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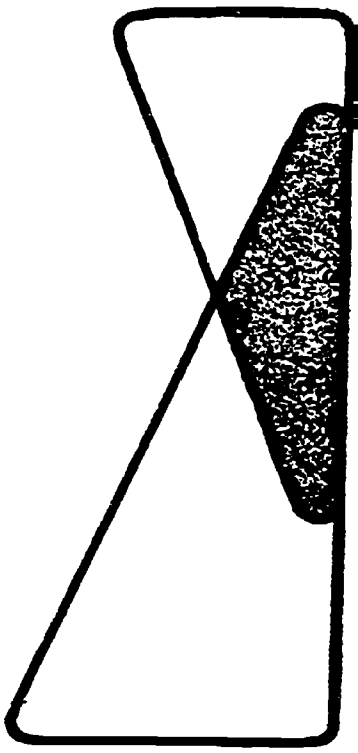
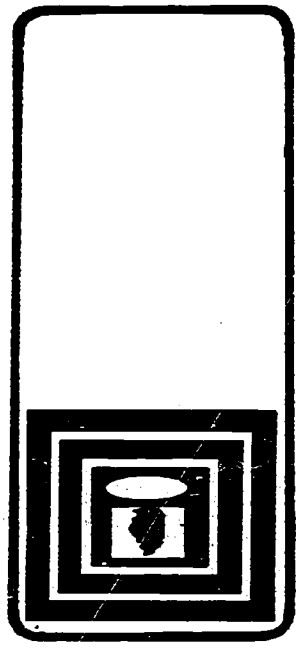
ABSTRACT

As part of the Phase II report of the Illinois Occupational Curriculum Project (IOCP), this document summarizes the investigative activities and resulting implications of both Phase I and Phase II. Based on the review of literature, conclusions and implications were stated which included: (1) The alternative strategies for curriculum development available in the literature may be broadly divided into Tylerian Models, Systems Models, and Product Development Models, (2) The state of the art in curriculum development presently evidences little forecasting power as a consequence of the absence of sound scientific of technical theorizing, (3) The development of any evaluation system from among the suggested prototypes should provide the user with flexibility and the opportunity to attend to alternative evaluate procedures, (4) The development of the IOCP Model should attempt to consider the critical aspects of various theories and philosophies of curriculum development, and (5) The IOCP model should attend to the human problems involved in implementation. Phase III of this project will be devoted to pilot testing the model. Related documents are available as VT 014 774 and VT 014 775 in this issue, and ED 050 270. (JS)

An Investigation Of Curriculum Development And Evaluation Models With Implications Toward A Systems Approach To Curriculum Development And Evaluation In Occupational Education





A Part of the Phase II Report of

Research and Development
Project No. RDB-B1-002

THE DEVELOPMENT OF SYSTEMS MODELS FOR DECISION MAKING IN OCCUPATIONAL CURRICULUM DEVELOPMENT AND EVALUATION

Funded Jointly by the
Board of Vocational Education and Rehabilitation
Division of Vocational and Technical Education
and the
Joliet Junior College
Joliet, Illinois

AN INVESTIGATION OF CURRICULUM DEVELOPMENT AND EVALUATION MODELS WITH IMPLICATIONS TOWARD A SYSTEMS APPROACH TO CURRICULUM DEVELOPMENT AND EVALUATION IN OCCUPATIONAL EDUCATION

As Part of the Phase II Report

"The Development of Systems Models for Decision-Making in Occupational Curriculum Development and Evaluation"

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STATE OF ILLINOIS
BOARD OF VOCATIONAL EDUCATION AND REHABILITATION
DIVISION OF VOCATIONAL AND TECHNICAL EDUCATION
RESEARCH AND DEVELOPMENT UNIT

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Joseph Borgen

Dwight Davis

PREFACE

This report focuses on one area of emphasis undertaken by the Illinois Occupational Curriculum Project in developing a model for occupational curriculum development and evaluation. It is only a part of the total Phase II report on the research and development project entitled The Illinois Occupational Curriculum Project, heretofore referred to as the Research and Development Project in Occupational Education entitled "The Development of Process Models for Decision-Making in Curriculum Development and Evaluation." This project is currently in progress at Joliet Junior College, Joliet, Illinois, with present efforts directed toward the initial development of a systems model designed to assist administrators in decision-making related to the development and evaluation of occupational education programs. The project is funded by the State Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education, Research and Development Unit, State of Illinois.

Purpose of the Project

This project is based on the assumption that more systematic means must be developed to assist curriculum planners in the development of new programs and the continuous evaluation of on-going programs in occupational education.

The following questions serve as the basis for the project research and development activities:

1. Can generalizable systems models be developed to provide curriculum planners with a systematic decision-making procedure for program identification, development, implementation, and evaluation?
2. Is it possible to develop guidelines for the identification and utilization of resources and evaluative criteria in accomplishing the activities specified in the systems model?

Objectives of the Project

The following are the overall project objectives:

1. To develop systems models for curriculum development and evaluation in occupational education.
2. To develop guidelines for the utilization and application of the systems models.
3. To test the applicability and usefulness of the systems models in a pilot situation at selected institutions offering occupational programs.
4. To develop a plan for dissemination and in-service training for curriculum planners in the utilization of the systems models.
5. To promote research in related areas.

Overview of the Total Project

The project is divided into four distinct phases. These are:

Phase I: Project Planning

Phase II: Initial Systems Model Development and Preliminary Evaluation

Phase III: Pilot Testing of the Model

Phase IV: In-depth Evaluation of the Project and Dissemination of the Findings

Phase I focused on a review of the literature, while Phase II involved the comparison and evaluation of systems, models, and decision-making and the development of a systems model for curriculum development and evaluation in occupational education. Phase III and Phase IV are proposed for further development, implementation, and evaluation of the model.

Phase I: Project Planning

Phase I was initiated March 1, 1970, with a grant of $24,550.00 from the State Board of Vocational Education and Rehabilitation. This grant combined with $6,916.00 in local funds providing a total budget of $31,466.00 to conduct the project through June 30, 1970.

The project planning activities centered around three major areas of concern identified as being particularly important to the establishment of a firm basis for the project:

1. Review of the literature on models for curriculum development and evaluation.
2. Review of current thinking on the effects of planned curriculum on social and economic conditions.
3. Study of potential consultants and resources agencies qualified to assist in subsequent phases of the project.

Phase II: Initial Systems Model Development And Preliminary Evaluation

Phase II was initiated July 1, 1970, with a grant of $67,178.00 from the State Board of Vocational Education and Rehabilitation. This

grant combined with $16,950.00 in local funds providing a total budget of $84,128.00 to conduct the project through June 30, 1971.

This phase of the project focused on research and development activities in four major areas of concern directed toward the initial development and validation of a systems model for curriculum development and evaluation in occupational education. The following topics served as the focus of investigative activities for Phase II of the project:

1. Investigation of Management Systems
2. Investigation of Curriculum Models
3. Identification of Decision-making Practices in Occupational Education
4. Initial Model Development and Testing

Developmental efforts were executed to coordinate the findings from the aforementioned areas of investigation with the objective of developing an initial systems model for decision-making in curriculum development and evaluation.

Future Phases of the Project

Two additional phases of this project are planned. Upon completion of Phase II, Phase III is proposed for pilot testing the model. This pilot test will provide orientation workshops for the application and use of the model, field testing of the model under actual conditions, and implementation of the model in selected institutions. Phase IV will provide for an in-depth evaluation of the project and the dissemination of findings to other institutions for their use in developing and evaluating occupational curricula.

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CHAPTER I

INTRODUCTION

The funding of the Illinois Occupational Curriculum Project (IOCP) is based on the assumption that a more systematic means can be developed to assist curriculum planners in the development of new programs and the evaluation of on-going programs in occupational education. Having based a research and development effort on this assumption made clear the need to complete an investigation of curriculum development and evaluation models already in use or in the literature.

This report summarizes the investigative activities and implications drawn from a number of months of literature search and discussions with consultants concerning existing curriculum development and evaluation models. This investigation spanned both Phase I (Project Planning) and Phase II (Initial Model Development) of the IOCP.

To guide this investigation, a series of questions were identified, including the following:

1. To what extent is it feasible to combine parts (variables, decisions, contents, etc.) of the three general types of models identified in Phase I and any other that may be identified in the earlier parts of Phase II? The purpose of this combination would be to make a more adaptable general model that would be more universally feasible.
2. What are the variables considered in each model?

3. What are the decisions to be made? by whom?
4. How can the model account for the institutional or administrative attitude?
5. What expertise is needed to implement the model?
6. Where does responsibility for success in curriculum development and evaluation lie?
7. What is the criteria for identifying variables.
8. What is the criteria for identifying and classifying parts of models?
9. What is the extent of support the models lend each other and the overlap that they have?
10. To what extent can development and evaluation models be combined?

Both in Phase I and Phase II, activities related to this investigation were executed with a good deal of consultative assistance. The use of consultants proved advantageous, for reasons of expertise and time. The ambitious nature of the Illinois Occupational Curriculum Project prohibited project staff from spending long periods of time on research of this nature. Rather, project staff time was devoted more to the analysis and synthesis of data gathered and ascertaining the implications for the development of a systems model for occupational curriculum development and evaluation.

The following is a list of terms defined as used in this report:

1. Curriculum - that set of educational activities under the control of the college. (34)
2. Model - a conceptualization in the form of an equation, a physical device, a narrative or graphic analog representing a

real-life situation. (59)

3. Occupational Curriculum - that set of experiences and activities aimed at preparation for employment. (34)
4. Program - a subpart of the curriculum; the combined set of activities and experiences of a particular individual in preparation for specific results.
5. System - the structure or organization of an orderly whole, clearly showing the interrelations of the parts to each other and to the whole itself. (59)

C H A P T E R I I

REVIEW OF THE LITERATURE

The following report is an in-depth analysis of the investigative activities conducted concerning models of curriculum development and evaluation. The consideration of each development process was guided by the following set of questions. These questions, as presented here, were used as analytic guides in the consideration and presentation of each model.

1. Who authored the model, and what has been the extent of its documentation?
2. What assumptions underlie the model, and are they enumerated in a rationale?
3. What are the major components and/or phases of the model?
4. Does the model provide substantive illustrations or are they available elsewhere?
5. Does the model contain components that would qualify it for one type of development activity rather than another?
6. At what levels of specificity* does the model function?

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*Levels of Specificity: Low (A) -- Model is basically composed of broad verbal and graphic outlines and/or definitions of its major components and phases; Middle (B) -- In addition to A, the model contains descriptions or explanations of the relationships between the several continuum on which it must be constructed; High (C) -- In addition to A and B, the model provides detailed sub-classifications of tasks or subsystems and indications of parameter locations.

Models for Curriculum Development

As a result of the review of the literature, three basic approaches to curriculum development were identified: (1) The Objectives Approach; (2) The Product Development Approach; and (3) The Systems Approach. Some examples of these three basic types of curriculum development models are presented herein, outlined using the format of the above six questions.

Objectives Model of Curriculum Development

1. The objectives model of curriculum development is thought to have originated with the work of Tyler (81). This general model has gained widespread acceptance. One clear delineation of the objectives model has been offered by Taba (77). Taba's statements will be considered representative of objectives models.
2. The rationale for the objectives model of curriculum development has been discussed in great detail by Tyler, Taba, and others. Taba (77) identified five major decisions to be made in curriculum development. These decisions reflect primary areas of concern for the developer.
    a. What are the aims of the school and the objectives of instruction? The objectives model assumes the primacy of objectives in the development process.
    b. What areas or subjects are to be selected? What specific content is to be covered in each?
    c. What types of learning experiences are to be utilized in the curriculum?
    d. How is the curriculum to be evaluated?
    e. What is to be the overall pattern of the curriculum?

The curriculum developer, then, must consider each of these questions as he seeks to create a curriculum. At each point, decisions among possible alternatives must be made. Taba (77) suggests three general questions, the answers to which provide criteria by which the developer makes decisions. These general questions suggest the rationale which guides the conception of the objectives model of curriculum development.

a. What are the demands, and the requirements, of the culture in which the curriculum will operate?

b. What do we know about the learning process and the nature of the learner?

c. What is the nature of knowledge? What are the characteristics and contributions of the disciplines?

In general, the rationale for the objectives model suggests that curricula originate from the demands and requirements of the society, that the curricula ought to be firmly grounded in our knowledge of the learner and the learning process, and that the curricula ought to reflect an understanding of the nature of knowledge. Further, the objectives of the curriculum must be clearly delineated, and a means of evaluating the effectiveness of the curriculum in meeting the objectives must be defined as a part of the development process.

3. Taba (77) suggested seven basic steps in the curriculum development process:

a. Diagnosis of needs. The curriculum developer must assess the needs of the society.

b. Formulation of objectives. From the needs assessment, the developer formulates objectives for his curriculum. The objectives reflect the intent of the curriculum to meet identified needs. There is a considerable amount of discussion as to how objectives are to be stated. The primary concern is whether objectives must be stated in behavioral terms. For a discussion of various viewpoints on this issue, see Atkin (3), Popham, et al. (50).

c. Selection of content. In most instances, curriculum developers must select representative content from a larger universe of possible content. The selection of content is closely associated with the needs and objectives identified previously.

d. Organization of content. Once content is selected, it must be organized in some manner. Questions of scope, sequence, etc., must be attended to at this step.

e. Selection of learning experiences. From the variety of learning experiences potentially available, the curriculum developer must select those that seem most appropriate to the objectives and the content selected for inclusion in the curriculum.

f. Organization of learning experiences. As with content, learning experiences must be organized in some fashion.

g. Determination of what and how to evaluate. As a part of the development process, the developer determines

what he will evaluate and how he will carry out that evaluation. A later section of this report deals with two evaluation procedures.

4. Perhaps the most detailed illustration of the objectives model of curriculum development is found in Taba's (77) work. The model has been used extensively.
5. This (objectives model) is one of the most general models proposed. The stages in its development are generalizable to a wide variety of instances.
6. The objectives model has a low level of specificity which means it is quite general. There are, however, many explicit applications and discussions of the model.

A review of the literature reveals a vast number of sources that are relevant to the objectives model of curriculum development. In the literature, the Tyler entry (80), together with the Taba entry (77), constitute two of the most important statements about the objectives model. The Douglass entry (17) is merely representative of many such works.

Product Development Model of Curriculum Development

1. The authorship of this pervasive development format is not attributable to a single individual or group. Its origins and principal proponents are in the operant psychology of B. F. Skinner (61), the programmed instruction movement (43), and the works of Tyler (82), Popham and Husek (51), Mager (41), and Baker (6).

