You should include in your instructional plan a way to incorporate
any unforeseen results that may appear during the formative stages of a
new program. This makes it necessary to update and revise a sequence of objectives as the program is tried out. On the other hand, if you want outcomes that are unique to individual students and creative in scope, then by all means plan carefully for them by preparing objectives that will direct learning experiences toward such results.

In summary:
1. Learning objectives tell the instructor and the student how they will be able to tell when learning is successfully completed.
2. Learning objectives are different than system goals, course goals, and course objectives.
3. Learning and therefore learning objectives can be classified as cognitive (6 categories), affective (5 categories) or psychomotor.
4. A good objective may contain much specificity, but it at least must have (1) an action verb; (2) a content reference; and (3) a performance standard.
5. The learner should be informed of his objectives, and if possible have a part in developing them.
6. One of the limitations on objectives is that some can be measured well only long after the student has left school. Approximations must be made in such cases.
7. A systematic way to modify and improve objectives should be part of any instructional development.
Classification of Learning Objectives

Objectives for learning can be grouped into three major classes.
(1) The cognitive area refers to objectives concerned with knowledge or information, and intellectual abilities: identifying, discussing, solving, and so on. (2) The second class is affective objectives. It considers behaviors relating to feelings, emotions, attitudes and appreciation: enjoying, conserving, respecting, and others. (3) A third class consists of psycho-motor (motor skills) learning. This involves skills requiring the use and coordination of skeletal muscles: performing, manipulating, constructing, and so on. All learning objectives can be developed within one of these three classes.

Bloom and others have written a taxonomy of educational objectives in the cognitive domain which includes the following areas (some exemplary verbs follow each section):

1. **Knowledge** (recall of specifics and universals; the recall of methods and processes; the recall of patterns, structures or settings.) Define, List, Identify, Indicate, Label, Locate, Select

2. **Comprehension** (apprehension of what is being communicated without relating it to other material or seeing its fullest implications.)
   Translate, Read, Interpret, Distinguish, Draw Conclusion, Classify, Derive, Estimate, Convert, Recognize

3. **Application** (use of abstractions in particular and concrete situations)
   Apply, Compute, Construct, Make, Draw, Demonstrate, Participate, Prepare

4. **Analysis** (break down of a communication into its parts so each part and its relationship to the others is clarified.)
   Perceive, Analyze, Determine, Differentiate, Deduce

5. **Synthesis** (putting parts together to form a pattern or structure not previously apparent.)
   Combine, Organize, Design, Develop, Plan, Produce, Write (Organize)

6. **Evaluation** (making qualitative and quantitative judgments about the extent to which an idea, attitude or action meets criteria set for it.)

Krathwohl and others\textsuperscript{2} have formulated a similar taxonomy for affective objectives. It has five major areas:

1. Receiving (willingness of the student to be aware of an event and to pay attention to it.)

2. Responding (the student reacts to an event through some form of participation.)

3. Valuing (the event has value to the student and he treats it as a belief or with a positive attitude.)

4. Organization (as the student encounters situations for which more than one value is relevant, he organizes the values, determines the interrelations, and accepts some as dominant.)

5. Characterization by a value or value complex (the student consistently acts in accordance with the values he accepts and this behavior becomes a part of his personality.)

The headings of the affective domain, like those of the cognitive domain, form a continuum for attitudinal behavior from simple awareness and acceptance to eventual personal "internalization" as attitudes become part of the individual's practicing value system.

Taxonomies of objectives can be useful to you in writing your objectives and your tests to conform with the type of learning you actually intend.

Detail of the psychomotor classification has not been well developed. However, it is important to ask two questions when developing objectives in this area:

1. **To what extent must the skill become habit?**
   
   Is it something the student must do at an instant's notice without time to think, and without time to relate this skill to other activities? Is it something he will do every day of his life, or infrequently? Will he be able to think through a check list, or must the sequence be internalized.

2. **How does this skill relate to other skills and knowledge?**
   
   Are there prerequisite skills? Is it one in a sequence? Does it depend on some cognitive cue for appropriate initiation? Does it require parallel cognitive (logical) development to determine its application?

Before going on, test your understanding of classification of objectives by classifying the following:
Identify each objective below by indicating the correct classification in front of the objective according to the following scheme:

<table>
<thead>
<tr>
<th>Cognitive</th>
<th>Affective</th>
<th>Psychomotor</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1 (Knowledge)</td>
<td>A-1 (Receiving)</td>
<td>P</td>
</tr>
<tr>
<td>C-2 (Comprehension)</td>
<td>A-2 (Responding)</td>
<td></td>
</tr>
<tr>
<td>C-3 (Application)</td>
<td>A-3 (Valuing)</td>
<td></td>
</tr>
<tr>
<td>C-4 (Analysis)</td>
<td>A-4 (Organization)</td>
<td></td>
</tr>
<tr>
<td>C-5 (Synthesis)</td>
<td>A-5 (Characterization)</td>
<td></td>
</tr>
<tr>
<td>C-6 (Evaluation)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The learner:

1. is able to choose the best of two solutions to a geometry problem using standards given by the teacher.
2. exhibits tolerance for others by displaying good manners toward those of minority groups.
3. lists the names and contributions of the five key curriculum workers as described in class.
4. properly knits a baby blanket.
5. attends all class sessions, or provides valid medical excuse
6. plays table tennis according to rules well enough to beat three inexperienced players 80% of the time.
7. states three ways the Gettysburg Address pertains to current personal, social or political situations (excluding those discussed in class).
8. displays interest in higher mathematics by volitionally attending lectures on this topic.

If you did not correctly identify at least seven of the above, you may wish to further study classification of learning objectives, using Bloom, Krathwohl, or another source. (1:C-6; 2:A-3; 3: C-1; 4:P; 5: A-1; 6:P; 7:C-3; 8: A-2 or A-3)
DESIGNING TEACHING-LEARNING EXPERIENCES

It is our purpose in this module to help you select teaching activities and student learning experiences that will enable the largest possible number of students in your course or group to master the learning objectives at an acceptable level in a reasonable amount of time.

Unfortunately, there is no formula for matching activities to objectives. What works for one teacher or with one group of students can be unsatisfactory in another situation. You need to know the strengths and weaknesses of alternate learning experiences. Then, with that background, you can make your selections in terms of student characteristics and needs that will best serve the objectives that you have established.

With guidance, most teachers and instructional teams can determine course goals and objectives, list learner characteristics, establish learning objectives, develop evaluation and testing approaches, indicate content and prepare pre-tests. Additionally, teachers generally have the skill and experience to decide on communication patterns, particularly the types applied in traditional classroom instruction, such as lectures, audiovisual presentation, class discussions, supervised group work, and independent study. But the teacher may not be familiar with newer forms of information-presentation, practice and feedback techniques and independent student learning experiences. Professional help may be required for making decisions about when to use, how to implement newer techniques.

In discussing the design of teaching-learning experiences, we will consider three aspects of the design; kinds of learning, communication patterns and learning experience forms.

KINDS OF LEARNING

It is important to ponder what is an idea, concept, objective, skill, knowledge or information bit in three dimensions related to learning.

1) When a student is first introduced to, or introduces himself, or becomes interested in .... "learns about"
2) When a student works with a set of ideas or concepts, principles, or skills ............ "is learning"

3) When a student confirms mastery of an objective, examines his competence in something, achieves or masters a skill or knowledge ............ "learned?"

The three kinds of learning are different and require different communication patterns and forms of learning experiences set in differing time frames.

INSTRUCTIONAL COMMUNICATION PATTERNS

Given that several students are sufficiently motivated and capable of a specific learning (achieving a specific objective) will the same communication pattern be equally effective for all the students? The answer would be quite valuable in selecting instructional communication patterns which will optimize learner needs while adhering somewhat to institutional requirements and constraints.

Two issues are related to optimizing learner needs through school services (such as communication patterns:

A) to serve the student.... It has been said that some students learn more and better with more and less structure. This is a moot issue, but student variability exists, we should recognize it by adopting our instructional communication patterns according to needs as seen by students and teachers.

B) to serve the school.... It must be recognized that the school as it exists today is an institution and its ends must be served, probably best through efficiency; use of student time, school facilities and equipment.
Instructional communication patterns involve distinct teacher and student verbal and non-verbal behavior including actions, reactions and relationships. Used in instructional settings, these types of behavior can be grouped into four groups of instructional patterns: direct presentation, interactive group, questioning and independent. We should give careful consideration to how we use each of these four instructional communication patterns when designing learning experiences.

STOP

An understanding of the four instructional communication patterns are necessary in instructional planning and developing.

Name the four instructional communication patterns:

STOP

Let us now examine each in detail.......

As diagrammed above, the teacher or a student tells, shows, demonstrates, dramatizes, or otherwise presents subject content to a student group of any size. This can be done in the classroom, auditorium, or some other place. The teacher or student in front of the group, may only talk. He may also utilize audiovisual materials, such as overhead transparencies, recordings, slides, or motion pictures, each singly or in various combinations. The presentation process can also take place without the teacher's being physically present if his presentation is on film, audiotape with slides, or videotape.

Each of these methods illustrates the one-way transmission process of a presentation - from teacher to students or from student to students. However, one should not assume a condition of mass communication in the sense that the same message is being communicated to all listeners. Listeners and viewers with different backgrounds get different responses to "the" message that is being communicated.

When a teacher makes a presentation, he may provide the students with printed outlines or other hand-out materials. He might direct the students to take notes during the presentation. In this kind of teaching situation students are generally passive.

Learning seems to take place more effectively when students are active. It is desirable to incorporate student participation activities as part of the presentation format. By "participation" we mean that the student makes physical movements or is challenged mentally to do something. Some teachers provide printed outlines and diagrams or other hand-out materials that serve as a guide for the presentation. Students are directed to add their own notes. Another technique involves the use of work sheets on which students respond to questions or problems that are interspersed throughout the presentation.
The current trend is to reduce the amount of time spent in teacher-presentation activity in favor of more time devoted to independent experiences by students. In this way a student can be actively engaged in learning most of the time. Even though this trend becomes more widely accepted, presentations can still serve to accomplish such things as: introducing new topics, providing orientation, motivating students, creating interest in a subject, integrating a topic with other topics and subject matters, and providing special enrichment materials and resources.

The direct presentation instructional communication pattern is commonly used and abused by its use to achieve ends for which it is not well designed and by poor execution of direct communication principles.

