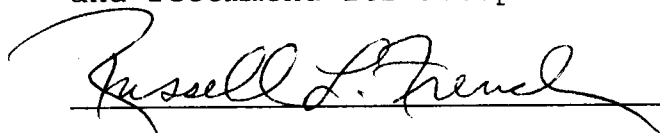


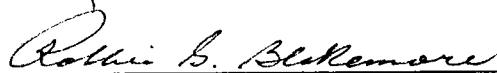
To the Graduate Council:

I am submitting herewith a dissertation written by Rebecca Grace Kemp entitled "Systems Thinking in the Development of Process and Content Models for Interdisciplinary Curriculum Change." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Home Economics.


Jay Stauss Major Professor

We have read this dissertation
and recommend its acceptance:







Accepted for the Council:



Vice Chancellor
Graduate Studies and Research

SYSTEMS THINKING IN THE DEVELOPMENT OF PROCESS
AND CONTENT MODELS FOR INTERDISCIPLINARY
CURRICULUM CHANGE

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Rebecca Grace Kemp

June 1983

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ABSTRACT

The purpose of this study was the development of systematic models to be used as an aid to the revision of curricula to encompass the principles of interdisciplinary inquiry. A review of existing literature in relevant areas (including curriculum, systems thinking, and interdisciplinarity) was conducted to provide background for the models, and two models were created. One model focuses on the process aspect of curriculum change, while the other focuses on content as the agent of change.

After a pretest of the models' clarity and applicability, a non-statistical evaluation of the models was conducted. A sample of University of Tennessee faculty and administrators was invited to comment on the models, and the responses were tabulated to provide an evaluation of the two models.

The major finding of the evaluation was that a model of curriculum change combining process and content aspects could prove more appropriate than either of the two models used singly. Consequently, a process/content model combining the two earlier models was developed.

Further research should explore revisions in the models themselves to make them more complete and

more generally applicable. Also, some type of empirical testing and evaluation of the models should take place. The models in this study may then form the basis for interdisciplinary curriculum change in a variety of areas.

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CHAPTER 1

INTRODUCTION

Specialization has for years been a key word in higher education, with students studying in ever more narrowly focused degree programs (Taschdjian, 1972). In response to this trend, and in recognition of the complexity of problems facing modern society, a movement toward interdisciplinarity in education is gaining momentum. Proponents recognize that the combination of ideas and methodologies from a variety of disciplines results in a broader outlook and more unique perspective for the student than more conventional studies focused on only one discipline, and Harris (1983) postulates that interdisciplinarity is an invaluable option for academicians struggling to survive a period of extreme economic crisis.

Those in higher education who seek to design and implement changes to introduce interdisciplinarity into their programs will find a scarcity of published guidelines. Thus, the process of interdisciplinary curriculum change is often one of blind experimentation. Systems thinking, or systems theory, is a formalized methodology for analyzing an existing entity or process to determine its component parts and their relationships.

Systems thinking is often linked with model building, the process of forming some systematic representation of the entity or process. The model itself may be in any form from pictorial to mathematical, but its purpose is to enable those involved in analysis of the system to visualize the multiple factors involved (Lippitt, 1973).

The concepts of systems thinking have already been successfully applied to educational situations (Eisner & Vallance, 1974), and should be ideally suited to the process of interdisciplinary curriculum change, since it is a process with obvious component parts. Systems thinking and the construction of a model based on the resulting perception of the curriculum change process allow a firmer grasp of the theory and philosophy inherent in such change. The model provides the added benefit of fostering mutual understanding of the situation when curriculum revision is undertaken by a group of individuals.

I. OBJECTIVES OF THE STUDY

The purpose of the dissertation study is the creation of two models for interdisciplinary curriculum change. One model will emphasize the process aspects of curriculum change; the other will focus on the specific

content of the curriculum and how it responds to or effects change.

Following development of the models, some possible applications of the models in real situations will be presented. Suggestions and recommendations for implementation of the models will be developed.

The research will draw upon a specific situation, that of the merchandising program in the Department of Textiles, Merchandising, and Design in the College of Home Economics at The University of Tennessee, Knoxville, to provide data for description and analysis. The models will provide a basis for continuing investigation in a variety of fields within higher education and may also provide guidelines for analysis of existing practice.

II. IMPORTANCE OF THE STUDY

The job market responds, as the business marketplace does, to the law of supply and demand. Until about 1969, the demand for college graduates was rising so rapidly there was little difficulty in finding employment after graduation (Gordon, 1974). Today the two major areas of employment for college graduates are in professional and managerial positions (Gordon), but even in those areas jobs are no longer readily available (Young, 1983). It is a possibility that the poor job market draws

some students away from traditional four-year programs and into vocational programs; additionally, there is an important national effort "to meet the unsolved problems of our society" (Gordon).

For these reasons, educational institutions are seeking new methods of preparing graduates for the job market. Vocationally relevant, career-oriented courses are increasing in number (Gaff, Festa, & Gaff, 1978; Zeisel, 1979), but the reinstatement or revitalization of core courses in traditional liberal arts subjects for all students is also a definite trend (Taschdjian, 1972). The need to prepare students for the challenges of the future is met in an increasing number of programs by the application of interdisciplinary teams in problem-solving games, often in classes centered around a current issue or topic of interest to students (Gaff, Festa, & Gaff).