2. This approach has traditionally assumed that:
    a. empirically validated curriculum should be developed and that this process is feasible;
    b. the development program must be marked by a cyclic process of redefinition; and
    c. a high degree of technical competence, facilities, and organization will characterize or be available to the development agency.
3. The major components or phases of this model include the following:
    a. Formulation
        1) Description of general intents. Completion of a program rationale.
        2) Exploration of various sources of program goals. Sources include:
            a) the society and community
            b) the institution
            c) the teacher and learner
        3) Justification of product. Search for existing materials and procedures that have proven effective.
        4) External review of procedures and findings (to be repeated throughout the development process).
    b. Specification
        1) Develop tentative, detailed specifications of project outcomes in terms of performance and statements of post-instructional behaviors for both student and teacher.

2) Analysis and subdivision of more complex program objectives into prerequisite and component skills.

3) Design criterion referenced items to measure objectives. Develop examinations containing measures of sub- and terminal objectives and field test to determine appropriate item format for target population.

4) Compose tentative list of expected entering behaviors.

5) Conduct a complete external review.

c. Development

1) Describe and produce alternative modes for presenting instruction. Criteria for mode selection include:

a) replicability

b) cost

c) feasibility

2) Testing of sample instructional segments.

3) Selection of segments to be included.

4) Statement of criteria for selection of learning experiences. Criteria could include:

a) presence of practice

b) presence of appropriate cues

c) provision for knowledge of results

5) Testing of longer sequences of materials on appropriate groups (individuals, small, large, etc.).

d. Field Testing: Purposes

1) To determine the appropriateness of procedures in real classrooms.

2) To collect teacher observations.

3) To collect data on change in student behaviors or competencies.

4) To experimentally compare alternative modes of presentation.

e. Revision Cycles

1) Organization of all sources of data:

a) observer records

b) user reports and preferences

c) pupil performance

d) results of controlled variation studies

2) Repeat revision and field testing. Utilization of a cost-effectiveness criterion.

f. Implementation

1) Broad scale introduction to regular classroom use.

2) Summative evaluation.

4. Substantive illustrations of this development process are widely available. They represent the process in whole or part. The citations at the end of this section present explicit delineations of the process or its parts.

5. This model is most appropriate for use by a well-coordinated, highly trained network of product development expertise. As Baker (4:17-18) has suggested: ". . . the systematic development of curricula according to the described pattern (product

development model) is an exhausting and resource-draining enterprise. Some university-developed curricula have been heavily data-based, but even in eras of liberal federal funding, the careful management of trained development personnel has usually not characterized such ventures."

6. This model is available with a high degree of specificity.

Systems Analysis and Curriculum Development

There has been increased attention given to systems analysis for possible application to curriculum development. In this section, three systems models are presented. Each model assumes, for the most part, that the developmental process is linear.

A systems approach to management cannot readily be introduced piece-meal into an organization. As will be shown, it would be difficult to use a systems approach for the development of the curriculum while other aspects of college management followed conventional line and staff relationships. Most relevant to the practitioner in educational administration is simply the systems perspective. It is a way of thinking about management problems.

Systems thinking will force the administrator to look at the totality of situations or problems, to take a long range view regarding his organization, to analyze consciously antecedent conditions and possible effects, to utilize cost-utility approaches to choice, and to optimize for the total organization. The predictive power of the educational manager will be enhanced through a more skillful approach and an improved ability to deal with uncertainty. Generally, the many heuristic vehicles, procedures, models, and tools employed by the systems approach can

contribute to the facilitation of administrative practice. The approach must be considered as a facilitator of the management process and not as a panacea.

The systems approach can be classified as being a way of thinking that represents an extension of the scientific attitude and method to the handling of administrative problem-solving. It encourages, even demands, the expansion of analytical activity, and attempts to utilize cross-disciplinary methods. It is holistic, rather than atomistic, and contextual: the focus is on the total problem and all relevant parts as well as on the environmental context against which the problem appears.

There are three major phases to the systems approach. These phases, while they appear separate in exposition, are thoroughly intertwined and integrated in practice.

1. Systems Analysis. Systems analysis is undertaken for the purpose of identifying rational decisions concerning the design, selection, and operation of a system. The main goal is the identification of the one best system (and subsystems) and the most efficient way of operating it. Here, a clear distinction must be made between the process and the structure of systems analysis. Process is parent to the structure. The analysis then sets the grand design pattern for the organization and in connection with the problems which will be processed.
2. Systems Engineering. Where a task is extensive and complex, there might be too many goals for a single group to manage properly. The task must be subdivided and assigned to several groups. Systems engineering divides the overall task into

subtasks. Assignments are then made to various groups so that each can operate in a well-defined sphere and where interaction among groups is clear-cut and minimal. A measure of the effectiveness of systems engineering is when the total task has been completed and the work of groups can be readily integrated into an overall working system. For example, a radio receiver is an operational system consisting of several subsystems -- detector, rf, if, and af stages. Each subsystem has unique specifications and each must integrate with the other and contribute to the operation of the radio.

3. Systems Management. Frequently, management is organized along departmental hierarchies. Information and authorization flow vertically within each hierarchy. Lateral flow between hierarchies, however, occurs only at the top. When sophisticated and complex activities which involve several departments of an organization are undertaken, the efforts of each department must be coordinated with the other. Management must transcend departmental boundaries. An important attribute of the systems approach is organizational control exercised by the systems manager. His responsibility cuts across functional and boundary lines. Here, authority and responsibility exist to implement the findings of systems analysis.

The systems approach to management has several advantages. It has provided an avenue for functional analysis in terms of antecedent conditions and developmental trends. Phenomena are assessed in context, spatially and chronologically. It has provided an approach to structural

analysis in terms of connections and relationships. Structures are not, therefore, abstracted or superimposed, but are analyzed through empirical referents. The approach is operational. A system problem is not mechanical, or psychological, or sociological; rather these are ways of looking at the problem. Problem-solving becomes a matter of looking at the system and the forces affecting it, and then asking and finding the answers to the right questions. The systems perspective is futuristic; i.e. one that projects developmentally long range plans. Systems thinking is a realistic way of manipulating variables in a complex context. End results are viewed in terms of relevant conditions and ultimate pay-offs. It has provided a unifying force for practice and inquiry and spans a number of disciplines. In this sense, it has resulted in a cross-disciplinary approach that has yielded a heuristic perspective on reality.

Disadvantages incident to the use of the systems approach are related to the size of the using organization. Most administrative personnel have been trained in operational activities and not in the use of systems management. The main ingredients of the systems approach to management are long-term planning and research data and the technology for employing the ingredients. Thus, in order to introduce the systems approach, new personnel would have to be employed. A key person in the support staff is the systems analyst who would be responsible for the operation of the entire system and its subsystems.

Three different systems models are presented below by source, documentation, assumptions, and major features.

Systems Model Number 1

1. Walter M. Arnold, Vocational, Technical, and Continuing Education in Pennsylvania: A Systems Approach to State-Local Program

Planning. Pennsylvania Department of Public Education, 1969. The project was undertaken as an effort to systematize state-wide educational planning.

2. Several assumptions appear:
   a. There is a relationship between socio-economic planning and vocational education program planning.
   b. State-level planning can be integrated with that of local school district planning.
   c. The planning sequence is linear.
3. Major planning steps and plan development levels are: (See Figure 1)

Planning Steps	Plan Development Levels
a. Problem Defining	a. Socio-Economic Planning
1) objectives	b. Vocational Education Program Planning
2) constraints	c. Vocational Education Resources Planning
3) translation	
b. Problem Solving	
1) analysis	
2) trade-offs	
3) synthesis	

4. While the model does not include substantive illustrations, ample data can be found in the literature related to Planning, Programming, Budgeting Systems (PPBS).
5. The model design appears to be an adaptation of the PPBS approach and modified for use in an educational system. This particular design, however, seems to be geared for use at a state-level operation.
6. The model is of a middle level of specificity. (See Figure 1)

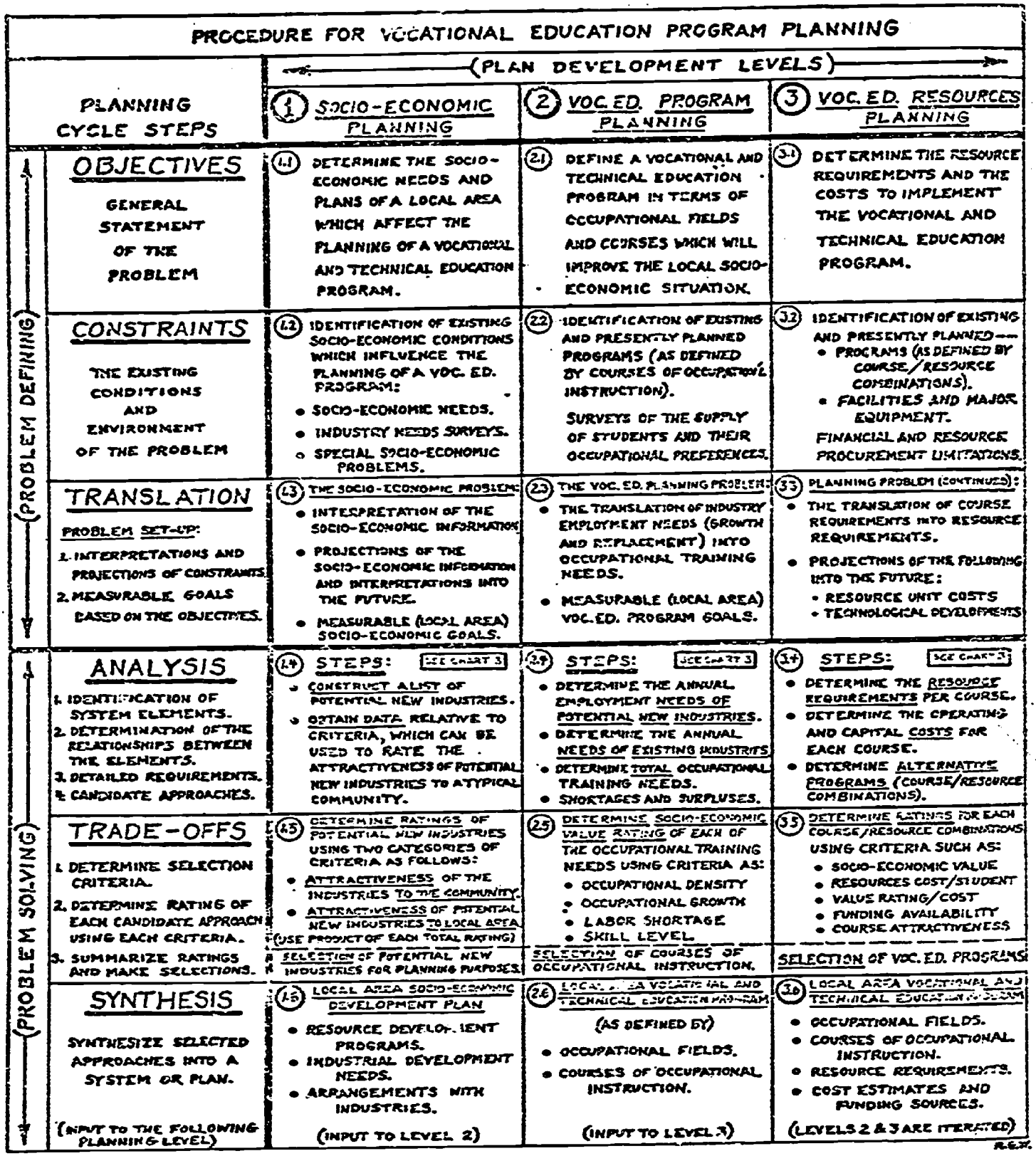


Figure 1: Procedure for Vocational Education Program Planning (2:211)

Systems Model Number 2

1. Stanley Young, Professor of Management, School of Business Administration, University of Massachusetts, and Charles E. Summer, Columbia University, Consulting Editor to Scott-Foresman and Company, Management: A Systems Analysis, Glenview, Illinois: Scott-Foresman and Company, 1966.

   Search of professional literature failed to reveal documentation.

2. Assumptions which the author appears to make about the decision-making model are:

   a. Specific recommendations for achieving total integration of a decision-making system have not yet been developed.

      1) Decision-making is synonymous with problem solving.

      2) A decision-making model is a construct which simply shows how decisions might be made.

      3) Decisions are made at each stage as a problem flows through a system.

      4) Decision-making can be approached through several disciplines; i.e. statistics, economics, mathematics, sociology, psychology, etc.

   b. The proposed model is linear in the same sense that problem solving techniques are linear. Problem solving generally is sequential in nature -- raising the problem . . . search for solutions . . . implementation . . . etc.

   c. The proposed model is a partially closed system.

   d. Any decision-making model must be congruent with management organizational philosophy.

3. Major steps of the model and suggested techniques appropriate to each step follow:

Steps	Techniques
a. Definition of Organizational objectives	Welfare, utility, benefit, or value measurement theory
b. Raising the problem	Sampling theory and reliability analysis
c. Isolating determinents	Correlation - partial or multiple, regression analysis, factor analysis, model building, controlled laboratory experiments, historical analysis, personal estimation, logical deduction
d. Search for solution	Search theory, heuristics, information theory, programming — linear and non-linear, simulation
e. Selection for best solution	Simulation, heuristics, programming — dynamic, invention, probability theory, sampling theory
f. Consensus	Group dynamics, information theory
g. Authorization	Theory of risk
h. Implementation	Critical path, PERT
i. Direction	Cybernetics, servo-theory, sampling theory
j. Auditing	Sampling theory, reliability, servo-theory, information theory

4. The author detailed a four and a half year participation in the design and installation of an actual decision-making system for a 250-bed general hospital. This was a case study which demonstrated the feasibility of planning, installing, and

controlling a planned decision-making system which was designed in terms of management problems that emerged.

5. The model analyzed by the author was a suggested one. It was used to illustrate the design and indicate the nature of a management system. While the terminology employed and the illustrations used might suggest that the system would be appropriate for business, industry, or institutional use, the system could be modified to fit the requirements of an educational enterprise.
6. The model contains a high degree of specificity.