Successful use of direct communication instruction is enhanced by:

- The message should be perceived by the listener as having utility.
- The communication is clear and coherent.
- Appropriate use of figure-ground relationships focusing on the major points to be communicated.
- Appropriate use of concrete and abstract, personal and impersonal examples.
- Communicator needs to accurately read the subtle cues from his listener that say such things as, "I don't understand" or "I think you're wrong and I wish I could tell you so," and then ask for feedback that will lead to clearer messages.

Direct presentation instruction communication can create and perpetuate a condition of learner dependence. On the other hand, when used appropriately, it is consistent with development of self-direction. The learner recognizing that he needs more information to achieve his objective, can involve himself in a direct presentation communication through questioning.
1. What is the main feature of the direct presentation instructional communication?

2. Should a teacher try to get learners to become more active during a presentation?

3. What can be accomplished during presentations?

4. Six ways to successfully use direct presentation instruction were given. How many can you identify?
II QUESTIONING COMMUNICATION

<table>
<thead>
<tr>
<th>Developer</th>
<th>Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asks questions</td>
<td>Responds to questions</td>
</tr>
<tr>
<td>Responds to clarification</td>
<td>Seeks clarification</td>
</tr>
<tr>
<td>Seeks clarification</td>
<td>Responds to clarification</td>
</tr>
<tr>
<td>Gives feedback</td>
<td></td>
</tr>
<tr>
<td>Yes, no, accepts, judges</td>
<td></td>
</tr>
</tbody>
</table>

In this instructional communication pattern, the teacher asks questions and/or asks for clarification, and the student responds or asks for clarification... or vice-versa.

The successful use of questioning and clarifying is highly dependent on three factors:

1) alertness and sensitivity to the meanings imbedded in the communication
2) asking questions that can be answered
3) careful sequencing of questions to:
   a) shape behavior
   b) draw out knowledge from which conclusions or hypotheses can be formed
   c) diagnose learning difficulties.

These instructional communications can also create extreme dependency on the teacher, other students or materials providing answers; or they can be used as instructional techniques that place the student in an excellent position to direct and be responsible for his own learning.

Questioning instructional communication puts the student in direct contact with the teacher and other students. Questioning and clarifying are often a way to deal directly with affective objectives. How can questions and clarifications from both students and teachers assist the achievement of affective objectives? Questioning and clarifying are basic interactional behaviors. These behaviors become more complex when used in group communication.
1. What are the distinguishing features of questioning instructional communication?

2. What three factors can enhance the successful use of questioning and clarifying?

3. What are some positive advantages of the interactive element in questioning communication?
Two kinds of group interactions may be seen:

1) T seeks clarification S presents information 
   accepts S asks questions 
   processes the discussion S responds to questions and 
   clarification S seeks clarification

In this group interaction, the teacher plays the primary role of moving the group discussion toward the group goal. Students will probably make use of a wide range of behaviors because it is they who structure the problem solution and it is they who receive and draw from others the knowledge necessary to solve the problem or achieve the group goal.

2) Group

   S asks questions 
   S responds 
   S seeks clarification 
   S responds 
   S presents information 
   S accepts and evaluates

Students in this group interaction, often structure their own purposes for the activity and engage in group discussion to achieve their goals.

One key to the successful use of interactive group communication patterns is the establishment of "group life". The group, as perceived by its members becomes an entity which group members think of and feel about as something very real. Transcending the individuality of individuals, it is something that happens to individuals in real group settings (perhaps even in simulated group settings!) When the condition of creating a "group life" has occurred, then in a real sense, it is the group that does the instructing. The teacher's
The role becomes one of facilitating the group activities. Another key is in the nature of the interaction itself. The importance of interaction cannot be overemphasized. It gives students and teachers the opportunity to get to know each other face-to-face. To be of maximum benefit to students, the interaction group should probably consist of no more than twelve people. From 8 to 12 participants seems to be an ideal number to encourage interaction.

The interaction group should carry on discussions that will review, clarify, correct, reinforce, and apply the learning that has resulted from independent study and presentation sessions.

The presentation and independent communication patterns may work satisfactorily to achieve objectives in the cognitive and motor-skill categories. Although some attention to objectives relating to attitudes and appreciations can be given in presentations and independent study, the best way to deal with affective objectives and questioning is with interaction. Through the give-and-take of discussions, students can be motivated and helped to sharpen their judgments and discriminations, to deal with new and novel situations and unpredictable happenings, and to approach attitudinal objectives, which we find so hard to define and state in carefully measurable terms.

The interaction group should not occasion the time for a lecture or any other lengthy presentation. Instructors who are unprepared for an interaction meeting or are inexperienced with this type of activity may fall back on lecturing for their own security. A teacher who is new to this kind of responsibility sometimes finds that much practice is necessary before he can successfully become a participating member of the group rather than the dominating member.

In interaction groups, the instructor may plan to have available some of
the materials and other resources used in presentations and for independent study. They could be useful when questions are raised and points amplified that may not have been satisfactorily discussed elsewhere.

Other values to be derived from interaction are:

- Students experience critical listening and oral expression through organizing and presenting ideas.
- Recognition given students who need encouragement.
- Identify the student who may be making poor progress.
- Instructors can be seen by students on a more human level, if the instructor is willing.

STOP

1. Describe the two kinds of group interaction communication and teacher and student behavior in each.

2. What is "group life" and what is the teacher's role in it?

3. Describe some advantages of group interaction communication.

4. How can a teacher learn the skills of being a good discussion facilitator?
IV. INDEPENDENT COMMUNICATION PATTERNS

The student works independently with his own ideas or with instructional materials that he manipulates to facilitate his own independent learning.

Independent study is receiving the most attention by persons interested in revising instructional procedures. There is much evidence to support the theory that learning must be accomplished by the individual for himself and that it takes place best when the student works at his own rate, is actively involved in performing specified tasks, and has successful results. This means that, ideally, a separate set of learning experiences for each objective should be designed for each student according to his individual characteristics and needs. Some experiments involving computer-based instruction are moving in this direction. By recognizing that active participation is a key element for learning, most teachers can design experiences for students that range from a carefully structured program to one that allows the student complete freedom and responsibility and enables him to choose his own experiences and materials and decide on the sequence for their use.
Various terms are applied to this pattern: self-instruction, individualized learning, individualized prescribed instruction, self-directed study, and independent study. The important features for the student are self-responsibility, self-pacing, and successful learning.

Within the framework of independent study certain other procedures are applied. As a student works by himself, he does so without the intervention of the teacher. When dealing with a subject that the student knows little about, it is essential that his learning experiences be carefully constructed and detailed. It is essential, however, that the learning experiences be carefully sequenced and that the material for them be precisely organized. Then the student's mastery of each step needs to be checked before he proceeds to the next one. To do this it is necessary to question the student or otherwise challenge him to demonstrate his new understanding. He then receives immediate confirmation (feedback) of the correctness of his reply or other effort. With success, he can confidently proceed. When difficulties arise he may ask the teacher for help. This, in independent study the student is continually challenged, experiences success, and learns the results of his efforts immediately.
Design Principles for Independent Communication Instruction

Many of the procedures employed in independent study activities are derived from research in human learning. Most learning psychologists agree with the following principles:

1. Pre-learning preparation: Students should have satisfactorily achieved the background learning that is prerequisite to the lesson. Unless the former learning has been soundly acquired, the subsequent learning may be rote and not easily related by the individual to the unit or total course structure.

2. Motivation: When a student is helped to become interested in a topic, or if a desire to learn about the topic can be encouraged, his attention will be captured and held.

3. Individual differences: Students learn at various rates, therefore learning experiences should be designed so that each student may proceed at his own pace and possibly on his own ability level, using materials that are most appropriate for him.

4. Active participation: Learning is an activity that must be performed by the student and not by the teacher through some kind of transmission process. Therefore, for successful learning, a student should be directed systematically to participation activities. The teacher's main function is to organize and make the materials available to students in the best possible form.

* Jerrold Kemp, Instructional Design, Fearon Publ., Belmont, Calif, 1971
5. **Successful achievement**: Learning must be structured in such a way that the student is mentally challenged and is frequently successful in his accomplishments.

6. **Knowledge of results**: Motivation for learning can be increased when a student is informed of how well he is doing during the course of a lesson (often through the results of self-check exercises, tests, informal discussions and so forth). Thus, there must be many opportunities for a student to test himself in order to check on his own progress. This knowledge provides "feedback" to the student, and when the results are positive, he is "reinforced" for continued effort.

7. **Practice**: Closely associated with success and the knowledge of results is the need to provide opportunities for a student to use his newly acquired knowledge and skills in numerous situations. Thus, once principles and generalizations have been attained, then exercises and practical application experiences should be available.

8. **Rate of presentation of material**: The rate and amount of material to be learned at any one time or in any one lesson, must be related to the complexity and difficulty of the material in terms of the abilities of students. Here especially, individual differences should be considered.

9. **Graduated sequencing of content**: Students can acquire more information and retain it longer when they see that the materials are meaningful and that they are systematically organized. This also means that content should be organized sequentially from simple to complex— that is, starting with fact learning, then moving on to concept formation, principles, and eventually to higher intellectual levels, such as problem solving,
prediction, and inference. Both inductive ("inquiry" and "discovery")
and deductive methods of treating subject matter should be employed.

10. **Instructor attitude**: A positive attitude by the teacher and by any
assistant can influence the attitude of students toward the accept-
tance of new instructional procedures.

The foregoing should be treated with respect as principles, but should be
considered sacred to your design activities, especially if you are a novice!
The principles should be referred to working toward rather than being used
as hard and fast rules to follow.

**Approaches in Planning for Independent Communication Instruction**

A) The simplest is to design a single track for all students and when
instructional materials are required, to select existing commercial
ones—printed materials, filmstrips, recordings, 8mm films and so forth.
Most of these materials are presentation devices and do not include student
participation activities. To provide for student participation, the teacher can
develop worksheets or other aids that will require that students respond
to or act on the material.

B) A more advanced way to present independent study is to start with a variety
of materials and prepare more than one instructional sequence in order to
provide for individual differences of students. Some students may take
the fast track, even skipping ahead and using few materials before reaching
the final evaluation step. Other students may require more slowly paced
tracks that contain a greater number of concrete illustrations or examples,
more review exercises, or even smaller segments of subject matter with a
repetition of explanations in different contexts.