Systems Model Number 3

1. William J. Gore, Department of Government, Indiana State University, Administrative Decision-Making: A Heuristic Model. John Wiley and Sons, Inc., New York, 1964.
   Documentation: American Political Science Review, 59-469, June, 1965. "This book is a major contribution to organization theory . . . Perhaps most significant . . . is its implication for total political systems . . . if his generalizations are true for simple organizations . . . as well as for the operation of larger political systems . . . (the book) is tightly written . . . it is likely to frighten away or lose those who most need its message . . ." by Donald Smithburg.
   American Sociological Review, 30:638, August, 1965. "The presentation of the model is largely descriptive . . . The few illustrations given are . . . short, very general . . . The style is uneven . . . the organization leaves more than a little

to be desired . . . The last few chapters, dealing with decision-making and organizational models . . . are well written . . . the book will provide thoughtful reading for those working on topics it covers . . ." by J. A. Litterer.

2. Several assumptions are advanced by the author:

   a. Rational systems of action are the organizing mechanisms of society. They presuppose an understanding of causes and effects, also a stability of goals.

   b. The heuristic process is oriented toward the relationship between personal values and ideology.

      1) Through the heuristic process, the private world of one individual is linked both to others and to the collectively constituted world.

      2) The emotional motivations that energize the formal (rational) organizational system are released by the heuristic process.

   c. The decision-making process links the conception of organization as a rational system with the conception of organization as a social system, or as a collective heuristic strategy.

   d. Heuristic decisions are mental and vicarious; they involve people in thinking about things instead of doing them. Decision-making is choosing, not between alternative courses of action, but between alternative goals.

3. Major components and phases of the heuristic model are:

Phases	Components
a. Perception	1) Tension articulated as problem
	2) Contingent response
	3) Situation identified as indeterminate
	4) Characterization of stimulus
	5) Determining reaction level
	6) Development of orienting set
b. Evaluation Set	1) Reorientation to search for meaning of situation
	2) Search for ideological meaning of situation
	3) Definition of organization's stake in situation
	4) Articulation of organization's stake in situation
	5) Consideration of costs of potential action
	6) Causal identification of alternative responses
	7) Declaration of cost in mounting responses
	8) Evaluative set defined in terms of stakes and costs
c. Estimation of Consequences	1) Reorientation to estimation of consequences
	2) Reconnaissance
	a) environment
	b) power centers
	3) Initial formulation of cooperative preference structure
	4) Initial attempt to define structure

Phases	Components
d. Maneuver for Position	1) Reorientation from internal to environmental interaction
	2) Definition of decision space
	3) Review of attitudes toward potential response
	4) Review concessions that could be made to secure sanction
	5) Determination that sufficient sanction has been secured
	6) Public pronouncement of proposed response

4. The general model was formulated from conceptions developed through four research projects and was augmented by information taken from more than two hundred case studies involving more than fifty public and private agencies. Illustrative data, however, were restricted entirely to a city fire department.
5. While the ostensible interest of the author is city government, the model does not appear to be limited to the operation of governmental agencies. Actually, the model appears to be appropriate for use in nearly any sort of organized endeavor.
6. The model is of a middle level of specificity.

Models for Curriculum Evaluation

The work of Glass (27) showed four basic models for evaluation which he labeled accreditation, Tylerian, management-systems, and summative-composite. The accreditation and Tylerian models have been utilized most often, but the appropriateness of these models for developmental efforts is limited. The accreditation model applies arbitrarily arrived-at

standards for judging a program and the Tylerian model focuses mainly on measuring the attainment of objectives, tending to ignore inputs and processes.

Project consultants felt that either a management-systems or a summative-composite model would be most appropriate for this developmental project and presented an example of each.

The management-systems model selected for presentation is by Stufflebeam (68) and the summative-composite model is by Stake (64). Subsequent paragraphs present these models and suggest the kinds of data that would be included in each.

Stufflebeam Model

The evaluation model developed by Stufflebeam is rather complex and is primarily oriented toward decision-making. Robertson (53) has presented a discussion of its application to the evaluation of vocational programs in general. The evaluation of the American Industry Project (46) is designed as a management-systems approach very similar to the Stufflebeam model.

Stufflebeam has identified four kinds of evaluation: context, input, process, and product. The four first letters of these words have been used to form the acronym to name the CIPP Evaluation Model. Figure 2 on the following page is taken from the Stufflebeam paper. The material in this figure provides a useful, general description of the methods and purposes of each of the four kinds of evaluation.

Whether a context, input, process, or product evaluation is the intention, the logical structure of activities, as suggested by Stufflebeam, will be the same. These activities are summarized as follows:

	Context Evaluation	Input Evaluation	Process Evaluation	Product Evaluation
OBJECTIVE	To define the operation context, to identify and assess needs in the context, and to identify and delineate problems underlying the needs.	To identify and assess system capabilities, available input strategies, and designs for implementing the strategies.	To identify or predict, in process, defects in the procedural design or its implementation, and to maintain a record of procedural events and activities.	To relate outcome information to objectives and to context, input, and process information.
METHOD	By describing individually and in relevant perspectives the major subsystems of the context; by comparing actual and intended inputs and outputs of the subsystems; and by analyzing possible causes of discrepancies between actualities and intentions.	By describing and analyzing available human and material resources, solution strategies, and procedural designs for relevance, feasibility and economy in the course of action to be taken.	By monitoring the activity's potential procedural barriers and remaining alert to unanticipated ones.	By defining operationally and measuring criteria associated with the objectives, by comparing these measurements with predetermined standards or comparative bases, and by interpreting the outcome in terms of recorded input and process information.
RELATION TO DECISION-MAKING IN THE CHANGE PROCESS	For deciding upon the setting to be served, the goals associated with meeting needs and the objectives associated with solving problems, i.e., for planning needed changes.	For selecting sources of support, solution strategies, and procedural designs, i.e., for programming change activities.	For implementing and refining the program design and procedure, i.e., for effecting process control.	For deciding to continue, terminate, modify or refocus a change activity, and for linking the activity to other major phases of the change process, i.e., for evolving change activities.

Figure 2: The CIPP Evaluation Model - A Classification Scheme of Strategies for Evaluating Educational Change

1. Focusing the Evaluation
    a. Identify the major level(s) of decision-making to be served; e.g. local, state, or national.
    b. For each level of decision-making, project the decision situations to be served and describe each one in terms of its locus, focus, timing, and composition of alternatives.
    c. Define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives.
    d. Define policies within which the evaluation must operate.
2. Collection of Information
    a. Specify the source of the information to be collected.
    b. Specify the instruments and methods for collecting the needed information.
    c. Specify the sampling procedure to be employed.
    d. Specify the conditions and schedule for information collection.
3. Organization of Information
    a. Specify a format for the information which is to be collected.
    b. Specify a means for coding, organizing, storing, and retrieving information.
4. Analysis of Information
    a. Specify the analytical procedures to be employed.
    b. Specify a means for performing the analysis.

5. Reporting of Information

   a. Define the audiences for the evaluation reports.

   b. Specify means for providing information to the audiences.

   c. Specify the format for evaluation reports and/or reporting sessions.

   d. Schedule the reporting of information.

6. Administration of the Evaluation

   a. Summarize the evaluation schedule.

   b. Define staff and resource requirements and plans for meeting these requirements.

   c. Specify means for meeting policy requirements for conduct of the evaluation.

   d. Evaluate the potential of the evaluation design for providing information which is valid, reliable, credible, timely, and pervasive.

   e. Specify and schedule means for periodic up-dating of the evaluation design.

   f. Provide a budget for the total evaluation program.

Some specification of these activities and suggestions as to methodology and available instrumentation is available to a limited extent in the literature: Worthen (86), Wallace and Shavelson (83), Burger and Cass (10), and Caldwell (11).

The Stufflebeam model is quite complex in two respects. First, as indicated above, it includes many kinds of data. Second, it attempts to establish a system whereby the evaluation efforts are coordinated across

levels of evaluation. Figure 3 from the Stufflebeam paper illustrates a system for coordinating evaluative efforts at the local, state, and Federal levels.

The figure illustrates coordination of evaluation efforts at three levels of government. Boxes one, ten, and fifteen could be labeled differently, however, and the feedback control loop could be adopted as a general plan for local program situations. For example, box one might have the label of individual course or learning experience, box ten might be labeled local program operations, and box fifteen labeled state program operations. Thus, for each course or learning experience there would be context, input, process, and product information. This information would be used to make decisions about the course and would also be fed into the overall program evaluation. These data from all of the learning experiences would provide the bulk of the information for evaluating the total program, as well as basic information for reporting into the state evaluation systems. At the top of the loop there would be feedback or information provided from the state to the local program in terms of state needs. This information, along with the self-evaluation, would be used at the local level to make decisions about the local program and the learning experiences in the local programs.

The CIPP Model provides a useful way of planning an evaluation effort in that it specifies to a great extent the kinds of data that are needed in evaluation. It also clarifies the evaluation task by its provision for evaluation at different levels, and the fact that at each level the data and information needs might differ somewhat, but they can and should be complementary. The consultants pointed out that the

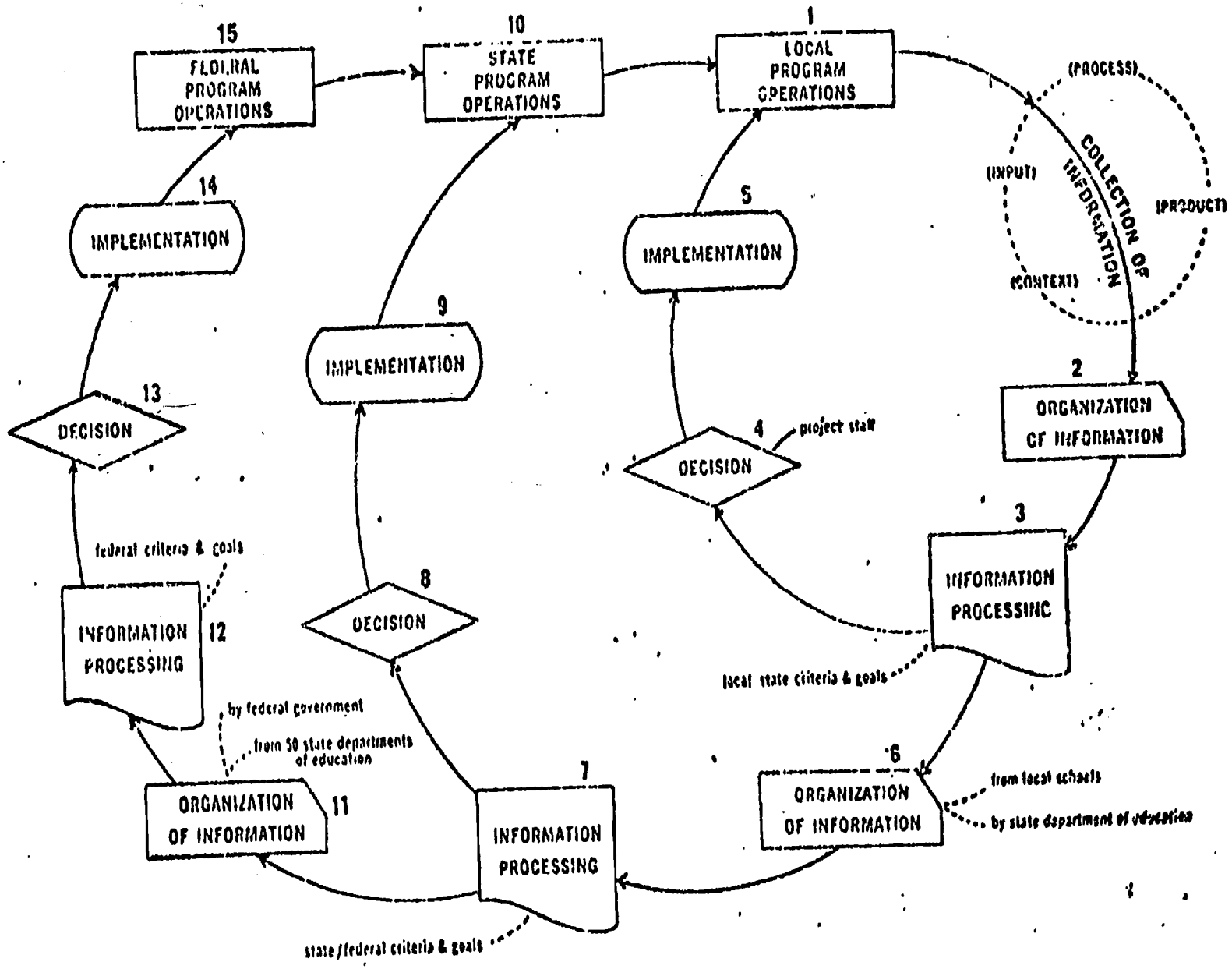


Figure 3: Feedback Control Loop - Evaluation in Federally Supported Educational Programs

Development and Evaluation Model presented as an example in the project proposal incorporates many of the features of the Stufflebeam Model, especially with respect to the context and input kinds of evaluation.

Stake Model

The Stake Model is similar in many respects to the Stufflebeam Model. It is perhaps less complex in appearance in that it does not attempt to specify the coordination of evaluation across levels. On the other hand, the Stake Model is somewhat more complex in its emphasis on gathering standards and judgments as part of the evaluation task. Figure 4 is taken from a paper by Stake (64) and is a presentation of the Stake Model.

According to the Stake Model, the evaluation task is to first identify the intents of the program in terms of antecedent conditions, transactions to occur in the program, and outcomes. Furthermore, the intended contingencies among the antecedents, the transactions, and the outcomes are specified. An early task for the evaluation is to determine what evidence is available to support the stated contingencies.

The intents determine much of the data gathering activity of the program evaluation. The observations column represents the fact that some kind of procedure will be used to determine whether the intents are fulfilled.

The model as presented suggests that standards are used to compare the intents with the observations, and that judgments are made on the basis of the standards. The standards are often difficult to establish. In some cases, a norm or reference group might be a standard, a standard

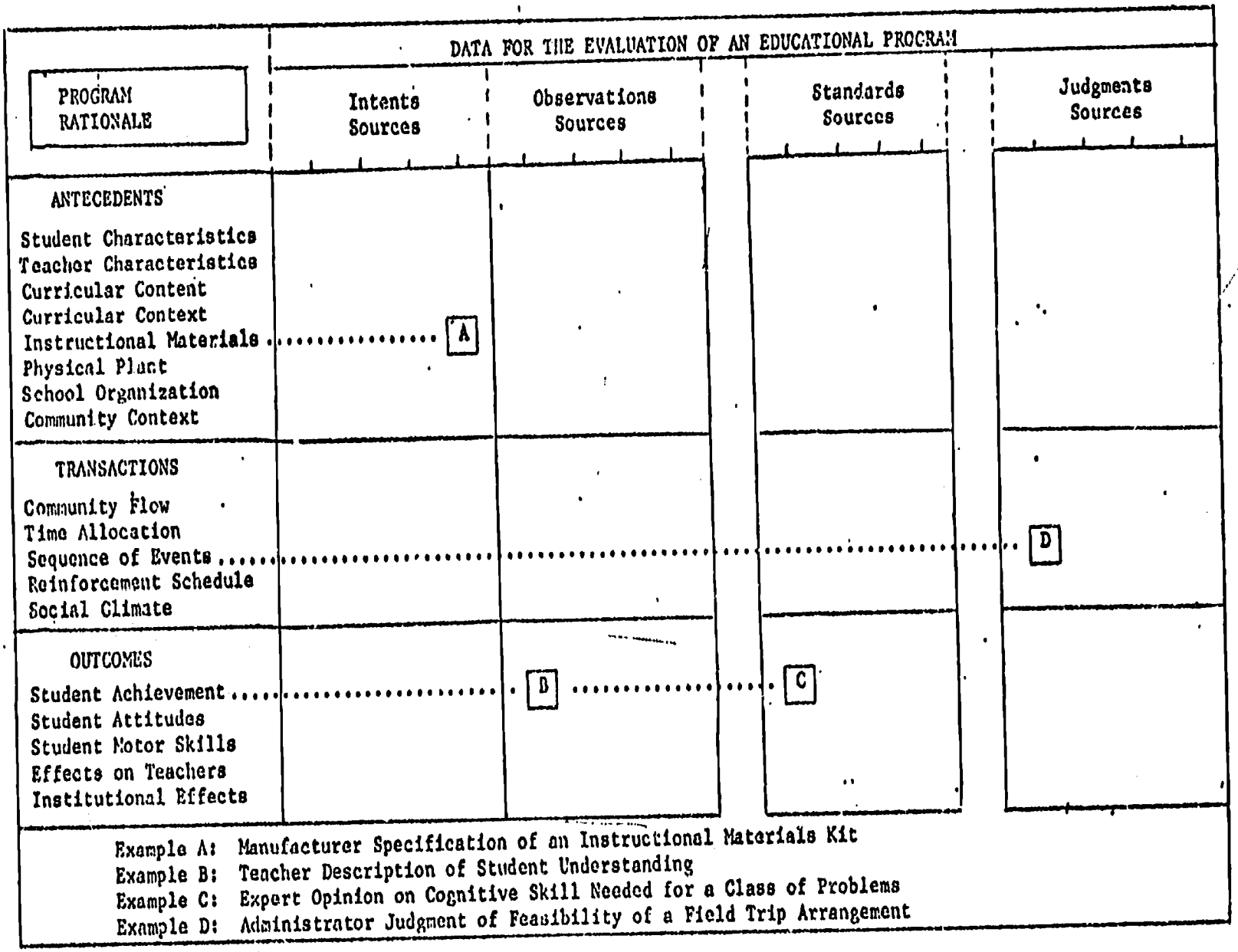


Figure 4: Illustration of Data Possibly Representative of the Contents of Four Cells of the Matrices for a Given Educational Program. (Adapted from: Robert E. Stake. "The Countenance of Educational Evaluation." Teachers College Record 68 (7):529, April, 1967. Used by permission.)

may be arbitrarily established by the program staff, or a group of experts might set some standards such as in the accreditation type evaluation. A task of the evaluation is to define at least some of the standards against which the observations are judged.

The model is somewhat misleading in that it infers a linear progression from intents to observations to standards to judgments. Certainly some of the evaluation will proceed in this manner, but variations will occur. For example, it would be important for the evaluator to obtain judgments of various people about the intents even before the program starts. Are the objectives of the program the right ones? What is missing from the program? These are the kinds of judgments that are needed early in the program.

The Stake Model is unique in its emphasis on judgments as important evaluation data. The standards and judgments columns might well be considered as permeating the intents and observations rather than the linear arrangement it seemingly portrays.

Content Analysis Technique For Occupational Curriculum Development

Oliver (47), in a recent issue of Educational Technology, suggested that the field of curriculum planning and design maintains the status of a relatively crude technology in terms of the lack of forecasting power of its products. Oliver believes that some of the lack of power is attributable to the preoccupation of the field with scientific rather than technological theorizing. Technological modes of functioning, he suggests, ought to be examined more closely by the curriculum designer. The prerequisite task in improving the rigor of curriculum design, and

the burden of the curriculum developer, is the development of a conceptual structure for identifying the critically dependent and independent events with which curriculum designers must deal.

It is interesting to note that Oliver stresses a three-level distinction which has not been used to any great extent in helping to explicate the domain of critically dependent and independent events for which the curriculum theorist and designer must be responsible. He suggests that these are functionally related categories: educational or training demands; contingent institutional, material and/or human capabilities; and the necessary instrumental conditions of learning and/or instruction. Oliver suggests that the planner ought to be concerned with the development of powerful category systems for organizing demands, capabilities, and conditions.

Gagne's work (23, 24, 26), when combined with Borow's Man In A World At Work and Fryklund's Analysis Technique for Instruction, present a cogent view of the primary elements of what may be described as an analysis technique for curriculum development. Occupational analysis combined with job analysis and task analysis provide for the identification, description, and delineation of available occupations, jobs, and the skills and abilities required to perform those jobs.

As outlined in Figure 5, the occupational analysis process is essentially a linear progression of analytic steps designed to achieve the identification and specification of the skills and abilities required of an individual to fulfill employment criteria. The principal advantages of this approach for vocational-technical curricula may lie in its recognition of the need to coordinate planning between the local program level, the local administrative level, and the national and state levels.

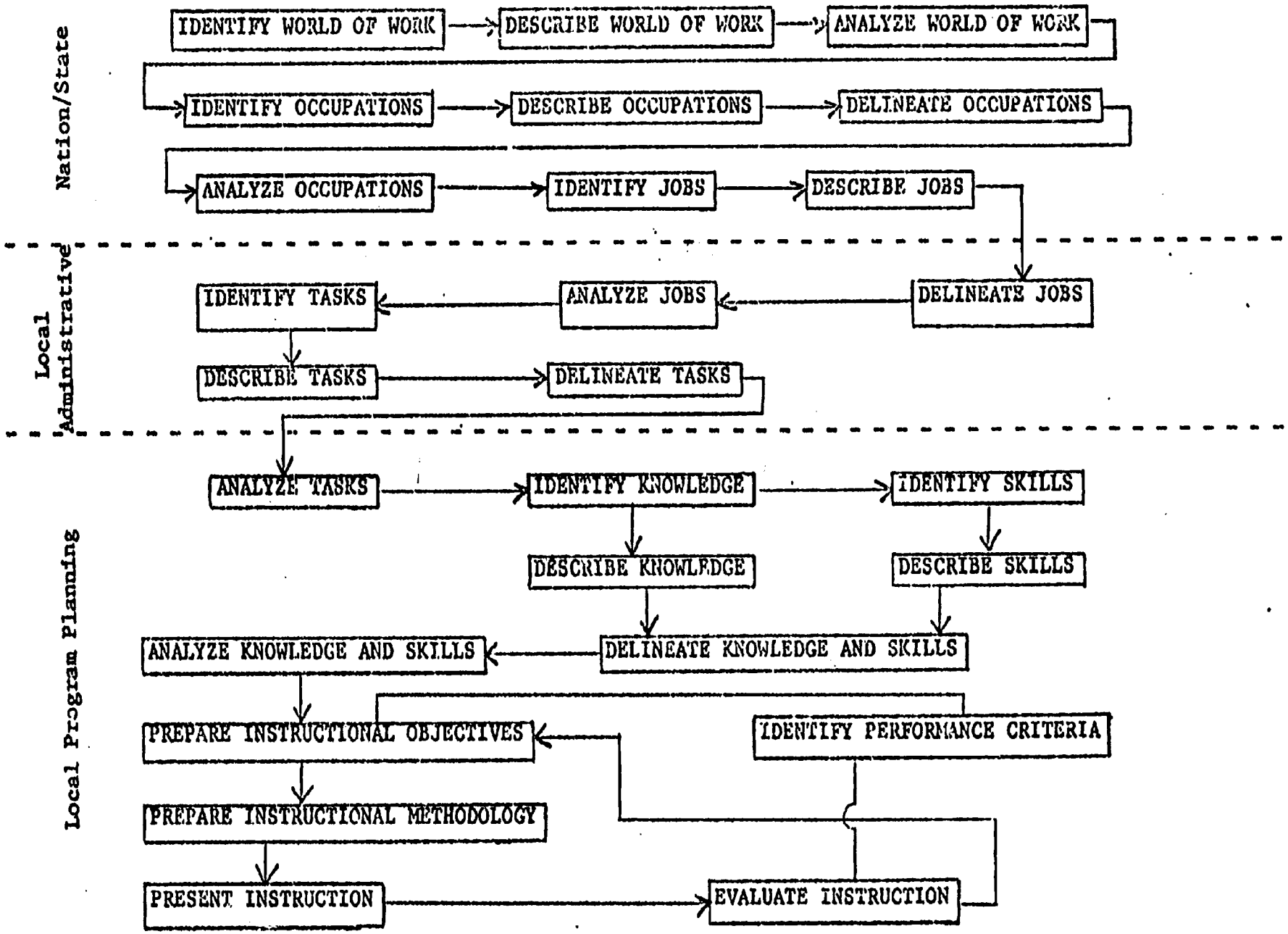


Figure 5: Principal Steps in a Job Analysis Approach to Curriculum Development

Unfortunately, the feedback channels or information systems that should coordinate the operations between these levels are not specified.

Assuming that different problems and consequently different types of information will be required for decisions at the three levels suggested, an evaluation network such as the one suggested by Stufflebeam in his Context, Input, Process, Product (CIPP) Model would be especially applicable to a curriculum development system that aimed to install this type of process.

In addition to the absence of feedback channels to control and monitor the flow of information for decision making, the model (Figure 5) distilled from the works of Gagne, Borow, and Fryklund focuses on the cognitive and psychomotor skills and abilities required to fulfill a particular job or perform a series of related tasks. It does not attend, at least explicitly, to the affective aspects of job performance. Available as a technique that met wide application in the 1930's and 1940's, and was to see extensive use by the United States Military Training Services, occupational analysis or task analysis necessitates the rather micro-division of a job into its knowledge and skill components. Moreover, it requires that this analysis yield a statement of the skills in the form of observable behaviors.

In a fashion quite representative of the other models reviewed in this report, the occupational analysis sequence does not contain any specification of system requirements for implementation or of the critical variables that would define such phases of the development process as the identification of tasks or the analysis of jobs. A revealing comparison can be made between the occupational development process and an alternative sequence for the development and validation of

an instructional system. Such a sequence is depicted in Figure 6. Even a brief comparison of the two "models" shows evident and important differences.

The instructional system procedure suggested in Figure 6 is clearly more expansive and more inclusive than the occupational development process described. It would appear that the job analysis approach, for example, could function as a feeder process into the phase called Defining Terminal Objectives (2A) shown in Figure 6. A melding of the two programs depicted would seem to present a more realistic picture of the evident complexity involved in the development and implementation of a curriculum. Even this combination appears to be inadequate, and this inadequacy is suggested by the absence from both depictions of any indication of how the output from either one or both of these processes is to be installed and adopted by an instructional system.

Component Analysis of Curriculum Development and Evaluation Processes: Some Criteria for Judgment

Attempts to analyze the curriculum development process into its essential components are not without precedent in the literature. Most recently, Dworkin (18) conceptualized curriculum as a social system composed of a group of interactive elements of persons, processes, and properties organized for the purpose of providing the conditions necessary for continuing education. Dworkin's logical analysis led him to develop seven exemplar models which he was able to derive from his general systems model of curriculum. Utilizing what Oliver (47) called technological theorizing, Dworkin suggested: (1) a model of symbolic distance; (2) a model for the expansion of shared meaning; (3) an analogue model of the change process in curriculum viewed as a social

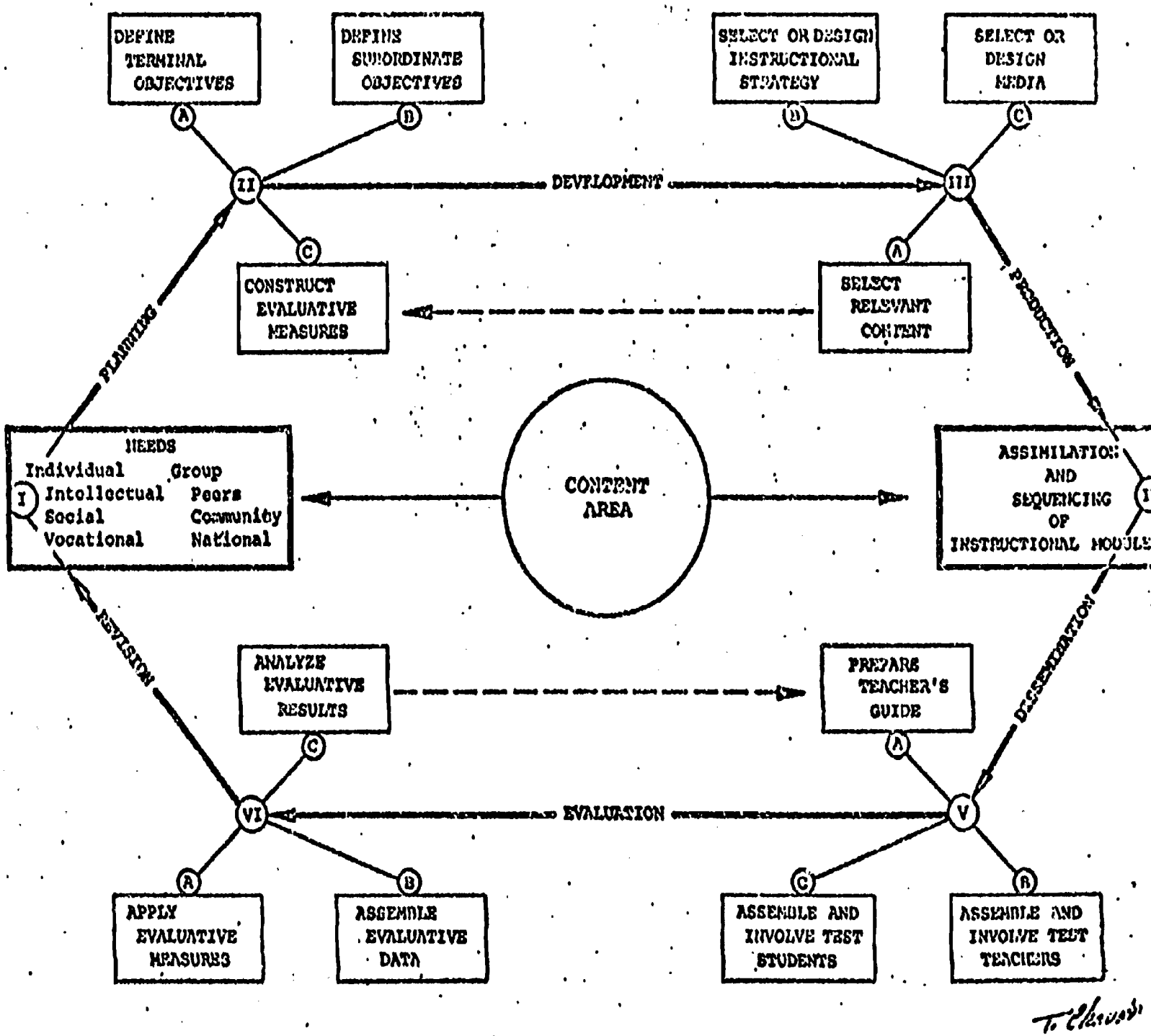


Figure 6: A Sequence for Development and Validation of an Instructional System

system: (4) a qualitative control of consequences in the curriculum system; (5) a model of symbolic orientation; (6) a concern matrix for curriculum as a social system; and (7) a model of systemic disorders.