C) A series of three differently paced paths may be advisable. This plan
enables the learner (in consultation with his teacher) to select the path he wishes to follow, but it leaves him viable alternatives if he sets his goals too high.

D) In a high-level program, it may be advisable to prepare an extensive package of materials and allow mature students complete freedom to use them in the way best suited to their individual styles. For example, if the objective is to operate a piece of laboratory equipment, the program for mastering this objective may include an 8mm film, a set of still pictures with captions, a programmed booklet, and actual practice with the equipment. One student might choose to begin with the film and then go immediately to the actual practice; another might prefer to read the booklet first and then look at the still pictures before he attempts to practice; a third might practice at the outset or just read the booklet and others might decide to study in sequences other than those described here.

STOP

1. In what significant ways do Independent Communication Instruction differ from the other three forms?

2. In what sense are the design principles appropriate and applicable for other instructional communication?

3. Which of the planning approaches for Independent Communication Instruction would be the most useful and appropriate?
Linking Objectives and Communication Patterns

The four basic patterns we have examined—direct presentation, questioning, interactive group and independent instruction—provided the framework within which planning for learning takes place.

The teacher should realize that there needs to be some degree of balance among these four instructional communication patterns. Some enthusiasts recommend that independent study, for example, is proper activity 100 percent of the time. Others believe that suitable opportunities must be available for teacher-student contact and group interaction. The trend is to reduce the time spent in presentations to groups, to give students increased responsibilities for independent study, and to provide for sufficient interaction experiences.

In using the instructional communication patterns, it will be helpful to answer two questions:

What will the teacher do?

Some activities are directed by the teacher as presentation to a group, such as an explanation with materials shown on film strip projector; other activities are controlled by the teacher through small group interaction, such as conducting a review discussion.

What will the student do?

Some activities are the responsibility of the student as he works by himself such as reading, laboratory work, and completing worksheets; other activities are the responsibility of the student when he is an active member of a small group—for example, reporting, replying, being tested.

Obviously, under an independent study program most of the activity in performed by students. The teacher participates in small group interaction sessions when reports, discussions, and evaluations take place.
As you consider each learning experience ask yourself "What will the teacher do?" and "What will the student do?" in achieving the learning objectives using one, several or a combination of instructional communication patterns.

Here is an example:

**Learning objective:** The student will identify seven major kinds of bacteria.

**What will the teacher do?** Direct presentation, questioning

**What will the student do?** Independent instruction, questioning

Asking the two questions seems to narrow and clarify the instructional communication patterns that could be used. Remember there are no right or wrong choices—only more appropriate and less appropriate.

Here is another learning objective example: This time you fill in the most appropriate communication patterns to be considered.

**Learning objective:** Applies principles of medical aspects to patient.

**What will the teacher do?**

**What will the student do?**

It is difficult to separate communication patterns into basic units.

Communication is usually expressed as a pattern of combinations. In fact, real communication is always a two way process. Our main point here, however, has been to stimulate you to think first about the major communication patterns that are required by the different kinds of learning mentioned earlier. Turn back to page 1 and 2 and re-read about the three kinds of learning, then
answer the following:

Which basic instructional communication patterns relate to the three kinds of learning (on pages 1, 2)?

Learns about ____________________________________

Is learning ____________________________________

Learned? ____________________________________

FORMS OF LEARNING EXPERIENCES

Given that a student is sufficiently motivated and capable of achieving certain objectives, will the same learning experience be equally effective in facilitating the three kinds of learning mentioned earlier: "learns about", "is learning" and "learned"? Your answer to this question is closely associated with the form the learning experience takes, and a consideration of the basic communication patterns.

The major forms of learning experiences based on the three kinds of learning may be expressed as follows:
Major Learning Experience Forms

--- Initial overview of topic or area
* May include one objective or many
* May associate previously understood concepts with new or other concepts
* May present new series of concepts and ideas not immediately understood
* May be complex or simple

--- Practice
* Activities the learner engages in a process of learning directed toward achievement of objective
* Activities should be provided to fit learner needs and complexity of the objective

--- Feedback
* So the learner knows if he has mastered the objective
* So the teacher knows if the student has mastered the objective

Specific Learning Experience Forms

- Reading Assignment
- Autotutorial
- Small group meetings
- Clinical Experiences
- Personal Independent Study
- Large Group Meetings

The learning experience form encompasses media, organizational patterns, and teaching methods. The learning experience form gives a planning team or teacher a central focusing point for considering organizational patterns, methods and media within a communication pattern framework. A planning process should first consider the instructional communications patterns suggested by the learning objective, and the kind of learning implied. Secondly, the major learning experience form, Initial Overview (or presentation), Practice and Feedback should be determined.
The following learning experience forms and criteria for the forms were developed with the major learning experience forms in mind.

Specific Learning Experience Forms and Criteria

Reading Assignments

1. Form/Handout-Text
   a) Informational
   b) Outline
   c) Fill in
   d) Study questions or reading assignment
   e) Etc., active learning...

2. Criteria
   a) Overview of less complex concepts
   b) Single concepts - depth
   c) Summarization

Large Group Meetings

1. Form
   a) Lectures
   b) Slides with commentary
   c) Demonstration
   d) T.V. demonstration
   e) Minimal supervised student participation - less active learning

2. Criteria
   a) Overview of more complex topics and multi concepts by telling about the whole, the parts of the whole and associated concepts or ideas
   b) Provide information on different areas known from experience
   c) Personal experience makes initial clarification of complex topics easier and more interesting.

Small Group Meetings/Indiv. Conference

1. Form
   a) Question - answer periods
   b) Demonstrations
   c) Personal experience
   d) Case presentation
   e) Discussion
   f) Verbal quizzes
   g) Moderate supervised student participation and rehearsal, student activity
2. Criteria
a) Can be useful as reinforcement and feedback for student
b) Not to be used for introducing new material, but to enable student-teacher-subject matter interaction to occur.
c) Allows for students questions and for teachers questions

Laboratories

1. Form
   a) Self-experience
   b) Mini labs
   c) Presentations in lab
   d) Demonstration in lab

2. Criteria
   a) Useful for reinforcement and feedback for student
   b) Application of abstract ideas
   c) Student-subject matter-teacher interaction

Auto-tutorial

1. Form
   a) Programmed information with feedback
   b) Student self-study questions
   c) Many combination of media-materials possible
      - visual (slide) with text, commentary, questions, etc.
      - visual (motion pictures) with questions, handout, sound.
   d) good student participation - if assigned with definitly.

2. Criteria
   a) Single concepts may be presented, reinforced feedback arranged
   b) Useful when time to master objective is important
   c) Fit into reinforcement for more complex topics; can be useful for associating concepts especially through visual means

Clinical Experiences

1. Form
   a) Clinical cases
   b) Personal experiences
   c) Lecture cases
   d) Ambulatory
   e) Field experience

2. Criteria
   a) Reinforcement, and application of concepts
   b) Personal interaction
   c) Should be used as introduction - presentation in a problem solving setting.
   d) Integration of subject fields
Personal Study Activities

1. Form
   a) activities which learner perform to facilitate reinforcement and understanding
      1) Scan, 2) Diagram, 3) Chart, 4) Outline, 5) Illustrate, 6) Sketch, 7) Construct, etc.

2. Criteria
   a) Provide opportunities for differing activities in a process of "learning"
   b) Makes provision for different levels learning, the specific learning experience form and criteria can be used as part of your total effort to design and/or select teaching-learning experiences.

SUMMARY

As we said earlier - there is no formula for matching teaching-learning experiences to objectives; what works for one may not work for another.

We have suggested kinds of learning, the kinds of communication and the form of the learning experience itself.

The process of selecting or designing teaching-learning experiences involves a consideration of all three in thinking through the designing or selecting of teaching activity and learner experiences that will be most effective for the student and efficient for the school. Teachers and planning teams should be more interested in the process of how these three elements fit together than a ready made recipe or model that tells how.
Module No. 5

INSTRUCTIONAL RESOURCES AND SUPPORT

The selection of instructional resources and support services are closely related to the design of teaching and learning experiences.

Two assumptions focus attention on this dimension of planning, teaching, and student learning encounters:

- **Instructional Support**

  In many education programs, educators often make plans for methods and for gathering or preparing materials without taking into consideration the instructional support services they will require. These services include funds, facilities, equipment, and personnel whose time must be scheduled for participation in the instructional plan. Teachers or teaching teams frequently neglect to request these necessary services until they are ready to use certain equipment, need a particular room, want to spend a sum of money, or require specific professional or technical assistance. Consideration should be given to instruction support needs before or during proposing of teaching and learning experiences.

- **Instructional Resources**

  The necessary supporting materials that can motivate students and serve as effective ways to explain and illustrate subject content include printed materials of many kinds, audiovisual media, and other items for group and individual uses. Because of the wide variety of audiovisual and related materials now available, no one teacher or even an experienced teaching team can know the best uses and strengths of them all. Many technological resources - such as television, 8mm film, programmed instructional materials, instructional kits and multi-media devices (two or more instructional materials used at the same time or sequentially) - require in-depth knowledge for selection, planning, preparation, and use. The great majority of teachers have not acquired this knowledge and they have precious little time to acquire it.

  These assumptions should orient you to two aspects which relate to development and implementing instruction, but need to be accounted for
during planning. There are many interrelated elements in any instructional situation and each needs careful consideration during the appropriate planning step. We do not presume to tell you what step is most appropriate. We do suggest, however, that each interrelated element be viewed in light of both instructional resources - "what media should be selected?", and instructional support - "what support will be needed to implement our plan?". These two questions can be combined, because one question is rarely relevant without the other. Materials and time cost dollars; it's a simple fact.

STOP

What are the two assumptions that are related to the design of teaching and learning experiences?

How are they related to each other?

First, let's look at: Instructional Resources

Members of planning teams have generally had suitable experience with using such traditional materials as textbooks, reference books, magazines, pamphlets, workbooks, and micro-forms of these and other printed items. But even though audiovisual and related resources are proving to be particularly useful for instruction, teachers' knowledge and judgment are limited concerning the features, advantages, and limitations of them. These resources include:

- objects and specimens
- community resources
- demonstrations
- gaming devices
- filmstrips
- slides
- overhead transparencies
- guest speakers
- disc and tape recordings
- displays and exhibits
- charts, graphs, and posters
- flat pictures
- motion pictures (silent and sound)
- television programs and recordings
slides with tape recordings
slides with transparencies
filmstrips with tape or disc recordings
still pictures with motion pictures

In the past, the failure of many instructional media to improve teaching and learning was frequently attributed to the shortcomings of the media themselves. This has been particularly true of language laboratories, instructional television, and some forms of programmed instructional materials. In actuality the failure was often caused by the lack of a carefully designed program, one that took into consideration all interdependent factors of the instructional design before selecting all appropriate instructional medium.

Educational researchers have pondered such questions as "Is there a medium or a combination of media that would be best for teaching a particular subject?" Can media be classified as to their effectiveness for teaching certain kinds of facts, concepts, principles, or other generalizations?" No answers have been produced. Much of the research into learning with audiovisual materials has been either inconclusive or even contradictory. What has resulted is evidence that certain learning experiences might be accomplished equally well by any of a number of media. On the other hand, it has also been shown that a medium that is well adapted for one instructional function may be unsatisfactory for a second, different function within the same instructional sequence. This research suggests that a variety of materials could be selected, with each one doing specifically what it can best do at a specific point in the learning sequence.

**Media Factors**

Many teachers select media on the basis of what they are most comfortable or familiar with. However, when we consider certain factors, we may find that one medium is preferable to others in certain situations. These factors are treated below.

1. **Will the material be presented to a group or will it be used for independent study?** Some audiovisual materials are best...
used for presentations. Others are more suitable for independent study, but most are adaptable to either use.

2. Does the content require graphic treatment (design, artwork, or lettering), direct photography (still or motion), or a combination of graphics and photography? Graphics can clarify and simplify complex concepts, but for some needs the true reality of a photographic form (photographs, slides, motion pictures) may be required. It usually requires more time to prepare graphic visuals than it does to make photographic materials of most subjects.

3. Should a visual be presented in the form of still pictures or as a motion picture? A motion picture is a "transient" medium, requiring the student to grasp the message as the film is projected. A still picture is a "persistent" medium, permitting the student to study the message at his own pace. It takes more skill, time and money to prepare a motion picture than it does to make still materials.

4. What kinds of still pictures are available? For instructional purposes, still pictures may be prepared in the form of photographic prints on paper, color or black-and-white slides, filmstrips, or transparencies for overhead projection. Each form has advantages and limitations concerning preparation and use.

5. Should a motion picture be prepared in 16mm or 8mm size? Eight millimeter is suitable for independent study and projection to small groups. If multiple copies are needed, film originally in 16mm and have 8mm prints prepared by a film laboratory.

6. Should the visual material be accompanied by recorded sound? When used with visuals, sound on tape, record, or film can direct attention, explain details, raise questions, and serve as transitions from one picture or idea to the next. On the other hand, some subjects can be treated so as to have suitable visual impact without using sound for explanation. If necessary, explanatory material can be put on paper to accompany silent materials.
7. When should the use of multi-media techniques be considered?

Multi-media methods are used in presentations when a series of media, such as transparencies and slides, presented together or sequentially, can best explain and illustrate content. Such presentations are complex to plan and prepare, but may be highly effective for instruction. To serve different learning styles of individual students, a variety of media may be assigned sequentially or be available for student selection.

8. What decisions must be made when selecting equipment? When deciding on materials, consider these matters relating to equipment for use with the materials. First, determine whether the equipment will be for teacher or student use. Equipment to be used by students may have to be simpler to operate and more durable than that for teacher use in presentations. Second, determine what technical specifications and special features are required or desirable. Consider how the equipment is to be used with the materials in the assigned facility. Then examine the makes and models that will best serve the purposes. Finally, find out what the equipment will cost. If the price for the items selected is higher than the budget will permit you may have to lower your requirements, reduce the number of units by having students share equipment for certain work, or revise your instructional plan and the required materials to eliminate the equipment or make substitutions.

When you begin to consider the above factors, we ask you to wear two hats simultaneously, an artistic hat and a technical one. This is difficult for most of us; but please try!!
We can use the above factors to develop criteria for selection of media. Which in your opinion are the most reasonable media factors listed? Which are most immediately applicable in your teaching? List at least 3 and write a phrase to tell why:

1. _________________________
2. _________________________
3. _________________________

WHICH MEDIUM?

Let's now address ourselves to this big question:

Regrettably, it is not possible to make media selections by simply following a chart, or table, or "cookbook", which would say essentially, "For this competency identify the type of learning listed in a column, find its intersection with type of learner listed in a row, and use the medium named at the intersection." Nor is it possible to make such mechanical rules based on the instructional event to be supplied or on the basis of the subject matter involved.

Most media can readily perform most instructional functions. They can be performed by pictures, by printed language, by auditory language, or by a combination of media. So far as learning is concerned, the medium is not the message. No single medium possesses properties which are uniquely adopted to perform one or a combination of instructional functions. Instead they all perform some of these functions well, and some not so well.
There is at least one sensible way to approach the selection of media, and with reasonable probability of successful results. This method is based on developing a sequence chart with headings consisting of questions directed to point the way to specific media. Each question requires a "yes" or "no" answer, thus leading one through the levels of the diagram, terminating in a particular medium or group of related media.

At the box for each question, branching paths are indicated and according to the "yes" or "no" answer, the user moves, to a more definitive question, and so on until he ends at a point which indicates an appropriate media class for the instructional task or lesson segment. This seems a very practical and reasonable approach that could successfully be applied to arrive at most media decisions.

Media Decision Sequence Charts
Using a sequence chart to more closely determine media:

Three general questions should indicate broad directions for instructional communications and learning experience forms derived from learning objectives.

* According to the verb and content referent of the behavioral objective: 1) what kind of teaching or student learning experiences and 2) what kinds of learning are indicated??

* What instructional communication patterns (direct presentation, questioning, group interaction, independent) or combinations are perceived as necessary, and which learning experience forms flow from perceived communication patterns (large group, small group, autotutorial, clinical, personal study, etc.). What combinations or alternatives may be selected or are most appropriate for the objective and the nature of the student group or individuals??

* Which category of learning experiencing (direct, realistic experience, verbal, printed abstractions, or vicarious sensory experience) is most suitable for the objective and learning experience in terms of the communication pattern (use criteria in designing Teaching-Learning Experiences module, pg. 20-22.)

Each diagram is a sequence chart under a teaching/learning pattern heading—presentation to groups, small-group interaction, or independent study.

Questions at various levels lead to media choices. Often the decision leads to a group of related media, such as the need for still pictures.
Making a Media Decision

Following the decision sequence chart will probably get us close to a preferable medium. In servicing the three broad directions mentioned is there a clear-cut best medium? If your need is to have students experience the dramatic impact of certain voices connected with historical events, then a recording is the medium to select. If you want to show the correct form of a swimming stroke, a motion picture is required.

But in many cases more than one medium may be suitable. Your choice may be between preparing a motion picture and making a video-tape recording for television use. From the standpoint of the learner, each one provides the necessary visualization of the sequence of events in the same manner. The decision, then, depends on preparation and use factors. Or, consider a decision to be based on learning efficiency (meaning, the shortest reasonable student study time for accomplishing the objective) when the following selection of materials is available: three pages in a book, a 50-frame programmed-instruction sequence, a five-minute filmed demonstration. Which one would you choose?

In making a selection you may wish to refer to the following criteria: (and to the reference section entitled Media Facts)

Does the needed material already exist in suitable form and quality?

What are the anticipated purchase or preparation costs?

What are the reproduction or duplicating costs, if any?

How much time will be required to locate or prepare each item?
What are the requirements for equipment, facilities, technical skills, or services in preparation?

Is one medium more suitable than the others with respect to ease of viewing or student handling?

Will there be problems regarding equipment, facilities, supervision, and scheduling?

Will there be problems in the maintenance and storage of the materials for future use?

Is there a student preference of one kind of material to others?

What is the teacher's preference?

Can a rating be made (from pilot try-outs using various possible materials, if feasible) to determine whether there is greater student achievement from the use of one type of material rather than others?

As you answer these questions you will find that some materials will rate high on one criterion, moderate on a second, and possibly low on another.

If you prepare a chart or a matrix such as the one illustrated below you can quickly see how each medium rates with respect to all criteria and also the relative standings of all media for comparison.
On the chart, instead of entering general words like low, moderate, high, use a three- or five-point numerical rating scale and assign a number to each box. You can determine which medium has the highest numerical rating by adding up the points.

This technique gives a somewhat objective basis for making a decision. But subjective judgment must still be used in the final selection and in deciding whether the expense and time involved are worth the potential learning from the medium.

STOP

Now, go on to the questions..............
Try these learning objectives and see if you can:

1. Use the media sequence chart to more closely determine media.
2. Make a media decision (or several alternatives) using the media decision criteria and chart above.

Learning objective examples

A. The student will describe in writing the major issues and events which led to the outbreak of the Civil War.

B. The student will write an essay describing the four elements of a concept, how a concept differs from a generalization, a principle or a theory and illustrate each with a factual example drawn from life.

Instructional Support

It is a simple fact, materials and time cost money in education as well as in most activities of life. No one is more aware of this fact than you and I.

It was suggested in the course information module that alternative course approaches be examined in terms of each course's predicted effectiveness, resource requirements and costs. Course approaches should have been
studied and funding decisions made at the outset of planning. This gives the planning team or teacher an advantage in knowing that funds have been allocated. Traditionally, early course decision alternatives are not funded because grants must be written, proposals prepared and justification arranged for. So, planning and development proceeds, compromises are made and the resultant course is less than expected.

All new and revised courses require funds with which to get started. Any school system or other institution interested in supporting innovations in its instructional program must provide money for research and development. After a carefully planned program proves its worth, the returns, in terms of increased student learning and better use of teacher services, should justify the initial investment.

**Budgeting for Planning, Development and Implementation.**

Financial support may be necessary for any or all of the following:

- **During the Planning Phase.**
  - Professional planning time
  - Consultant service

- **During the Development Phase**
  - Staff time
  - Construction or renovation of required facilities
  - Purchase of equipment, installation, and check-out
  - Purchase or preparation of instructional materials, including professional search and planning time, technical staff time, raw materials, and duplication for required multiple copies.
  - Development of testing devices for evaluation
  - Consultative services
Costs for try-outs, including time of individuals and consumable materials

Time required to plan any revisions in the instructional plan and the materials

Time required to train teachers and staff for implementation phase

Administrative costs (travel, telephone, overhead, and so forth)

* During the Implementation Phase

Faculty and staff salaries

Replacement of consumable and damaged materials

Equipment servicing and maintenance

Depreciation of equipment and overhead charges

Time and materials for updating the program

STOP

How can you plan for these costs? Perhaps by examining what once were considered hidden costs. Let's do that now. What "hidden" costs do you see in the above lists? Write them below under the heading Hidden Costs.