Wickert (84) investigated the problem of identifying criteria and formulating an action model for the process of curriculum development. Twenty-four criteria that were judged to be crucial, functional, and observable within available curriculum models were identified by Wickert. These criteria were in turn judged by curriculum experts and then an examination of school systems was conducted to determine whether or not personnel within those systems judged the criteria to be important. Twenty-three of the twenty-four criteria evidenced a strong degree of acceptance in the three school systems Wickert studied. Only nine of the twenty-four criteria received both the high rating of the school systems and the curriculum experts. Although having some utility as a description of possible standards for assessing curriculum, Wickert's consideration may bear more importantly on the difficulty of obtaining agreement between practitioners and theoreticians on what is important in a curriculum or a curriculum development process.

In a manner similar to the procedure followed by the American Psychological Association and the American Educational Research Association, some curriculum theorists have attempted to develop recommendations for evaluating curricular and instructional materials. While the goals of the professional associations referred to centered on the specification of psychological and educational tests, the problems their committees faced were rather similar to the problems encountered when curriculum theorists attempt to develop comparable indicators.

In general, two types of dilemmas must be solved when a curricular analysis is performed. The first requires the designation of the critical components of a curriculum, and the second requires the operational specification of the standards, and relative importance of standards, that will be used to assess the alternative components. For example, Tyler and Klein (79) developed sample recommendations on curriculum evaluation which they presented at the 1970 American Educational Research Association annual convention in Minneapolis (See Table 1). The seven sample characteristics: Rationale, Specifications, Appropriateness, Effectiveness, Conditions, Practicality, Dissemination, are translated into prescriptions for practice. These prescriptions are rated as "essential," "very desirable," or "desirable."

Admittedly, recommendations of this type can be utilized in several fashions. They may function as reminders to the curriculum developer or utilizer. On the other hand, as an input into a model formulation to guide the development of curriculum, they would require a detailed specification before they could be operationalized. For example, recommendation R 1, "The value of the objectives must be substantiated," is a curriculum prescription that is more honored in the breech than in the observance. For obvious reasons, the attempt of curriculum technologists to describe empirically the intrinsic value of curricular components or of a curriculum development process is a task that does not lend itself to scientific investigation.

Scriven (56, 57) has been a major proponent of the judgment of worth of a program or curriculum's goals and objectives. Scriven has suggested that the effort of evaluation to describe the extent to which a set of objectives may have been achieved by a particular program is only

TABLE 1

Recommendations for Evaluating Curriculum
and Instructional Materials
(Sample Recommendations)*

Rationale

R1. The value of the objectives must be substantiated. (Essential)

R3. The basis for the selection of the content of the curriculum and instructional materials must be described. (Essential)

Specifications

S1. The technical manual should state in detail the objectives. (Essential)

S2. Objectives should be specified operationally, i.e., behavioral responses of students. (Essential)

Appropriateness

A1. The kind of student for whom the curriculum and instructional materials are designed should be specified. (Essential)

Effectiveness

E1. Technical manuals should cite sources of available evidence to document any claims made about effectiveness and efficiency. (Essential)

E3. Evaluation should be utilized when appropriate in the process of instructional development. Also, evaluation should be used when materials are completely developed. (Essential)

Conditions

C1. The technical manual must indicate the qualifications of the reader which are required in order to use the materials effectively. (Essential)

Practicality

P1. The technical manual should indicate which instructional materials are required and whether any of the instructional materials can be reused. (Essential)

P2. The technical manual should indicate what may be involved in teacher training. (Desirable)

Dissemination

D1. Provisions should be made for continued dissemination of new materials, new approaches, and new studies. (Very Desirable)

*Presented by Louise L. Tyler and Frances Klein at the AERA 1970 Annual Meeting, Symposium on Recommendations.

part of the task of evaluation. He has emphasized that the evaluation specialist must accept the responsibility for also judging whether the objectives or goals were worth pursuing in the first place. Faced with the evident realization that this process will not submit to the traditional modes of empirical scrutiny, Scriven allows that the basis for these judgments must lie in the evaluator's sense of ethical knowledge.

Although prescriptions such as R 1 may present scientific and philosophic problems, recommendations such as S 2, "Objectives should be specified operationally, i.e. behavioral responses of students," also assume that the operationally or behaviorally stated objective is an "essential" element of a curriculum. The present controversy in the literature on curriculum development suggests that there is at this time no strong consensus on this problem.

Eash (20) developed and field-tested a rating list for use by educators who wish to assess curriculum materials and learning packages. Eash's categorization of the components of a curriculum utilizes the traditional division of the curriculum into four broad categories: Objectives, Organization, Methodology, and Evaluation. Each of these broad areas is then subdivided and components of the area are rated individually and summarily. Table 2 presents that part of the instrument that is concerned with curricular objectives. The complete instrument is presented in Appendix A.

Eash (20) has presented some evidence that it is possible to train teachers to utilize the scale effectively, if effectiveness is defined in terms of inter-rater reliability. Here, as elsewhere, one difficulty is the implicit assumptions the instrument makes about the relevant

TABLE 2

Objectives Section of Maurice J. Eash's Instrument
For The Assessment of Instructional Materials
(Form IV)

I. OBJECTIVES	Yes	No
A. Are there objectives stated for the use of material?	___	___
1. General objectives?	___	___
2. Instructional objectives?	___	___
3. Are the objectives stated in behavioral terms?*	___	___
4. If stated in behavioral terms, do the objectives specify:		
a. The type of behavior?	___	___
b. Conditions under which it will appear?	___	___
c. Level of performance expected?	___	___
5. List examples of objectives.		
B. If there are no objectives stated for the use of the material, are the objectives instead implicit* or readily obvious? If yes, please outline below what objectives you believe govern the purpose of the material.	___	___
C. What appears to be the source of the objectives (both stated and implicit objectives)?		
1. Are the objectives related to a larger frame of instruction?	___	___
2. Are the objectives specific to a subject skill?	___	___
3. Are the objectives related to a broader behavioral pattern* that is to be developed over a period of time?	___	___

4. What seems to be the emphasis of the objectives: (Check as many as appropriate)

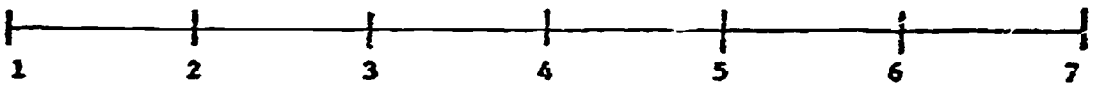
a. Attitudinal* ___ c. Cognitive development skills* ___
b. Motor skills ___ d. Subject skills ___

5. Are the objectives drawn from: (Check as many as appropriate)

a. A learning approach* ___ c. Demands of subject ___
b. Society needs (Citizenship) ___ d. Demands and needs of child* ___

D. Quantitative Rating of Objectives

(DIRECTIONS: Please make an "x" on the rating scale below at the point which represents your best judgment on the following criteria. Please place the "x" on a specific point.)



Objectives - vague, unclear, or missing. Those included not useful. Fails to distinguish between general and instructional objectives. Mixes various types of objectives, confusing to the teacher.	Average, some of the criteria for objectives met, some missing, at times inconsistent, objectives only partially operational for the classroom teacher.	The objectives are stated clearly and in behavioral terms. Both general and instructional objectives are stated in a consistent conceptual framework. Excellent, one of the best, useful for a teacher.

*All terms followed by an asterisk are defined in the glossary attached to Appendix A.

aspects of a curriculum package. If the assumptions are acceptable, it certainly could be employed in the development process as a set of guidelines or a rating scale. Yet, either use will require some training in its terminology.

What is implicit in the questions listed in Table 2 is that the objectives of a curriculum or package are, in some sense, a reflection of the philosophy or rationale that initiated the program. The purposely general level of these kinds of statements makes them far more difficult to analyze than a set of objectives with a high degree of specificity. Whether the analysis is performed on the objectives or the rationale, one would expect some degree of congruence to exist between the two.

Whether or not it is fair to dichotomize responses to questions such as (1.A.3) "Are objectives stated in behavioral terms?" may certainly be debated; but the more pertinent questions might be:

1. How will the system incorporate the development and statement of objectives?
2. What alternative routes are available for achieving the statement of objectives?
3. What skills and materials will be needed for this specification to occur?
4. How much time and money will be required for the process to be completed?
5. Is there a point of critical trade-off between resources required to obtain such a specification and the benefits that accrue to the student?

Although Eash's device was designed as an aid in input evaluation, it is displayed here because it clearly implies one expert's judgments

on what the critical components of a curriculum package are. Translated into a list of goals to be achieved during a development process, what is clearly absent is the weight that should be attached to each of the four broad categories (See Appendix A), and to the individual components of each of the categories themselves.

Insofar as curriculum evaluation can be seen as synonymous with curriculum development, some attempt will now be made to summarize the prototypic models of curriculum evaluation. Drawing primarily from Stake (66), we will categorize the models as to their: Key Emphasis, Purpose, Key Activities, Key Viewpoint Used to Delimit Study, Outside Experts Needed, Expected Teaching Staff Involvement, Risks, and Payoff. These eight characteristics are applied to five prototypic evaluation procedures: namely, those suggested by: Tyler (81), the accreditation movement (45), Stake (64), Stufflebeam (69), and Taba (78). Judgments of the correspondance between these evaluation procedures and the eight characteristics are summarized in Table 3.

In addition to summarizing what may be the trade-offs necessitated by the selection of one curriculum evaluation process or another, Stake's analysis implies what each of these evaluation processes holds to be important about curriculum evaluation. Insofar as that is accomplished ("Risks" and "Payoff"), his suggestions may provide an additional basis for the designation of the critical elements of curriculum development.

One could, and possibly should, differ with any one of the entries in the cells of Table 3. It is no easy task to isolate a "Key Emphasis" or "Purpose," whether these be in curriculum development or evaluation. One unfortunate application of an analysis such as the one depicted in

TABLE 3

PROTOTYPES OF CURRICULUM EVALUATION*

Prototype Evaluation Procedures	Key Emphasi	Purpose	Key Activities	Key Viewpoint Used To Delimit Study	Outside Experts Needed	Expected Teaching Staff Involvemsnt	Risks	Payoff
Ralph Tyler's Evaluation Model[1]	Instructional Objectives	To measure student progress toward objectives	Specify objectives; measure student competence	Curriculum Supervisor; Teacher	Objectives Specifiers; Measurement Specialists	Conceptualize objectives; Give tests	Oversimplify school aims; ignore Processes	Ascertain student progress
School Accreditation Model[2]	taff elf-Study	To review content and procedures of instruction	Discuss program; make professional judgments	Classroom Teacher; Administrator	None; unless authentication by outside peers needed	Committee discussions	Exhaust staff; ignore values of outsiders	Increase staff leadership responsibility
Bob Sta- e Countenance Model[3]	Description and Judgment Data	To report the ways different people see the curriculum	Discover what audience wants to know about; observe; gather opinions	Audience of final report	Journalists, Social Psychologists	Keep logs; give opinions	Stir up value conflicts; ignore causes	Broad picture of curriculum and conflicting expectations
Dan Stufflebeam's CIPP Model[4]	Decision-Making	To facilitate rational and continuing decision-making	Identify upcoming alternatives, study implications, set up quality-control	Administrator Director	Operations Analysts	Anticipate decisions, contingencies	Overvalue efficiency, undervalue student aims	Curriculum sensitive to feedback
Hilda Taba's Social Studies Evaluation Model[5]	Cause and Effect Relationships	To seek simple but enduring explanation of what works	Exercise experimental control and systematic variation	Theorist; Researcher	Research Designer, Statistical Analysts	Tolerate experimental contstraints	Artificiality; ignore personal values	Gets rules for developing new programs

*Prepared by Robert E. Stake, CIRCE, University of Illinois, October, 1969 (mimeo).

References:

[1]Tyler, Ralph W. General statement on evaluation. Journal of Educational Research, March, 1942, 492-501.

[2]National Study of Secondary School Evaluation. Evaluative Criteria, 1960 Ed., Nat'l Study of Secondary School Evaluation, Washington, D. C.

[3]Stake, Robert E. The countenance of educational evaluation. Teachers College Record 68, 523-540, April, 1967.

[4]Stufflebeam, Daniel L. Evaluation as enlightenment for decision-making. The Evaluation Center (College of Education), Ohio State University, Columbus, Ohio, 1967 (mimeo). To be published by Association for Supervision & Curriculum Development.

[5]Taba, Hilda. Teaching strategies and cognitive functioning in elementary school children. Cooperative Research Project No. 2404. San Francisco State College, San Francisco, 1966.

Table 3 would be to allow it to constrain the reader to choose either one or another of the suggested prototypes. What is more clearly required is a melding of the elements of several in order to satisfy the rationale of a particular program or project.