Hidden Costs

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
Many of these hidden costs may be related to personnel, facilities, time and scheduling and equipment. We will consider them next.

**Personnel**

Instructional planning and development is not a "one man show" but a real team effort. Members of the planning team need a number of skills, and good working relationships as they plan, develop and put the program into operation. We believe that at present members of the planning team can acquire most of the skills alluded to in this series of modules and will be able to see the need additionally for consultant services as required. Evaluation and media specialists as well as the instructional development specialist and subject matter specialist may be helpful and brought into the planning and development as their services are required.

**Time and Schedules**

Next to personnel, the allocation of time is the most difficult element with which to deal in any new program. Finding time to work on the initial planning may be difficult. Often a new program will not be accepted by the administration until some preliminary planning has been completed and a detailed proposal is presented. The time for this preliminary work may have to be borrowed from time that would have been spent on other activities. A real dedication is often required to complete the initial plans.

Time is required for professional planning, staff and clerical assistance in locating and in preparing materials, support services for adapting facilities and installing equipment, and for many other things.
After the planning is completed, schedules may be set up for trying out the program—or try-out implementation. During the same period, time must be scheduled for staff orientation and training. Finally, we must draw up the work schedule for teachers, aides, and students in order to put the instructional program into operation.

**Equipment**

When the kinds of materials to be used in the program are being decided upon, be sure to consider any equipment that will be required in order to use them. Although decisions about equipment usually depend on the choice of materials, there are instances when the type of equipment available may influence the form of material to be used. For example, still pictures in the form of slides might be preferred for independent study use, but because filmstrip viewers are available or are much less expensive and easier to use than slide projectors, the planning committee may decide to prepare filmstrips rather than slides.

In investigating other programs, talk with the technicians as well as the persons in charge about the equipment they use. Questions are: which kinds of equipment have proven to be durable, easy to use, and cause the least amount of damage to materials.

Expert help may be needed in making decisions about the wide variety of equipment available today for both group presentations and individual use. It may be difficult to know what to choose without extensive background and up-to-date experience. Do not leave the final decision of equipment to consultants. Those persons involved in a new program should themselves carefully examine and try out whatever equipment is recommended. Also, have students work with it before making any final decisions, if possible.
Sometimes we are impressed with highly sophisticated, complex equipment that apparently can do many things, some of which we may not need. Often, less complex and less costly equipment can serve equally well.

Purchasing equipment may be only the initial expense. The cost of maintenance and the replacement of parts must also be kept in mind. Be practical in requesting what you need, but be reasonable in terms of funds available, complexity of the equipment, and potential upkeep problems.

Facilities

Facilities for an instructional program may be required to support any of the following:

- **Presentations** to groups of regular-size classes (25-30 students) or to large-size groups (up to many hundreds of students), and requiring audiovisual projection, sound amplification, and other features.

- **Independent study stations** (carrels) of a suitable size to hold necessary equipment and study materials while still being comfortable for students, plus the necessary electrical outlets, projection screens, storage areas, and other features.

- **Small-group meeting rooms** with informal furniture arrangements for teacher-students or student-students interaction activities, with provisions for audiovisual projection, wall displays (such as chalk-boards and exhibits) and other features.

- **A resource center** where materials and equipment can be gathered, organized, and made available to instructors and students.

- **Staff meeting rooms and workrooms**
You may wish also to consider what presently available facilities can be used without modification, which ones require minor or major adaptations, and where new construction is essential. Ideas for adapting present facilities can be obtained by visiting other institutions with similar programs in operation. It may be necessary to consult with qualified experts who are knowledgeable about space needs for various activities, special equipment and electrical and other technical matters.

Support services therefore consist of Budget (costs), Personnel, Time and Schedules, Equipment, and Facilities. These must all be taken into consideration because

Planning and Development Costs

Finally we come to the cost factor. Predicting the cost of planning and development is in itself a costly process in terms of time. Predicting costs may be a difficult, but necessary step.

We may wish to use the instructional cost index referred to in the evaluation module. This is a cost per student of all factors chargeable to the planning and development effort for a particular student group.

The cost structure could consist of two parts: 1) development costs of planning and pilot tryouts, 2) operational costs anticipated for the actual implementation.

Once calculated, the development costs which are likely to be relatively high should be amortized. That is, a portion of the develop-
mental costs (for example, one-fifth of the total amount for each of five terms or years) is added to the operational cost total, thus spreading out these costs. The instructional cost index for a semester is calculated by dividing the sum of the operational cost total by the number of students satisfactorily completing the work.

The developmental costs include:

- Planning time—percentage of salary for time spent by each member of the planning team on the project (or number of hours spent by each member multiplied by his hourly salary rate), and fees for consultants.
- Staff time—percentage of salary for time spent by each member engaged in planning and production, and in gathering materials (or the number of hours spent by each person multiplied by his hourly salary rate).
- Supplies and materials.
- Outside services for preparing or purchasing materials.
- Construction or renovation of facilities.
- Equipment
- Installation of equipment.
- Testing, evaluation, redesign, reproduction, and so on (including personnel time and costs for material and services).
- In-service education for teachers, aides, and others who will participate in the program during implementation (cost for time).
- Overhead costs such as utilities, furniture and room or building costs, or depreciation allowance.
- Miscellaneous: office supplies, telephone, travel and other items.
The operating costs include:

- Administrative salaries (based on percentage of time) chargeable to the project.
- Faculty salaries for the time spent in the program - working with groups and individual students, planning daily activities, evaluating program, revising activities and materials.
- Salaries for aids, maintenance technicians and others.
- Replacement of consumable and damaged materials.
- Repair of damaged equipment.
- Depreciation costs of equipment.
- Overhead costs for utilities, facilities, furnishings, custodial services.
- Evaluating and updating materials; costs for personnel time and materials.

To determine an instructional cost index, first total the dollar amount for all factors listed as developmental costs. Then divide this sum by the number of years over which the developmental costs are to amortized. Next, total the costs for the operational phase. To this amount add the prorated developmental cost and divide the final total by the number of students in the program (the number of students may vary from semester to the next). The resulting amount is the instructional cost index.
In summary, we have considered instructional resources and support in this module.

It is hoped that the two questions;

* What media should be selected??

* What support will be needed to implement our plan??

will receive intensive study by the planning team and that decisions based on good information about instructional resources and support services can be made.

References will be available to provide information on media. You may wish to review these in making decisions about resources.
Evaluation in Instructional Planning and Development

Module No. 6

I. Definition and Basic Concepts

Evaluation is one instructional development activity that must be considered throughout the development process. The term evaluation is preferred here because in all educational settings a certain amount of judgment is necessary whenever decisions are to be made on the basis of test information. The term "measurement", on the other, is too easily taken to assume some automatic decision on the basis of data alone.

Evaluation will be defined as the activity of judging how well what is done corresponds to expectations as expressed by criteria. Such judgments should rarely be wholly intuitive, and will usually benefit from considerable forethought and carefully collected data.

Before looking at evaluation as it applies in various instructional settings, let us consider a way of thinking about evaluation that will make it easier to consider all aspects of evaluation problems in real situations.

Stufflebeam* has suggested that there are four basic types of evaluation. These are listed and very briefly defined below:

Context evaluation: what is the setting and what are the needs?

Input evaluation: what are the available capabilities and resources?

Process evaluation: how well are things progressing?

Product evaluation: how well did we do?

The acronym CIPP is useful in remembering these kinds of evaluation.

Another concept that is central to evaluation of instructional development is feedback. Feedback is based on the homeostatic principle. That is the principle upon which your home furnace and many other control systems work. Signals are fed from a controlling mechanism to the operating mechanism that tell the latter when it is within prearranged limits. So the house stays 70°+ 3°, the sodium-potassium balance of your body provides a healthy tissue environment, and so on.

Feedback as part of evaluation provides information at all stages of instructional development and instruction to keep teachers and students informed of the extent and direction of their progress.

Before going on, review the following from memory, and check back to reinforce your thinking:
1. What is "evaluation" used here?
2. How is evaluation defined?
3. What are the four basic types of evaluation?
4. What is the function of feedback?

II. Evaluating the Development Plan

We must ask ourselves, "How good is this plan for instructional development that we have designed?" It is a question that is too infrequently asked, and more rarely answered.

Quantitative methods to evaluate instructional costs in relation to the number of students served and the outcomes of instruction are presently being developed. One method that is being applied to educational programs is called Program Evaluation and Review Techniques (PERT). It offers a way to plan, control, monitor, and evaluate the progress at each step of a complex project. More and more school systems are participating in Planning-Programming-Budgeting-System (PPBS) of which "program budgeting" is a part. Program budgeting is a systematic way of relating the expenditure of funds to the accomplishment of planned objectives.

Whether or not you use one of the above methods, there are some basic considerations, and some kinds of data that you will need to be aware of.

Effectiveness

Effectiveness is essentially an estimate (or measure) of how well the development plan works, when applied to a course. To find out about the plan's effectiveness, thus, it should be tried out or pilot tested using one or more courses, and teaching one or more groups of students. The number of students that accomplished the stated objectives within the time set can be
determined. Or, to be more specific, determine the percentage of the students who reached an acceptable level of achievement for each objective. The data can be interpreted as the measure of the effectiveness of the instructional design for this group of students.

For example, if all students accomplished all objectives, the effectiveness of the program was excellent. If 90 percent of the students accomplished all objectives or if 90 percent satisfactorily completed 80 percent of the objectives, there may be some question about the plan's effectiveness. To answer this question, the faculty and administration must decide on what level to accept the program as being effective.

Realistically, it is very likely that because of individual differences among students and your inability to design ideal learning experiences, you cannot hope to reach the absolute standard of 100 percent, but must settle for a somewhat lower level of student accomplishment. Then another question must be answered. Assume that your performance standard requires all students to accomplish 90 percent of the objectives, but they actually accomplish 86 percent of them. This information must be fed back to the development team, and decisions must be made about the time, effort, and expense required to redesign the weak areas of the program in order to raise the learning level to 90 percent, as well as whether the effort to reach the 90 percent level is worth the cost? There may be factors that would make the cost of achieving your goals almost prohibitive. You may have to settle for a somewhat lower level of accomplishment until someone develops a revision of the program that will make it possible to reach the desired level of performance with reasonable effort.

Efficiency

In evaluating efficiency, there are two aspects that require attention. One is a measurement of student performance, against instructional time. The other is consideration of the effectiveness of the instructional program against cost.
Estimates of efficiency may be made by comparing the number of objectives a student achieved to the time he took to achieve them. For example, Bill satisfied seven objectives in 4.2 hours of study and work. By dividing the number of objectives that Bill achieved by the amount of time it took him to accomplish them, we find that his performance index is 1.7 (7/4.2). Thus the higher the index, the more efficient the student's performance level. This information will be of value in evaluating both student efficiency and the relative efficiency of the methods and materials in the instructional design plan. Subjective decisions must be made for accepting the level of a performance index or the need to raise the index through the use of other activities and materials.

Perhaps a more pertinent estimate of efficiency for most schools is based on the cost/effectiveness of instruction.

Before you can assess the efficiency of the program, you must determine how much it costs per student to reach the accepted effectiveness level. This cost per student can be called the instructional cost index. To determine it, it is necessary to tabulate all factors that are chargeable to the design plan for the instruction given to a particular student group. This cost structure should consist of two parts: (1) developmental costs of planning and pilot try-outs, and (2) operational costs incurred during actual implementation.

Detail and examples of the factors included in developmental and operational costs are considered in the "Instructional Resources and Support" module.

After the costs for a number of different topics, units, or whole courses have been assessed, it would be possible then to determine whether operating costs for a particular topic are too high, acceptable, or relatively low. The calculations should be repeated each time a particular unit or course is taught so that any change in the cost index can be determined and the reasons for the change evaluated.

If the program proves to be effective in serving student needs (and it should be constantly evaluated and revised until it does), but the instructional cost index remains higher than desired, certain steps might be taken to lower the index:
• Include more students in the program. This will increase the denominator of the formula.

• Decide if there are any activities for which teacher aides might be used in place of regular teachers without reducing the effectiveness of the program.

• Plan to relieve teachers of some student-contact time by developing additional independent study activities for students.

• As a last resort, lower some of the required performance levels.

Subjective Evaluation

In addition to the more objective or data-centered types of evaluation that have been discussed above, there are several possibilities for more subjective evaluation of instruction.

Inferences can be made from the way students perform on examinations about aspects of the course that were, perhaps, under emphasized, or inadequately planned or taught. If students regularly fail to achieve objectives in a content area, that area may be unusually difficult to comprehend. If they consistently miss questions, a particular cognitive level, learning experiences may need to be replanned. Observations of the behavior of students, and replies to the informational and attitudinal questionnaires and rating scales by students, teachers, and staff members at the end of a unit or at the conclusion of the course may indicate the degree of success for the various phases of the program.

Also, consider follow-up studies of students - their study habits next term (for example, their ability to work independently, if this has been a part of the program), their accomplishments in subsequent courses, their future selection of courses and vocational or avocational interests in the subject area that may possibly have been motivated by their achievements in the program. These are some of the ways to make subjective judgments of the success of your instructional design plan when in operation.
Summary

Before leaving evaluation of the development plan, let us analyze a few of the evaluation questions that fit into the four-part typology introduced earlier.

Context Evaluation:
What is the setting of this plan? Who is to be served? What statements of curriculum goals and philosophy are available? What real need exists for this new plan? Why?

Input Evaluation:
What are the capabilities and backgrounds of potential participants? Who is available to contribute to the development plan? How much time, and money are available as resources for planning? What are the planning criteria?

Process Evaluation:
Are planning deadlines being met? Does the plan, so far developed, meet the general criteria? What needs to be done to redirect planning to better conform to criteria? Are role-holders performing their prescribed functions?

Product Evaluation:
Does the plan work when tried out in a pilot situation? How closely does the plan meet originally conceived criteria? How should the plan, or the criteria be changed to make a better fit? What should be done to revise the plan? What changes should be made in roles or role-holders? Were assumptions about student characteristics valid?
Being able to formulate and interpret effectiveness and efficiency data is only one part of good evaluation of the instructional plan. Perhaps more important is the ability to ask the right evaluation questions at the right time in the planning process.

III. Evaluating Student Learning

Evaluation of student learning begins with the criteria that are part of objectives. The focus of student evaluation should be the degree to which each student achieves the objectives. Too often students are compared to one another on a ranked scale, because there are no objectives for the course, or the objectives do not provide adequate criteria for evaluation.

The potential impact that teacher judgment has upon the lives of students is profound in its human implications. Teacher judgments may close college doors to students. Teacher judgments may provide the conditions for conflict between students and their parents. Teacher judgments may induce the conditions of unrealistic competition among students and often cause wounds that may be fleeting or of long duration. Teacher judgments have the potential for molding the self-concept of students with respect to their adequacy or inadequacy as students.

It is evident that those teachers who diagnose well and make regular judgments of student performance are much less often faced with the make-or-break judgments which can be so damaging in the lives of students. Teachers who pay attention to their measuring, evaluating, and judging role and perform that role in the many situations where less rides on the outcome find in the long run that their judgments are surer, more helpful to them and the student, and better understood by students.

Measuring student learning is a day-to-day responsibility. It is not reserved for formal testing periods, the submitting of formal projects, or long-term assignments. Testing situations range from brief, informal interviews to elaborate formal testing situations. In general, you can accept the idea that more judgments by the teacher are better than fewer and that the frequent use of informal judgments improves the quality of student assessment.
Some additional guidelines for student evaluation are suggested by Nough and Duncan:

1. Objectives should be designed so students can achieve them with reasonable effort.
2. Only the most valid and reliable evidence should be used in judging student achievement.
3. Students should be taught to judge themselves in realistic ways.

Validity/Reliability

One of the distinct advantages of instructional objectives, when they are stated in terms of the evidence that the teacher will accept that the objective has been met, is that such objectives help a great deal in developing valid measures for assessing the attainment of objectives. The general question that must be asked about the validity of a measuring device is, does the device measure what it claims to measure? When instructional objectives are stated in terms that describe the evidence that the teacher and student will accept that the objective has been met, the objective itself focuses on what the testing situation will measure. The validity of the measure is partially specified by the instructional objective itself.

The nature of validity in measurement can be more precisely demonstrated if the basic validity question raised above is extended. To the question, "Does the device measure what it claims to measure?" we can add two subquestions:

1. Does the device measure all or at least a representative sample of what it is supposed to measure?
2. Does it measure nothing else but what it claims to measure?

What is validity? Why is it important to student evaluation?

Evaluation devices need to be reliable as well as valid. When we speak of the reliability of a test we refer to the accuracy with which it measures. If the test is reliable, we would expect to get the same results on repeated measures of the same attribute. If, for example, you used a reliable intelligence test to measure Mary's intelligence, you would anticipate that each time you measured her intelligence the test would provide the "same" score, within limits.
Test reliability and test validity are related. As a matter of fact, there can be no test validity unless there is some degree of test reliability. It is essential to have both qualities present in a measuring device. In actual practice, as one works toward validity in testing situations, he sometimes loses some of the reliability; and, similarly, as one works toward reliability, he sometimes loses some validity.

The complex relationship between validity and reliability can be explained and illustrated. An accurate or reliable description of a student's ability to write can be obtained by a careful assessment of the number of English usage errors he makes in an extended series of compositions. Writing ability though is much more complex than is suggested by just a description of English usage. The teacher who strives only for reliability in his assessments is very likely to end up with an accurate or reliable description of the student's performance, but one which in some ways misses the point.

On the other hand the teacher may try to judge the general writing ability evidenced by the students in the extended series of compositions. He ends up with a general - usually vague - description of the student's ability. Yet he has no assurance that this assessment is accurate. He would find if he were asked to repeat the assessment that he could not come up with the "same" result.

What is reliability? How does it relate to validity?

TESTING FOR MASTERY

Testing for mastery means no more than finding out whether or not students have mastered objectives. In order to do this, however, teachers must be most careful to design test items and procedures that reflect the classes of objectives involved (cognitive/affective/psychomotor).

Evaluating educational achievement has become so sophisticated over the years that it has obscured a fundamental dictum of measurement. That dictum is:

If one wants to know how a student performs, the best way to find out is to get him to perform.

The less elaborate and more unencumbered the testing situation is, the more likely one is to get a clear assessment of the student's performance.
Elaborate tests could be developed to determine how well a pilot can fly, but the best assessment will grow out of placing him in a situation where he actually does fly. The best assessment of his abilities is usually the most direct assessment.

Many of the more subtle aspects of educational achievement, for example, attitudes, do not lend themselves well to direct assessment. Since direct assessments may consume so much time and energy, we substitute elaborate, carefully designed, hypothetical testing situations. When such indirect assessments are necessary, they should be used. When they are not necessary, the fundamental dictum holds.

The illustrations that follow illustrate the range of testing situations available. In illustrating a variety of testing situations, a variety of test items will be used as examples. There are whole books written on the fine points of test-item construction, and some general principles of item and test construction will be discussed and illustrated later in this module. Our concern here is with test situations that will provide valid data to be used by teachers and students as evidence (necessary but never sufficient) that students have attained objectives.

This first example is from the evaluation class of the cognitive domain.

Objective: Students will state in writing at least four criteria for evaluating the qualifications of a member of the House of Representatives and apply these criteria to three pairs of candidates for House seats in their state.

Test situation: The teacher gives the following assignment to the class: "One week from today is Election Day. We have discussed the election issues and the candidates. To help you decide which candidates are best qualified I want you to develop four criteria - to be made explicit - and use these to judge each of three pairs of candidates running for the House of Representatives from our state. Be sure to 'spell out' the criteria you are using for judging. This assignment is due on Friday. Are there any questions about what is required?" (The detailed clarification, if necessary, should come through
teacher response to students' questions.)

To assess the resulting student efforts reliably, the teacher should have some guide for determining the relative merit of each paper. She might make use of a rating scale such as the following as she reads each paper.

1. Quality of criteria: _________excellent _________average _________poor
2. Clarity of criteria: _________excellent _________average _________poor
3. Application of criteria:
   Candidate pair 1: _________excellent _________average _________poor
   Candidate pair 2: _________excellent _________average _________poor
   Candidate pair 3: _________excellent _________average _________poor
4. General comments:

The second example is from the affective domain:

Objective: Students will write a short story in which the main character expresses a feeling that they hold deeply.