Observations on Curricular Differences

One way to begin to separate alternative curriculum development processes is to examine some notions or questions relating to learning and the assumptions that may underlie these processes. Grobman (32) has identified the following as critical questions that should be considered during a curriculum development project:

1. How do students learn most effectively? Do all students learn best in the same way?
2. Do students learn because they are rewarded and/or punished; that is, what is the role of motivation in learning and how is motivation fostered?
3. Can one train the mind or the faculties of the mind, with the result that general competence in all intellectual areas will be enhanced?
4. Will knowledge of the past--particularly of the classics of the past--prepare students to deal with the problems of the future?
5. Will training in one area be transferred automatically to other areas? Can such transfer be expected to occur only with specific preparation for transfer? Or can transfer not be expected under any conditions?
6. What is the role of insight in learning? What kinds of insight are important? How are these developed?

7. What levels or types of cognitive skills enhance retention of learning? What levels of cognitive learning increase ability to use present learning in later high-cognitive level tasks?
8. Is learning most effective when it proceeds from the known to the unknown or from the unknown to the known?
9. Should learning go from the abstract to the concrete, or from the concrete to the abstract?
10. Should learning be sequential, and pyramided on previous knowledge?
11. Can complex cognitive abilities be mastered during the child's first school year? Or can they be mastered only when taught initially during the child's first school year?
12. To what extent are children born unequal in terms of intellectual potential? Is there a great variation in the innate, intellectual ability of students? Barring pre-natal or post-natal injury, can all children be brought up to an effective functional level?

Crobman points out that questions such as No. 3 have been dismissed by the majority of learning theorists as untenable. This dismissal is anchored in the aversion of contemporary learning theorists to an earlier school of thought that has come to be called "mental discipline." On the other hand, most of the questions remain rather open-ended, with more or less empirical evidence available on them. Consequently, if changes in behavior or the capacity of students are to be designated as the important outcomes of transactions that occur under the aegis of a curriculum or its instructional component, it would seem to follow that a development process will have to attend to several of these questions.

The onus of Grobman's questions falls on the behavior theorist. Without reviewing the gap between research and practice, it would seem that the output from a curriculum development and evaluation model should reflect relationships between curriculum and learning theory. Whether it is presently possible or advisable to draw meaningful differences between alternative instructional methodologies (See Appendix A, Section III) may be debated. Unfortunately, scientific inquiry into this area, as summarized by Rosenshine (54), suggests that the profession evidences a "significant lack of knowledge" (p. 661) about the critical variables that relate instructional methodology and student learning.

Grobman goes on to develop a comparable list of problematic questions from the realm of educational philosophy and value judgment and suggests that these, too, are relevant concerns for the curriculum developer. Her summary of the problems involved in ascribing a particular theory of learning or philosophy of education to curriculum has relevance to the development of a systems model for curriculum development and evaluation.

> The fact that theories of learning, philosophy of education, and value judgments have not been identified by developmental projects as guidelines, does not mean that they are not part of the assumptions underlying the curriculum. Where these assumptions are not identified, it is harder to evaluate them, to check them for consistency, to be sure they are mutually compatible and supportive, and to insure that they represent a valid reflection of what the project wants to do. (p. 110)

It appears that the development of an operational model to guide local educators in their attempts to develop curriculum will certainly have to attend to the points raised by Grobman.

Within this broad frame of reference, it may now be possible to make some useful generalizations across alternative curriculum designs.

Initially, it appears that one critical dimension along which alternative approaches to curriculum development may be distinguished is their approach to the selection and specification of the content which is to form the core of the instructional experience. For example, the curriculum projects of the fifties and sixties (i.e. Biological Sciences Curriculum Study) may be characterized as curriculum movements that were generated in an attempt to revivify the relationship of the disciplines and the K-12 curriculum. In an attempt to do this, these projects were typified by the utilization of content experts from the humanities and sciences who were called upon to testify to the contemporary validity and relevance of the curricular offering of the schools and where necessary, to change or augment it.

On the other hand, the broad perspective that is possibly provided by one of the Tylerian models, Taba's social studies model for example, would seem to approach the problem from a different point of view. Instead of beginning with testimony from content experts, Taba's approach to curriculum is anchored in a survey of the society in an attempt to describe its needs. This description of needs is then translated into a series of objectives which become the aims of the curriculum. It seems that the origins of the content-centered curriculum projects and those models that might variously fall under the Tylerian approach are different in content origin; the first beginning in the disciplines, the second beginning in the society at large.

In a similar fashion, the procedures that have been variously collected under the banner of occupational analysis appear to represent an approach that is more comparable to the Taba model than it is to the content-centered curriculum. Where systems models fit when compared to

either one of the preceding approaches is difficult to suggest. What seems to be clear is that systematic approaches to curriculum development are characterized not so much by definitions of what is important to be learned or how learning is going to occur, so much as they are by attempts to order efficiently that process over time via the designation of critical decisions and the factors that may be predicted as influencing these decisions.

In addition to the origins of content as a point of view from which alternative approaches to curriculum development may be identified, a dimension called relative complexity may differentiate the models discussed. For example, as was pointed out in the section on reviewing curriculum models, one characteristic that typifies the product development model is its antecedent requirements of high degrees of technical competence in facilities and personnel designed to conduct that effort. On the other hand, the more traditional approach suggested by Tyler has had wide use by schools that have attempted to modify their curricular strains, although its application may have occurred at a rather simplistic level.

What seems to happen in the on-going project at the school level is that neither one model nor another is chosen exclusively. Rather, it would appear that particular elements from one or several models are intertwined into a sometimes rather nebulous network of operations. For example, it is not unlikely that some type of needs assessment study, survey of the local community, or search of the professional literature within a particular domain may well preface an organized attempt to develop or initiate a curriculum strain. Aspects typical of several models, such as the specification of instructional outcomes in the form

of observable behavior and some attempt to indicate the required frequency of response in these categories, may also be included. The differentiation seems to occur when the rather minute specifications of Popham and Baker, for example, that deal with the technical requirements for the specification and measurement of criterion performance, are described.

A motif that seems to have run through much of what has been said to this point is that dimension of curriculum development that is frequently described as the implementation of the curriculum into an instructional system. In addition to models describing curriculum development, there does exist in the literature a series of statements on systematic change or innovation. For example, the work of Clark and Guba (14) is frequently cited as a research and development model that can be used to guide the implementation of a curriculum into an instructional system. This type of approach to change has been criticized of late by House, Kerins, and Steele (36) in their review of its effectiveness as a rationale underlying the Illinois Gifted Program. Yet, one cannot dismiss the importance of developing a system that does attend to the problems involved in implementing the curriculum in a human network.

Speaking to this problem, Eash (19) has suggested that curricular change, when that change is described as alteration of classroom practice, may be ascribed to three alternative models. Eash identified them as: (1) the authority model; (2) the co-action model; and (3) the displacement model. After a discussion of each, it is his conclusion that the co-active approach to curriculum change, an approach characterized by an early

and meaningful cooperation between researchers and developers, is the only approach that has legitimacy and possible utility for effecting the alteration of educational programs.

C H A P T E R I I I

CONCLUSIONS AND IMPLICATIONS

The investigation of models for curriculum development and evaluation in the literature rapidly revealed that the concept of a model, i.e. what it is and what it is supposed to do, has little real utility, except as a piece of appropriate jargon. It was hard to avoid the conclusion that there are, presently, few if any actual models of curriculum development. This may in part reflect the equally obscure role that has been held by theories of curriculum.

Difficulty was experienced in comparing models because each of the following variables played a part in determining the overall advantage or disadvantage of a model:

1. How ready is the institution for change?
2. What expertise can be expected to play a role in the development process?
3. What is the nature of the desired change?
4. Where are the pressures for change originating?
5. Who will initiate the change in curriculum? How will the new curriculum be institutionalized?

The following is a list of conclusions and implications for the Illinois Occupational Curriculum Project, drawn from the review of the literature:

1. The alternative strategies for curriculum development available in the literature may be broadly divided into Tylerian Models,

Systems Models, and Product Development Models. The application of these models at the local level is rarely a pure adoption of one over another, but is rather a combinatorial process.

2. The state of the art in curriculum development presently evidences little forecasting power as a consequence of the absence of either sound scientific or technological theorizing. The model for curriculum development and evaluation being prepared by IOCP should address itself to this fact.
3. The contingencies that compose a curriculum development process may be broadly categorized as: (1) educational or training demands; (2) contingent institutional, material, and/or human capability demands; and (3) demands of the necessary instrumental conditions for learning and/or instruction. These contingencies should be reflected in the IOCP model.
4. As an analytic attempt to describe the components of a task performance, the strategies of occupational analysis present a tried procedure and should be adopted for use in the program development section of the IOCP model.
5. Curriculum models are not noted for their evaluative component. The occupational analysis approach should be supplemented with a systematic evaluation process in the IOCP model, not unlike the CIPP Model developed by Stufflebeam.
6. The development of any evaluative system from among the suggested prototypes should provide the user with flexibility and the opportunity to attend to alternative evaluative procedures. Since the system developed will be utilized by a variety of

institutions, an effort should be made to allow for the planning and implementing of an evaluation program fitted to the needs of the particular program or institution.

7. The IOCP model should allow for the assessment of curricular objectives and goals in such a fashion that the value is judged. Rather than just stating "Are objectives stated in behavioral terms?" the more pertinent questions might be: (1) How will the system incorporate the development and statement of objectives? (2) What alternative routes are available for achieving the statement of objectives? (3) What skills and materials will be needed for this specification to occur? (4) How much time and money will be required for the process to be completed? (5) Is there a point of critical trade-off between resources required to obtain such a specification and the benefits that accrue to the student?
8. Regardless of the specific nature of the model developed, there is a tradition that suggests it will have to deal with four primary aspects of the curriculum; that is, (1) the development and statement of objectives; (2) the organization of objectives and content; (3) the presentation of alternative methodologies for instruction; and (4) the internal and external evaluation of both the process and product components of the curriculum.
9. The IOCP model should attend to both the discipline and the society at large in determining content for learning experiences. Occupational analysis is a technique for determining technique that may more closely relate to the discipline approach.

10. The systems approach to curriculum development attempts to order efficiently, over time, the critical decisions and factors that may be considered as necessary and most important. These factors considered could represent any philosophy of curriculum development. Therefore, the development of the IOCP model should attempt to consider the critical aspects of various theories and philosophies of curriculum development.
11. In order for the IOCP model to be practical as a guide to assist administrators in making curriculum decisions, it must contain sufficient detail to suggest activities at an operational level and yet avoid complexity and detail that would require excessive expertise and time.
12. The IOCP model should attend to the human problems involved in implementation.

REFERENCES

1. Armitage, P., C. S. Smith, and P. Alper. Models for Education Decision-Making. London: Penguin Book Company, 1969.

2. Arnold, Walter M. Vocational, Technical, and Continuing Education in Pennsylvania: A Systems Approach to State-Local Program Planning. Pennsylvania Department of Public Education, 1969.

3. Atkin, J. Myron. "Behavioral Objectives in Curriculum Design: A Cautionary Note." The Science Teacher, May, 1968, pp. 27-30.

4. Baker, Eva L. "Curriculum Development." UCLA, (no date -- ditto), pp. 17-18.

5. Baker, Eva L., Robert J. Berger, Howard J. Sullivan, and John D. McNeil. "Developing a Research-Based Kindergarten Reading Program," in Experiments in Kindergarten Reading. Southwest Regional Laboratory for Educational Research and Development, Inglewood, California, 1968.

6. Baker, Eva L. "Establishing Performance Standards," in Establishing Instructional Goals. Prentice-Hall, Englewood Cliffs, New Jersey, 1969.

7. Baker, Robert L., Vernon S. Gerlach, Richard E. Schutz, and Howard J. Sullivan. "Developing Instructional Specifications," in Developing Instructional Products. Southwest Regional Laboratory for Educational Research and Development, Inglewood, California, 1968.

8. A Bibliographic Guide To Operations Analysis of Education. National Center for Education Statistics (DHEW) Division of Math Analysis and Dissemination, Washington, D. C.

9. Black, Guy. The Application of Systems Analysis to Government Operations. New York: Fruarilk A. Praeger, 1968.

10. Burger, Jane C., and Cass, Barbara L. "An Application of Stufflebeam's Model to Large Scale Program Evaluation," Occasional Paper. Pittsburgh, Pennsylvania: The University of Pittsburgh, 1968.

11. Caldwell, Michael S. "Input Evaluation and Educational Planning," Occasional Paper. Columbus, Ohio: The Ohio State University Evaluation Center, College of Education, January, 1968.

12. Chestnut, Harold. System Engineering Tools. New York: John Wiley and Sons, Inc., 1965.

13. Chin, Robert. "The Utility of System Models and Developmental Models for Practitioners," in W. G. Bennis, K. D. Benne, and R. Chin, The Planning of Change. Holt, 1961.

14. Clark, David L. and Egon G. Guba. "An Examination of Potential Change Roles in Education." Seminar on Innovation in Planning School Curriculum, October, 1965.

15. Conceptual Design for A Planning Program Budgeting System For California School Districts. California State Department of Education, Sacramento, California, 1969.

16. Cook, Desmond L. PERT = Applications in Education. Cooperative Research Monograph No. 17. OE-12024, US Government Printing Office, 1966.

17. Douglass, Earl. The High School Curriculum. New York: The Ronald Press Co., 1964.

18. Dworkin, Leo. A Systems Theory Approach Toward the Reconceptualization of Curriculum. Doctoral dissertation. Michigan State University, 1969.

19. Eash, Maurice J. "Bringing Research Findings Into Classroom Practice." The Elementary School Journal. Vol. 68, No. 8, May, 1968, pp. 410-418.

20. Eash, Maurice J. "Developing an Instrument for the Assessment of Instructional Materials (Form IV)." Paper presented at the American Educational Research Association Annual Convention, Minneapolis: 1970.

21. Fryklund, Verne C. Analysis Technique for Instruction. The Bruce Publishing Company, Milwaukee: 1956.

22. Gagne, Robert M. "Analysis of Instructional Objectives," in Teaching Machines and Programmed Learning, Data and Directions, Robert Glaser (ed.). Department of Audiovisual Instruction, National Education Association, 1965.

23. Gagne, Robert M. "The Analysis of Instructional Objectives for the Design of Instruction," in Glaser, R., (ed.) Teaching Machines and Programmed Learning II: Data and Directions. Washington, D. C.: National Education Association, 1965, pp. 21-65.

24. Gagne, Robert M. The Conditions of Learning. New York: Holt, Rinehart, and Winston, 1965.

25. Gagne, Robert M. "Curriculum Research and the Promotion of Learning." AERA Monograph Series on Curriculum Evaluation I. Chicago: Rand McNally, 1967, pp. 19-38.

26. Gagne, Robert M., (ed.). Learning and Individual Differences. Columbus, Ohio: Chas. E. Merrill Books, 1966.

27. Glass, Gene V. The Growth of Evaluation Methodology. Research Paper No. 27. Laboratory of Educational Research. Boulder: University of Colorado, 1969 (mimeo).

28. Glasser, Robert. "Instructional Technology and the Measurement of Learning Outcomes: Some Questions." American Psychologist, 18, 1963, pp. 519 and 521.

29. Goodlad, John I. "Curriculum: A Janus Look." The Record, 70:2:95-107, November, 1968.

30. Gooler, Dennis D., and Arden Grotelueschen. "Process Accountability in Curriculum Development." Curriculum Theory Network, Special Issue No. 1, Toronto: OISE, 1970.

31. Gore, William J., Department of Government, Indiana State University, Administrative Decision-Making: A Heuristic Model. John Wiley and Sons, Inc., New York, 1964.

32. Grobman, Hulda. Developmental Curriculum Projects: Decision Points and Processes. F. E. Peacock Publishers, Inc., 1970.

33. Hammond, Robert L. "Evaluation at the Local Level," EPIC Evaluation Center, University of Arizona, September, 1967.

34. Harris, Norman C. Technical Education in the Junior College/New Programs for New Jobs. Washington: American Association of Junior Colleges, 1964, p. 21.

35. Holland, James G., and B. F. Skinner. The Analysis of Behavior. McGraw-Hill Book Co., Inc., New York, 1961.

36. House, Ernest R., Thomas Kerins, and Joe M. Steele. The Demonstration Center an Appraisal of the Illinois Experience. Center for Instructional Research and Curriculum Evaluation (CIRCE), University of Illinois at Urbana-Champaign, December, 1970.

37. Johnson, Richard A., Fremont E. Kast, and James E. Rosenzweig. The Theory and Management of Systems. New York: McGraw-Hill Book Company, 1967.

38. Knezevich, Stephen J. (ed.). Administrative Technology and the School Executive: Applying The Systems Approach To Educational Administration. American Association of School Administrators, Washington, D. C., 1969.

39. Lowe, C. W. Critical Path Analysis by Bar Chart. New York: Braudon Systems Press, 1966.

40. Lumsdaine, Arthur A. "Assessing the Effectiveness of Instructional Programs." Teaching Machines and Programmed Learning II: Data and Directions, Robert Glaser (ed.). Department of Audiovisual Instruction, National Education Association, 1965, pp. 267-313.

41. Mager, R. F., and J. McCann. Learner-Controlled Instruction. Varian Associates, Palo Alto, California, 1961.

42. Maley, Donald. "An Investigation and Development of the Cluster Concept as a Program in Vocational Education at the Secondary School Level." University of Maryland, Report #ERD 115-A, August, 1966.

43. Markle, Susan M. "Empirical Testing of Programs," in Programmed Instruction, The Sixty-sixth Yearbook of the National Society for the Study of Education, Phil C. Lange. The University of Chicago Press, 1967, pp. 104-138.

44. Miller, R. B. "Task Description and Analysis," in Psychological Principles in System Development, Robert M. Gagne (ed.). New York: Holt, Rinehart, and Winston, 1963, pp. 187-230.

45. National Study of Secondary School Evaluation. Evaluative Criteria, 1960 Edition. National Study of Secondary School Evaluation, Washington, D. C.

46. Nelson, Orville. "The American Industry Evaluation System." Journal of Industrial Teacher Education, 6, 3, 37-48, Spring, 1969.

47. Oliver, C. L. "Toward Improved Rigor in the Design of Curricula." Educational Technology, April, 1970.

48. Pennsylvania Research Coordinating Institute for Vocational Education. Vocational Technical and Continuing Education in Pennsylvania: A Systems Approach to State-Local Program Planning, Walter M. Arnold, Harrisburg, 1969.

49. Pfeiffer, John. New Look at Education: Systems Analysis and Our Schools and Colleges. New York: Odyssey Press, 1968.

50. Popham, W. James, et al. Instructional Objectives. AERA Monograph Series on Curriculum Evaluation, Monograph #3, Chicago: Rand McNally, 1969.

51. Popham, W. James, and T. R. Husek. "Implications of Criterion-Referenced Measurement." Journal of Educational Measurements, Vol. 6, No. 1, Spring, 1969.

52. Robeck, Martin J. "A Study of the Revision Process in Programmed Instruction." Unpublished Master's Thesis, University of California, Los Angeles, 1965.

53. Robertson, Alan G. "Applying Systems Analysis Techniques to the Evaluation of Vocational Programs." Journal of Industrial Teacher Education, 6, 3, 30-36, Spring, 1969.

54. Rosenshine, Barak. "The Stability of Teacher Effects on Student Achievement." Review of Educational Research. Vol. 40, No. 5, December, 1970, pp. 647-662.

55. Scriven, Michael. "The Methodology of Evaluation," in Perspectives in Curriculum Evaluation. Rand McNally and Co., Chicago, 1967, pp. 89-93.

56. Scriven, Michael. "Critique of the PDK Volume on Evaluation." Paper presented at the American Educational Research Association Annual Convention, New York: 1971.

57. Scriven, Michael. "The Methodology of Evaluation." AERA Monograph Series on Curriculum Evaluation, No. 1., Perspectives of Curriculum Evaluation. Chicago: Rand McNally, 1967, pp. 39-83.

58. Silvern, Leonard C. "A Cybernetic System Model for Occupational Education." Educational Technology, January, 1968.

59. Silvern, Leonard C. Systems Engineering of Education I: The Evolution of Systems Thinking in Education. Education and Training Consultants Co., Los Angeles, 1968.

60. Sjogren, Douglas, et. al. Phase I Report: Tasks 8 and 11. A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation. Joliet, Illinois: Joliet Junior College, Spring, 1970 (mimeo).

61. Skinner, B. F. Cumulative Record, enlarged edition. New York: Appleton-Century-Crofts, 1961.

62. Smith, B. O., William Stanley, and J. Harlan Shores. Fundamentals of Curriculum Development. New York: Harcourt, Brace and World, 1957.

63. Southwest Educational Development Laboratory, Calipers, Planning the Systems Approach to Field Testing Educational Products. The Southwest Educational Development Corporation, Austin, Texas, 1969.

64. Stake, Robert E. "The Countenance of Educational Evaluation." Teachers College Record. 68:523-40, 1967.

65. Stake, Robert E. "Language, Rationality, and Assessment," in Beatty, Walcott H. (ed.). Improving Educational Assessment and an Inventory of Measures of Affective Behavior. Washington, D. C.: Association for Supervision and Curriculum Development, 1969.

66. Stake, Robert E. "Prototypes of Curriculum Evaluation." (Chart) Center for Instructional Research and Curriculum Evaluation (CIRCE), University of Illinois, 1969 (mimeo).

67. Stern, Jacob. "A Matrix Analysis Approach to Curriculum Change and Development," Guidelines and Supportive Papers for Planning and Conducting Short-Term Teacher Education Activities. Iowa City, Iowa: University of Iowa, February, 1970.

68. Stufflebeam, Daniel L. Evaluation as Enlightenment for Decision-Making. Columbus: Evaluation Center, Ohio State University, January, 1968.

69. Stufflebeam, Daniel L. "Evaluation As Enlightenment for Decision-Making," in Improving Educational Assessment and An Inventory of Measures of Affective Behavior. Washington, D. C.: Association for Supervision and Curriculum Development, National Education Association, 1969.

70. Stufflebeam, D., and R. Hammond. Ohio State Project on Elementary School Teacher Education Development Program, USOE, Chapter V.

71. Stufflebeam, D. L. "Toward A Science of Educational Evaluation." Educational Technology, 8, July 30, 1968.

72. Svenson, Arthur L. "Management Systems and the Exception Principle." Systems and Procedures Journal, Vol. 15, No. 4, July-August, 1964, pp. 44-51.

73. Symmes, Stowell (ed.). Handbook for Curriculum Change: Guidelines. Joint Council on Economic Education, 1969.

74. Systems Approach to the Management of Public Education. Metro. Detroit Bureau of School Studies, Inc., Michigan, April, 1969.

75. Systems Development Corporation. Systems Theory: Some Applications for Curriculum and Instruction. Santa Monica, California, March, 1969 (28 pages).

76. Systems Planning in Public Education Service Bureau, Inc., Arlington, Virginia, Arm. Ldrsp Service, 1968.

77. Taba, Hilda. Curriculum Development: Theory and Practice. New York: Harcourt, Brace and World, 1962.

78. Taba, Hilda. Teaching Strategies and Cognitive Functioning in Elementary School Children. Cooperative Research Project No. 2404. San Francisco State College, San Francisco, 1966.

79. Tyler, Louise L., and Frances Klein. "Recommendations for Evaluating Curriculum and Instructional Materials." Paper presented at the American Educational Research Association Annual Convention, Minneapolis, 1970.

80. Tyler, Ralph. Basic Principles of Curriculum Development. University of Chicago Press, 1950.

81. Tyler, Ralph W. "General Statement on Evaluation." Journal of Educational Research, March, 1942, pp. 492-501.

82. Tyler, Ralph W. Principles of Curriculum and Instruction, University of Chicago Press, Chicago, 1950.

83. Wallace, Richard C. and Richard J. Shavelson. "Evaluation of Curricular Programs," in Research in Process Curricula, Eastern Regional Institute for Education, 635 James Street, Syracuse, New York 13203. A series of related papers presented at the 1970 Annual Meeting of the American Educational Research Association, Minneapolis, March, 1970.

84. Wickert, Jack J. Identification of Criteria and Formulation of an Action Model for the Process of Curriculum Development. Doctoral dissertation, Western Michigan University, 1969.

85. Wolf, Richard. Program Free Testing, Research Memorandum, Southwest Regional Laboratory for Educational Research and Development, Inglewood, California, 1968.

86. Worthen, Baline B. "Toward A Taxonomy of Evaluation Designs." Educational Technology, 8, August 15, 1968.

87. Young, Stanley, and Charles E. Summer, Jr. Management: A System Analysis. Glenview, Illinois: Scott Foresman and Company, 1966.

A P P E N D I X A

An Instrument for the Assessment of Instructional Materials (Form IV)

(Developed by Maurice J. Eash, University of Illinois at Chicago Circle)

An Instrument for the Assessment of Instructional Materials (Form IV)

I. Objectives	Yes	No
A. Are there objectives stated for the use of the material?	___	___
1. General objectives?	___	___
2. Instructional objectives?	___	___
3. Are the objectives stated in behavioral terms?*	___	___
4. If stated in behavioral terms, do the objectives specify:		
a. the type of behavior?	___	___
b. conditions under which it will appear?	___	___
c. level of performance expected?	___	___
5. List examples of objectives:		

B. If there are no objectives stated for the use of the material, are the objectives instead implicit* or readily obvious? ___ ___
If yes, please outline below what objectives you believe govern the purpose of the material.

C. What appears to be the source of the objectives (both stated and implicit objectives)?

1. Are the objectives related to a larger frame of instruction?	___	___
2. Are the objectives specific to a subject skill?	___	___
3. Are the objectives related to a broader behavioral pattern* that is to be developed over a period of time?	___	___

4. What seems to be the emphasis of the objectives: (Check as many as appropriate)

a. Attitudinal* ___ c. Cognitive development skills* ___
b. Motor skills ___ d. Subject skills ___

5. Are the objectives drawn from: (Check as many as appropriate)

a. A learning approach* ___ c. Demands of subject ___
b. Society needs (Citizenship) ___ d. Demands and needs of child* ___

D. Quantitative Rating of Objects

(DIRECTIONS: Please make an "x" on the rating scale below at the point which represents your best judgment on the following criteria. Please place the "x" on a specific point.)

Objectives - vague unclear or missing. Those included not useful. Fails to distinguish between general and instructional objectives; mixes various types of objectives, confusing to the teacher.	Average, some of the criteria for objectives met, some missing, at times inconsistent, objectives only partially operational for the classroom teacher.	The objectives are stated clearly and in behavioral terms. Both general and instructional objectives are stated in a consistent conceptual framework. Excellent, one of the best, useful for a teacher.

II. Organization of the Material (Scope and Sequence) Yes No

A. Has a task analysis* been made of the material and some relationship specified between the tasks? ___ ___

B. If a task analysis has been made, what basis was used to organize the materials: (Check as many as appropriate)

1. Errorless discrimination* ___
2. Simple to complex ___
3. Figure-ground* ___
4. General to specific ___
5. Logical order ___
6. Chronology ___

C. If no indication of a task analysis has been made, what assumptions do you believe the authors have made concerning the organization of the instructional sequence of the material?

D. Is there a basis for the scope of the material included in the instructional package? ___ ___

1. If there is a basis, is it:
   a. related to a subject area? ___ ___
   b. to a motor skill development? ___ ___
   c. to a cognitive skill area? ___ ___
   d. to an affective response system*? ___ ___
   e. other (please specify)_____ ___ ___

	Yes	No
2. Has the scope been subjected to analysis for:		
a. appropriateness to students?	___	___
b. relationship to other material?	___	___
E. Is there a recommended sequence?	___	___

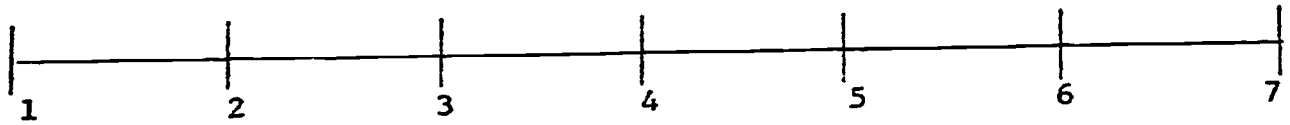
1. What is the basis of the recommended sequence? (Check as many as appropriate)

a. inter-relationships of a subject* ___
b. positive reinforcement and programmed sequence* ___
c. open ended development of a generalization* ___
d. advanced organizer (cognitive)* ___
e. other (please specify)_____ ___

F. Briefly outline the scope and sequence:

G. Quantitative Rating of Organization of the Materials (Scope and Sequence)

(DIRECTIONS: Please make an "x" on the rating scale below at the point which represents your best judgment on the following criteria. Please place the "x" on a specific point.)



Sequence illogical or unstated, teacher is left to puzzle it out. Does not appear to have subjected material to any analysis to build an instructional design. Scope is uncertain, seems to contradict sequence. Little help unintentionally to teacher or children in organizing material.

Average in organization. Some help but teacher must supply much of organizational sequence. Scope somewhat limited, may be too narrow (or broad). Sequence is not detailed enough and may not have been tested with a range of children.