Test situation: The test situation properly calls for a short story written in keeping with the specification of the objective. The teacher assessment could be in terms of (1) the degree to which the feeling was manifest in the main character and, if the teacher desired, (2) the general quality of the story as a vehicle for expressing the chosen feeling.

The final example is in the psychomotor domain:

Objective: Students will demonstrate how to set up and prepare a tape recorder for use (thread the tape, turn the recorder on, play the tape, and adjust the pitch and volume controls).

Test situation: The test situation is almost self-evident. To be valid it requires an opportunity for each student to go through all the steps. Therefore, after each completion of the performance by a student, the tape recorder should be returned to its initial condition.
When the professionally responsible teacher sets instructional objectives, he does so in terms of what he and the student wish that student to become. When the teacher instructs students he looks at them in terms of how he can help them become. When the teacher measures student achievement, he looks at students critically in terms of what they have become and also in terms of what they can become. These three views of students and their behavior need to be in good balance. The skillful teacher can and does take all three views. He sees students in terms of desire for achievement, how he can help them achieve, and then critically in terms of what they have achieved.

What is mastery? What is a basic rule for evaluating achievement? Where must it be broken? Think of an objective in each domain for a course you teach, and write down a test situation that tests each objective.

Testing Situations/Test Construction

Many good, detailed books are available on test construction. For our purposes, we will mention only briefly the most popular and useful test situations, and how they relate to the classes of learning.

Observation of Student Performance

The quality of such observations is enhanced by checklists or rating scales or a combination of the two. A rating scale differs from a checklist in that a rating scale assesses the quality of particular characteristics of the performance. Checklists are useful primarily in measuring the presence or absence of behavior or the products of behavior. If ratings are to be included in the assessment of students, the ratings should be limited to as few degrees as necessary to discriminate among the performances of different students. On most combined checklists and rating scales three ratings - excellent, average, and poor - are sufficient.
Samples of Student Work

A short story, a map, a cotton blouse, a sample of typing, a homework assignment, a still life—all can be samples of student work. These products of behavior provide a good basis for assessing student achievement and are used extensively for this purpose. The important thing to remember about such samples is that they should be in keeping with the instructional objective. The assignment needs to be sufficiently explicit that the student can readily pose the test situation for himself. Rating scales are a great help to teachers in assessing samples of students' work.

Self-Reporting Devices

Interviews, questionnaires, autobiographies, and projective-type questions are used to make assessments of student achievement. Some objectives in the affective domain would be difficult to measure without using these. Because self-reporting is commonly used to assess objectives difficult to assess in any other way, the most important consideration in the use of self-reports is the degree to which they gain a valid response from the student. If an autobiography is to be self-revealing, the student must feel free to be self-revealing. If an attitude questionnaire is to reveal the student's true feelings it must be so constructed and administered that it helps him reveal his true feelings.

Self-reporting devices can infringe on the privacy of students. This is an ethical question for the teacher. No self-reporting test situation should be used without adequate safeguards for student privacy.

Test/Essay

The essay test has little or no use in the assessment of the first level of cognitive achievement (knowledge). Objective tests are more valid and reliable for such assessments. The essay test can be used effectively on all levels of the affective domain. As a test form, the essay is used where an essentially indirect form of assessment is necessary. From the student's response the teacher hopes to infer something about the students' learning. He
may wish to see if the student can organize diverse ideas, express feelings,
or treat situations imaginatively, humorously, or ironically.

The essay question should be carefully worded so that it calls out
a response from the student that provides a firm basis for inferring (1) that the
student does or does not have the ability being assessed and (2) the degree to
which that ability is present.

Tests/Objective

Many different kinds of items are used in objective tests—alternate-
choice, multiple-choice, fill-in or completion, matching, and multiple-response
items. And there are also many rather simple mistakes one can make in
constructing such items which can spoil them.

Fill-in items are best used to test level-one objectives in the
cognitive and affective domains. The fill-in can be a word or some short
combination of words.

Two common errors made in the construction of fill-in terms are
(1) providing too many cues, so that the answer is given away and (2) providing
so few cues that the student cannot select a right answer even if he can recall.

Matching items calls for determining relationships between two or
more sets of expressed knowledge or feelings. They are better if they have a
distractor, that is, have at least one more item in one column than the other.
Certainly a good upper limit for items to be matched is ten. Some matching
items are of poor construction because they mix many kinds of things. As far as
possible, the elements in one column should be homogeneous. As should the
elements in the other column.

Multiple-choice items are widely used in objective tests for application
and evaluative applications of knowledge and feeling states. Good multiple-choice
items take time to construct, and need to be carefully worded both in stem
(introductory statement) and in the options. There should be at least four
options from which to choose, with all options plausible but only one option
clearly correct. The options should be much alike in wording and in length.
The stem of the item should not cue the student to the correct option by its
wording.
The above illustrations focused attention on simple test situations. There are a few general guides to assembling a group of items or test situations into a formal test. Like the simpler testing situations discussed to this point, the formal test needs the properties of validity and reliability. Validity is enhanced if the items in the test adequately sample the kinds of performance, and only those kinds of performance being measured. Both reliability and validity are enhanced when the items are not ambiguous.

Reliability is increased as the need for the scorer to bring his own judgment to bear to determine the correctness of the student's response is decreased.

The testing situation should provide for optimum student performance. Directions need to be clear. Items of particular types should be grouped together. The test format should be clear and well organized, if not actually pleasing to the eye. If the different test sections carry different weights in the final scoring or are expected to require different amounts of time, this should be indicated.

Teachers often approach testing with the idea that it is their job to discover the students' inadequacies. By taking this attitude they unconsciously create a testing situation in which the student feels that the teacher is out to get him. Such conditions do not provide for optimum student performance. What the teacher really should want is evidence that the student can perform to meet the objectives the teacher has taught for. Good tests and testing situations do uncover inadequacies in student performance, and they should, but this is not their only purpose. Tests and testing situations are developed mainly to provide the most valid and reliable evidence on the quality of the student's performance. As such they should be devised in a way that they elicit from the student the best performance he is capable of.

What five test situations were discussed? When is each most appropriate?

Testing With Audiovisual Materials

Most traditional classroom tests measure cognitive learning - knowledge and information. If an objective requires verbal knowledge and other symbol responses (as for the understanding and application of facts, concepts, or
principles), then paper-and-pencil tests may be appropriate. But when an objective includes the term "he able to do" or has other intent for performance, skill ability, or for attitudes and appreciations, then tests that are closer to the reality of the objective itself should be used. Here are some examples:

Practical manipulation of objects, materials, and tools - for example, from a layout of tools or materials require the student to select the correct ones with which to perform an operation, or to show which tools are used with particular materials.

Audio recordings - the identification or analysis of specific voices, descriptions, or situations.

Photographs or slides - the recognition of sequencing of steps in a process; examples or applications.

Films or videotape recordings - selecting correct procedures; reacting to problem situations.

Many of these resources are best suited for testing individual students rather than large groups. An individual student may be given the materials to use for a set period of time, during which he must respond or perform the required operation. To test larger numbers of students, the instructor can set up a number of stations in a room or laboratory, each one with the necessary testing equipment or materials for a single problem or question. If there are 20 stations to test 20 students, for example, one student will start at each station. A set number of minutes is permitted for the students' response, then he moves on to the next station. The procedure is repeated until each student has been at each station.

Evaluation can also be based on student reports, projects, and other activities, as well as on behavior observed by teachers and by other students as reported on rating scales or in anecdotal records. Any of these methods can be used to measure achievement.

Evaluation should not be confined to an examination given at the conclusion of the study of a topic or unit. Testing should be on-going throughout the unit, as the student moves along in the learning sequence. Brief
"check-points" or exercises can be used as intermediate evaluation devices so that the students, as well as the teacher, has the opportunity to know how successful his learning is as he proceeds.

Why test with audiovisual materials? Can you think of some new applications of non-paper-and-pencil tests that you could use in a course you teach? How many tests should be given in any one course?

Performance Contracting

Student performance contracting should not be confused with institutional performance contracting. In the latter an institution usually contracts with an instructional development company for an instructional program that will provide a given level of student learning. The company is paid on the basis of successful student performance. The issues revolving about this type of performance contracting cannot be discussed here.

Student performance contracting is the situation in which the individual student agrees (contracts) with his instructor to perform to prearranged standards on preselected objectives. When he so performs he earns the grade stipulated for the performance he chose. In this way the student is able to emphasize and de-emphasize areas of his choice and knows ahead of time the level of performance that will be required. On the other hand, the instructor is assured that his minimal standards are met by all students, and that requirements for superior grades are clear.

What is student performance contracting? Can you see how you might use it? Why might you choose it?
SUMMARY

One major role of the teacher is that of judging student performance. This does not mean, however, that all evaluation should be translated into grades. It is clearly evident in the practical school situation that those teachers who take the judgmental role seriously and perform it with skill are less likely to be forced to crucial and often damaging judgments about the students they teach.

The kinds of testing situations employed by teachers are extremely varied. They are in part prescribed by the objectives they are intended to assess. Because the testing situations are contrived to provide both valid and reliable evidence on student performance, they need to be carefully devised. Fundamentally, they need to call forth from the student a performance which is as closely in keeping with the specifications of the objective as possible.

There are many types of testing situations and test items which teachers can use. There are for most of these a number of useful guidelines for their construction and use. The responsible teacher needs to become skillful in the development and use of a variety of measurement techniques if he is to function successfully in guiding the course, and evaluating the outcomes, of his instruction.

Again, as in evaluating the development plan, let us consider a few of the important evaluation questions that must be constantly in mind:

Context Evaluation: In what setting should evaluation take place? What kinds of impact could the test have on students?

Input Evaluation: What do we know about the students' capabilities and characteristics? What audiovisual or other methods are available for testing? Can students evaluate themselves?

Process Evaluation: Are students keeping up with the instructional program?

Product Evaluation: Is the test valid, reliable? How can the evaluation program be improved? What evaluation approach best served the needs of this particular course? Are students mastering objectives?
Earlier we mentioned that two purposes are served by evaluation. The first is to measure the achievement of the learners. The second purpose, closely related and of equal importance, is to determine if there are any faults in the instructional plan in order to permit the teacher to improve it. The student will serve as the primary resource for evaluating the program. Analysis of test results, direct observation of the student interaction in classroom, laboratory or application situation, as well as other evaluation measures, can indicate deficiencies in the planned experiences, learning sequences, and the need for corrections.

This phase of evaluation also allows the teacher to determine if, at any point in the instructional sequence, too much previous student knowledge has been assumed or if the emphasis is on subject matter content with which the student has already had some experience. These situations will not require a high level of student interest or attention. Because of the possibility that the instruction as planned will not work out in the real world, one or more "try-out" or "dry run" phases of instruction should be made before a program is actually used.

Please list at least three reasons for "try-out" or "piloting" phases of evaluating the instructional plan.
A representative sample of the student group should be used to "test" the instructional procedures, materials, and experiences under normal conditions. Information obtained from the evaluation of this pilot test may indicate that one or more revisions in the plan should be made prior to using it with a full student group.

The trial testing and revision procedure (perhaps including retesting and further revision) is important to the success of a plan. The tryout procedure should relate not only to objectives, subject matter suitability, learning experiences, but also to the roles of personnel, instructional resources and support levels - in short all the factors that together affect learner performance in achieving objectives. Read the following case study of a new program in nursing education. Please answer these questions as you read:

1. How will the new approaches be "piloted"?
2. How are needs for try-out testing expressed in the Project Objectives?
3. Summarize the try-out evaluation (piloting) process in the project.
4. How would you criticize this program?
APPENDIX C

DATA COLLECTION INSTRUMENTS
You and others have agreed to plan and develop a new course within the next five months. You feel this is a short period but you and your colleagues are resolved to prepare a good course within the time limits already established.

How would you rank the following as to their necessity in being accomplished during that time? (Circle the appropriate number on each scale)

1. Using your developed course with a small group of students to try it out.
   (1) (2) (3) (4) (0)

2. Developing criterion tests to measure student learning.
   (1) (2) (3) (4) (0)

3. A means should be worked out to evaluate the instructional plan produced by your team.
   (1) (2) (3) (4) (0)

4. The team should be oriented to planning and development concepts.
   (1) (2) (3) (4) (0)

5. Consideration of instructional support services and coordination of planned programs.
   (1) (2) (3) (4) (0)

6. Guidelines should be used for selecting media.
   (1) (2) (3) (4) (0)

7. Planning and development skills should be understood by team.
   (1) (2) (3) (4) (0)

8. Teaching-learning experiences should be selected and developed.
   (1) (2) (3) (4) (0)

9. Each team member and leader should understand his own expectations and those of others before formal planning and development activities.
   (1) (2) (3) (4) (0)
C.I.P.D. Attitude Rating Scale (2)

10. Major teaching-learning experiences should be determined by the team.
   (1) (2) (3) (4) (0)

11. Student capabilities in and out of the subject matter content area should be pretested.
   (1) (2) (3) (4) (0)

12. Appropriate characteristics of the learners should be determined as they apply to subject matter to be learned and learning objectives.
   (1) (2) (3) (4) (0)

13. Learning objectives should be classified.
   (1) (2) (3) (4) (0)

14. Before planning and developing, the team should experience an interactive planning and development process.
   (1) (2) (3) (4) (0)

15. Learning objectives should be written by team members.
   (1) (2) (3) (4) (0)

16. Alternate course approaches should be developed and proposed.
   (1) (2) (3) (4) (0)

17. Course objectives should be written by team members.
   (1) (2) (3) (4) (0)

18. Instructors should reflect on the interactive, sharing aspect of team membership.
   (1) (2) (3) (4) (0)

19. Subject matter content should be decided upon.
   (1) (2) (3) (4) (0)

20. Topics within the subject matter should be grouped and arranged.
   (1) (2) (3) (4) (0)

21. Course goals should be developed by team.
   (1) (2) (3) (4) (0)

22. The dynamics of the group interaction should determine to a great extent the success of planning and development.
   (1) (2) (3) (4) (0)
**ATTITUDE INVENTORY**

**Directions:** Circle the word or phrase below each question that best exemplifies your feelings. Please respond to each question, by circling the word or phrase of your choice in each row below the question.

1. **How do you perceive your role as a team member in planning and developing instruction?**

<table>
<thead>
<tr>
<th></th>
<th>Uncomfortable</th>
<th>Slightly Uncomfortable</th>
<th>Neither Comfortable nor Uncomfortable</th>
<th>Slightly Comfortable</th>
<th>Very Comfortable</th>
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<td></td>
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<td>Exciting</td>
<td>Neither Exciting nor Boring</td>
<td>Boring</td>
<td>Very Boring</td>
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<tr>
<td><strong>B)</strong></td>
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<tr>
<td></td>
<td>Completely</td>
<td>&quot;Turned Off&quot;</td>
<td>Ambivalent</td>
<td>&quot;Turned On&quot;</td>
<td>Completely</td>
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<tr>
<td><strong>C)</strong></td>
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</table>

2. **How do you perceive planning and developing instruction as a group process?**

<table>
<thead>
<tr>
<th></th>
<th>It Won't Work</th>
<th>It May Work</th>
<th>Ambivalent</th>
<th>It May Work</th>
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</thead>
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<tr>
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<tr>
<td></td>
<td>Very Successful</td>
<td>Successful</td>
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<td>Unsuc-</td>
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<td><strong>E)</strong></td>
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<td></td>
<td>Very Unsure</td>
<td>Unsure</td>
<td>Neither</td>
<td>Confident</td>
<td>Very Confident</td>
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<tr>
<td><strong>F)</strong></td>
<td></td>
<td></td>
<td>Confident</td>
<td></td>
<td></td>
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</tbody>
</table>

3. **How will team planning and development be perceived after the simulation?**

<table>
<thead>
<tr>
<th></th>
<th>Participants Will Use All Knowledge Gained</th>
<th>Participants Will Use Some Knowledge Gained</th>
<th>Participants Will Use Little Knowledge Gained</th>
<th>Participants Will Not Use Any Knowledge Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G)</strong></td>
<td></td>
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<tr>
<td></td>
<td>Planning and Development Will Not Be Slightly Organized</td>
<td>Planning and Development Will Be Slightly Organized</td>
<td>Planning and Development Will Be Very Well Organized</td>
<td>Planning and Development Don't Know</td>
</tr>
<tr>
<td><strong>H)</strong></td>
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</table>


Problem Solving

1. You are going to help plan a new course. List some activities you could engage in before you write learning objectives.

2. List types of information you would need to develop alternate course approaches.

3. What are the three major parts of a learning objective?

4. The following statements were submitted to you, as team leader. (Read each statement and describe the level where it may be useful: school goal, course goal, course objective, learning objective.)

   (a) Given the names of ten current local, state, and federal representatives from the area, describe the office held by each representative.

   (b) All graduates shall be well-informed and possess knowledge about the structures, processes, and forms of government.

   (c) Students will be able to function adequately in assuming a role in a mock or simulated legislature.

   (d) Students will understand the legislative process of a democratic form of government.
5. Each of the objectives listed below were submitted. Classify each as cognitive, affective, or psychomotor.

(a) The student voluntarily looks for instances of good art where shading, perspective, color, and design have been well used.

(b) Following instruction in human physiology, a human skeleton, and opportunity to study and practice, the student will explain flexor and extensor muscular actions of the knee joint.

(c) The student will perform an acceptable backward dive of his choice from the diving board into the pool.

6. For a course in "training nurse-practitioners to deliver obstetric and gynecologic services to ambulatory, apparently well women", what are some of the learner characteristics and capabilities that you would consider.

Problem Solving (2)
How would you describe the major aspects of the role of a team member in planning and developing instruction?

How would you describe the major aspects of the role of a team leader in planning and developing instruction?
IDENTIFICATION OF TERMS

Identify - define - describe as many as you can:
(short answer - open-ended)

(Answer as briefly as you can)
Course goals

Course objectives

Alternative Course Approaches

Learning Objectives

Learner Characteristics and Capabilities

Teaching - Learning Experiences

Instructional Resource Support

Measuring Student Learning

Evaluating Instructional Plans
PERCEIVED COMPETENCY RATING SCALE

How would you rate the following with respect to your competence in performing? (Circle appropriate letter below each statement)

A = most competent  B = competent  C = not competent  D = least competent  0 = unwilling to do

1. Study learning objective statements and classify them.
   (A)  (B)  (C)  (D)  (0)

2. Gather cost figures for alternate courses and predict course effectiveness.
   (A)  (B)  (C)  (D)  (0)

3. Study and determine several alternate course approaches.
   (A)  (B)  (C)  (D)  (0)

4. Write measurable learning objectives.
   (A)  (B)  (C)  (D)  (0)

5. Write attainable, relevant, and measurable course objectives.
   (A)  (B)  (C)  (D)  (0)

6. Recognize well stated course and learning objectives.
   (A)  (B)  (C)  (D)  (0)

7. With others, determine a course goal.
   (A)  (B)  (C)  (D)  (0)

8. Develop a pre-test.
   (A)  (B)  (C)  (D)  (0)

9. Select and list with your team, the major topics that should be treated in a content area.
   (A)  (B)  (C)  (D)  (0)

10. Determine subject matter, as part of a team, for your course.
    (A)  (B)  (C)  (D)  (0)

11. Write tests for learning objectives before instruction begins.
    (A)  (B)  (C)  (D)  (0)
12. Use learning objective classification to write a test item for each learning objective.
   (A)    (B)    (C)    (D)    (O)

13. Determine prerequisites for a course.
   (A)    (B)    (C)    (D)    (O)

14. With other team members decide on individual student characteristics that will affect plans for their learning.
   (A)    (B)    (C)    (D)    (O)

15. Decide, with team consensus, upon teaching-learning communication strategies.
   (A)    (B)    (C)    (D)    (O)

16. Contribute to evaluating the team's plan for developing instruction.
   (A)    (B)    (C)    (D)    (O)

17. Name the important support services that will affect instructional plans.
   (A)    (B)    (C)    (D)    (O)

18. Select or determine teaching-learning experiences appropriate for learner group or individuals.
   (A)    (B)    (C)    (D)    (O)

19. Develop or select, with team consensus, appropriate and effective instructional resource media and materials.
   (A)    (B)    (C)    (D)    (O)

20. Work within an instructional planning, development system.
   (A)    (B)    (C)    (D)    (O)

Perceived Competency Rating Scale (2)
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