Excellent organization of scope and sequence. Conceptually developed based on a consistent theory; task analysis or other appropriate investigation has been done. Tested for appropriateness of recommended sequence.

III. Methodology

A. Does the author(s) and/or material suggest any methodological approach? ___ ___

	Yes	No
B. Is the methodological approach, if suggested, specific to the mode of transaction?	___	___
1. Does the mode of transaction*: (Check as many as appropriate)		
a. rely upon teacher-centric method* (largely teacher directing)?*	___	___
b. rely upon pupil-centric method* (largely self-directing)?*	___	___
c. require active participation by the students?	___	___
d. passive participation by the students?	___	___
e. combination of active and passive participation by the students?	___	___
f. direct students' attention to method of learning as well as the learning product?	___	___
g. provide for variation among students - uses several approaches to method?	___	___
C. Does the mothodology suggested require extensive preparation by the teacher?	___	___
1. How much deviation is permitted in methodology?		

Much ___ Some ___ Little ___

2. Does the methodology require unusual skills obtained through specific training?	___	___
3. Is there any statement on how methodology was tested; any experimental evidence?	___	___

4. If you have tried the recommended methodology, how successful did it seem for your students?

Most succeeded ___ Approx. half succeeded ___ Few succeeded ___

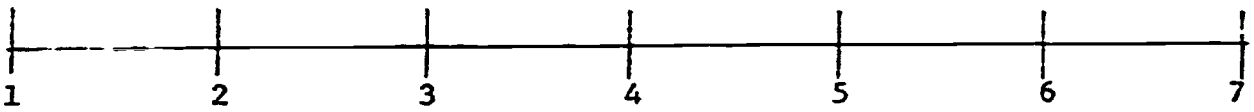
a. Please provide a brief description of the students who were successful and those who were not successful.

b. What variations on recommended methodology have you used?

D. In a brief statement, describe the recommended methodology.

E. Quantitative Rating of Methodology

(DIPECTIONS: Please make an "x" on the rating scale below at the point which represents your best judgment on the following criteria. Please place the "x" on a specific point.)



Very little help is given on methodology, or methodology is too abstract and complex for most students and teachers. Methodology appears to be unrelated to content and an afterthought in the learning package. Too active or passive for most students. Teacher required to participate fully with too many students at every step. Does not have appropriate methodology for variety of learning ability among students.

Gives help to the teacher, but would like more. Some students would be able to cope with suggested methodology, but others not. Does not appear to have been widely field tested. Teacher has to work out variety for students with special learning difficulties.

Uses a variety of modes in the transactions. Does not chain a teacher to a mode without reason, but provides assistance for different abilities. Describes the field test of the methodology. Teachers will find methodology easy to use and believe students will respond. Methodology is part of goals of instruction and not just vehicle for content.

	Yes	No
IV. Evaluation		
A. Are there recommended evaluation procedures for teachers and students in the instructional package?	___	___

1. What do the evaluation procedures emphasize? (Check as many as appropriate)

   a. Cognitive skills ___
   b. Subject skills ___
   c. Psychomotor skills* ___
   d. Affective responses* ___

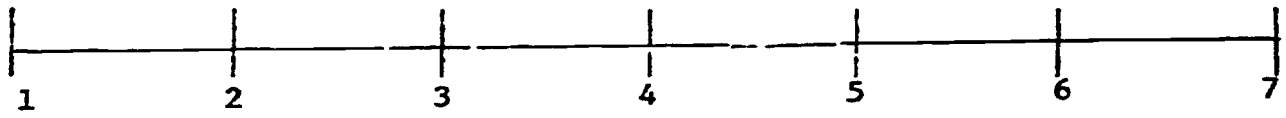
2. Are the evaluation procedures compatible with the objectives? ___ ___

	Yes	No
3. Are evaluation procedures developed for several different levels: (Check as many as appropriate)		
a. immediate feedback evaluation for the pupil	___	
b. evaluation for a variety of the areas in #1 above, and over a period of time	___	
c. immediate feedback evaluation for the teacher	___	
d. evaluation on a norm referent*	___	
e. evaluation on a criterion referent*	___	
B. Are the evaluation procedures contained in the package?	___	___
C. Does the evaluation give attention to both product and process learning?	___	___
D. Is there information on how evaluation procedures were tested and developed?	___	___

E. Briefly state what evaluation procedures are included, if possible, and give examples:

F. Quantitative Rating of Evaluation

(DIRECTIONS: Please make an "x" on the rating scale below at the point which represents your best judgment on the following criteria. Place the "x" on a specific point.)



Haphazard in approach. Product and process learnings either entirely neglected or confused. Lists items, but poorly constructed, no evidence of testing of evaluation approach. Students receive no assistance through feedback. Fails to recognize and examine different types of learning where appropriate.

Some examples given, range of evaluation limited. Samples given but limited and sketchy. Teacher finds useful that which is given, but needs more examples. Evaluation is limited to product or process. Unsure on whether evaluation has ever been tested, but seems logical though limited in types of learning examples.

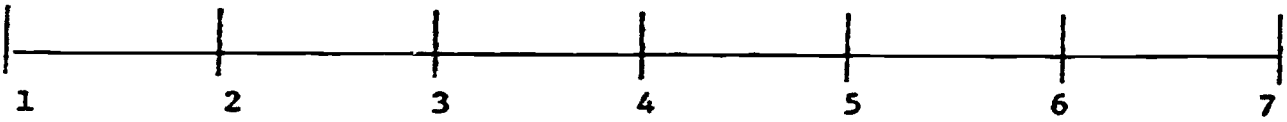
Many suggestions and helps in evaluation for the teacher. Has criterion reference procedures where appropriate. Student obtains assistance in learning through feedback evaluation. Gives attention to several kinds of learning, consistent with objectives of learning package.

COMMENT

A. Draw up an overall statement of the strengths and weaknesses of the material as an instructional package. Prepare your statement as if it were to be addressed to your fellow classroom teachers who are going to use it to make a decision on these instructional materials.

B. Quantitative Rating Overall Assessment of Material

(DIRECTIONS: Please place an "x" on the point in the rating scale which best represents your overall judgment of these materials. Place the "x" on the specific point.)



Poorly designed, conceptually weak and inconsistent or haphazard design. Does not appear to have been field tested: inaccurate assumptions about children who will be using material. Overpriced, underdeveloped, a bad bargain.	Has strengths and weaknesses, but most teachers would find satisfactory. On the balance comes out about average, would need considerable supplementary effort by teacher. A compromise or price and availability.	Excellent, one of the best by comparison with other available material. Theoretically strong and carefully field tested. Shows consistent instructional design. Would recommend highly, well worth the price.

A GLOSSARY OF TERMS
USED IN THIS INSTRUMENT

1. *Objectives stated in behavioral terms - a work picture of the type of behavior product which one might expect when the objective is achieved. Objectives stated in behavioral terms will usually name the behavior, state the conditions under which it will appear, and the level of performance expected, e.g. the child will be able to spell (type of behavior), in formal and informal writing (condition under which it will appear), 98% of the words in his written work (level of performance).

2. *Implicit objectives - an examination of the content will permit the reader to readily identify the objectives that the student should accomplish, even if the producer has not stated them. If a filmstrip gives the sequential steps in solving arithmetic problems using long division, one would assume the implicit objective to be to teach the student the process of long division.

3. *Broader behavioral pattern - instructional materials frequently are geared to goals that include complex behavior which is to be developed over time. Example: voting behavior as a function of citizenship involves a broader behavioral pattern which chains together a complex of behaviors ranging from knowing the candidates and the issues, to being registered, and knowing how to operate a voting machine. The instructional material may be designed to contribute to a broader behavioral pattern rather than a simpler, more specific behavior. Even if the objective is geared to a single specific behavior there should be some relationship to a broader behavioral pattern.

4. *Attitudinal objectives - objectives that are designed to develop feelings and predispositions to act in accordance with internalized values and beliefs. These may be listed as attitudes, values, interests, and appreciations. They may be fairly direct as to develop in each student an interest in listening to a newscast at least once a day, or more complex as to form an attitude of critically evaluating the news by investigating the source of reports.

5. *Cognitive development skills - objectives which have cognitive development skills (thinking) as a basis will usually emphasize thinking processes as their focus, such as understanding, discriminating, utilizing, chaining, and evaluating as opposed to emphasizing specific subject products.

6. *Objectives drawn from a learning approach - objectives may be drawn utilizing approaches to learning, in some cases emphasizing wholeness of learnings prior to fragmenting into specifics for instruction. Example: the student will become familiar with the background of the 12th and 13th century European interest in colonies and trade, prior to studying the specific explorations. The extreme of the above approach would be a small step by step sequencing of the material on Europe in the 12th and 13th century in which concepts on European interest in trade and colonies

were fed to the student on a programmed basis, eventually leading through the various explorations. There objectives are based on different approaches to learning.

7. *Objectives based on demands and needs of child - objectives using this emphasis usually have as their focus some developmental sequence (physical, emotional, or social) as their central organizer. Example: the student will express affection as well as receive affection. The behavior of expressing affection is developmentally more advanced than simply receiving affection. Example: the student will cooperate with another student on taking turns in using a game. If this objective is to be taught, it is usually sequenced with other objectives according to the way most children develop.

8. *Task analysis - the materials have been developed into specific tasks for the learner which have behavioral requirements that suggest a sequence for presentation and which allow an observer to determine if the learner accomplishes the task.

9. *Errorless discrimination - the tasks are sequenced in such a manner that the student should move from step to step without making errors. This technique is used in some types of programmed instruction.

10. *Figure-ground - the organization of materials, frequently perceptual in nature, in a field so that one stands out in a distinct way (figure) and the rest remains in the background (ground). Figure-ground organization can be used with other characteristics such as sounds, where one sound is heard over and above a background of others.

11. *To an affective response system - where recognition is given to different levels of attitudes, from the simplest of merely attending to an object, to the building up of complex attitudes which predispose one's behavior toward a wide range of stimuli: e.g. enjoying a variety of forms of music.

12. *Interrelationships of a subject - where the subject matter contains a logical relationship of concepts and processes. Example: adding must be mastered prior to multiplying. The local community is studied prior to more distant entities of state or federal government.

13. *Positive reinforcement and programmed sequence - where the material has been developed into small steps that lead the learner toward a larger concept through a sequence that permits the learner to receive frequent reinforcement through knowledge of right answers.

14. *Open ended development of generalization - the instructional sequence is purposely quite open; e.g. letting the learner try out many possibilities and alternatives before arriving at a generalization.

15. *Advanced organizers (cognitive) - a framework of key concepts, crucial to understanding and relating concepts of the larger body of material, are strategically placed in the sequence, forming an ideational ladder to which other material can readily be related. In some materials a short

summary preceding the main body of instructional material delineates the key concepts or stresses their relationship to other concepts known by the learner, thus serving as advance organizers through the ideational anchors it gives to the learner for organizing, relating and remembering the new materials.

16. *Modes of transaction - a transaction is the interaction of a learner and stimuli in this context consisting of instructional materials. A mode is the channel that is used. Is the student asked to passively view, manipulate, verbally organize? Is the teacher an important part of the mode through exercising control over the learner's channels of transaction? Is the student free to seek out channels of transaction or are they chosen for him? These are questions which must be answered when setting up modes of transaction (methodological) to be used with instructional materials.

17. *Teacher-centric method - the teacher is largely responsible for choosing and directing the mode of transaction for the learner. Teacher-centric modes of transaction usually prescribe that the "teacher will . . ." and are predicated on obtaining specific learner responses.

18. *Pupil-centric method - the learner is responsible for choosing the modes of transaction with the instructional material and is frequently left to evaluate and revise his behavior toward materials without teacher supervision.

19. *Psychomotor skills - muscular or motor skills which require manipulation of material or objects. The ability to stack blocks is a psychomotor skill.

20. *Affective response - responses which emphasize feelings, emotion, or degree of acceptance or rejection stemming from internal attitudinal sets. Such responses may be labelled attitudes, biases, interests, etc.

21. *Norm referent evaluation - judging a learner's performance by what other known groups of learners do on the same tasks. Achievement test scores, aptitude tests and mental test scores report their results in norm referent terms. The statement "This particular learner scored at 4th grade level" is using a norm referent evaluation of the learner's performance.

22. *Criterion referent evaluation - the learner is judged on his ability to do a specified task or demonstrate the behavior appropriate to the task. The learner is judged on whether he can or cannot demonstrate the appropriate behavior that signifies task accomplishment and is not judged by comparison of his performance with another group of learners.

BIBLIOGRAPHY OF ILLINOIS OCCUPATIONAL CURRICULUM PROJECT DOCUMENTS

1. "Proposal for Phase I of A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation." IOCP, Joliet Junior College, Joliet, Illinois: February 1, 1970.

2. "Proposal for Phase II of A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation." IOCP, Joliet Junior College, Joliet, Illinois: May 29, 1970.

3. "Proposal for Phase III of A Research and Development Project in Occupational Education: The Development of Systems Models for Decision-Making in Occupational Curriculum Development and Evaluation." IOCP, Joliet Junior College, Joliet, Illinois: April 23, 1971.

4. "Phase I Report of A Research and Development Project in Occupational Education: The Development of Process Models for Decision-Making in Curriculum Development and Evaluation." Unpublished report by IOCP, Joliet Junior College, Joliet, Illinois: October, 1970.

5. "Phase II Report of A Research and Development Project in Occupational Education: The Development of Systems Models for Decision-Making in Occupational Curriculum Development and Evaluation." Unpublished report by IOCP, Joliet Junior College, Joliet, Illinois: May, 1971.

6. "An Investigation of Curriculum Development and Evaluation Models With Implications Toward A Systems Approach to Curriculum Development and Evaluation in Occupational Education." Unpublished IOCP report, Joliet Junior College, Joliet, Illinois: May, 1971.

7. "An Investigation of Decision-Making Practices in Illinois Junior Colleges With Implications Toward a Systems Approach to Curriculum Development and Evaluation in Occupational Education." Unpublished IOCP report, Joliet Junior College, Joliet, Illinois: May, 1971.

8. "An Investigation of Systems Designs and Management Techniques With Implications Toward a Systems Approach to Curriculum Development and Evaluation in Occupational Education." Unpublished IOCP report, Joliet Junior College, Joliet, Illinois: May, 1971.

9. "Guidelines for Occupational Program Identification." Unpublished IOCP report, Joliet Junior College, Joliet, Illinois: June, 1971.

10. "Activity Manual for Occupational Program Identification." Unpublished IOCP report, Joliet Junior College, Joliet, Illinois: June, 1971.