The models to be developed in the course of this study are directly applicable to educational programs aimed at preparing students for problem-solving roles in society. An emphasis on the product of such programs necessitates responsiveness to the job market; if educational programs are grouped by methodology rather than product, such discrete areas as nutrition and textile science may be indistinguishable.

III. RATIONALE

While educational curricula are resistant to change, it may be said that change is inherent in curriculum when it is viewed in historical perspective. When the first colleges were founded in the American colonies, their curricula were largely those of medieval scholasticism. The focus later changed with the introduction of new ideas via the works of Copernicus and others. Still later, the Industrial Revolution and the demands it placed on society brought about a more open acceptance of the role of vocational education in colleges and universities (Rudolph, 1977). Today, the growth of the "knowledge industry," rapid technological change, and the resulting necessity of disseminating more knowledge demand rapid change in our educational system (Hayman, 1977).

It is a generally accepted idea that the problems of society are growing more complex, and the combining of disciplines and professions to discover and effect solutions to these problems has emerged as a viable option (Bellack, 1973; Harris, 1983). There is a need to develop means through which the curricula of higher education can more rapidly change and respond to the need of modern society for individuals capable of solving

complex problems. It is the purpose of this study to explore one approach to the training of those individuals, the approach commonly termed "interdisciplinarity," and to develop guidelines which may be used by educators in designing such curricula.

IV. RESEARCH APPROACH

The focus of this dissertation will be the creation of two models for curriculum change and comparison of their potential applications. Specific emphasis will be given to change to produce more interdisciplinary programs than those currently in evidence in higher education. As a particular example, the possibilities and procedures for interdisciplinary curriculum change in home economics will be explored.

Selected literature in the areas of curriculum, interdisciplinarity, systems thinking and modeling, communication, and teaming will be reviewed. Included in the literature review will be an examination of existing relevant models. Analysis of the literature will provide a basis for determining what constitutes the system of curriculum in higher education, and how that system can be altered to introduce interdisciplinarity.

Using the methods and terminology of systems thinking, the researcher will create a process model and a content model of curriculum change. The end results (aims) of the two models will be the same, that is, a move toward more interdisciplinary curricula, but the methods, the foci of the change process, will be different in each model. In developing the models, the researcher will briefly examine the use of committees or teams in development of new curricula, the barriers and facilitators in the communication process, and the usefulness of interdisciplinary curricula in preparing graduates to fill the demands of the job market. When the models are completed, a comparison will be made to expose the advantages and disadvantages of each, with the possible end result that one may be found superior to the other. As an aid to comparison, the models will be presented to a sample of university faculty and administrators for comment.

V. LIMITATIONS

No empirical study is included in this dissertation. Past work in the area has demonstrated the need for development of a sound theoretical framework for curriculum development (Livoti, 1977, including citations from Perry and Rosencrans) before empirical studies begin.

Livoti cites as an example an unpublished dissertation by Anthony in which the effect of empirical work is only to narrow the applicability and scope of the model proposed.

The following limitations thus apply to the dissertation:

1. The study is descriptive in nature, and therefore not subject to quantifiable verification. Models cannot perfectly describe reality; they merely represent it (Hultsch & Deutsch, 1981).
2. The planning of instruction is not included in the study.
3. Implementation and empirical evaluation of the models are not included in the study.

VI. CONTRIBUTION

The models developed in the course of this study are seen as a valuable step toward an understanding of the curriculum development process. They will provide a basis for further study to determine the effectiveness of the systems approach to curriculum change in higher education. Later work may also explore the methods and role of instruction in interdisciplinary education.

CHAPTER 2

REVIEW OF LITERATURE

I. CURRICULUM

The first question which must be answered in a study of this nature is: What is curriculum? In particular, a stipulative definition (Miles, 1967) of curriculum which suits the purpose of the study is needed. Because the literature offers a plethora of different definitions of curriculum, it is beneficial first to develop a categorical set of approaches to curriculum.

Frymier (1973) classifies approaches to curriculum as disciplinary, social/cultural, or individual in focus. He describes the disciplinary approach as a vocational one the purpose of which is to train the learner in the uses of ideas and processes in a vocational situation. The second approach to curriculum is a societal one which utilizes the school setting to teach whatever knowledge, skills, and values are necessary to prepare the student for his future role as an effective, functioning member of society. The individual approach differs from the other two primarily in being a means

to an end rather than an end in itself; it attempts to enhance and support the life of the individual student.

Similarly, Dewey (1902) identifies as fundamental factors in the educative process the nature of the learner, the nature and conditions of society, and the specializations and divisions of knowledge. Taba (cited in Brown, 1978) and Tyler (1949) proposed that three sources of data be used in curriculum planning: learners, society, and specialized subject matter.

Eisner and Vallance (1974) group curricula into five roughly corresponding categories: cognitive processes, curriculum as technology, curriculum for self actualization and consummatory experiences, curriculum for social reconstruction, and academic rationalism. These categories are largely equivalent to those in Frymier, with the additional viewpoint of curriculum as technology; that is, how knowledge is transmitted and learning takes place. An apparent conflict in their thinking arises when Eisner and Vallance identify cognitive processes and technological approaches as valid means of curriculum development, yet later identify their focus on the way learning takes place as "the fallacy of formalism."

In practice, it is difficult to apply any purist approach in curriculum design. Eclectic approaches, stressing some combination of the categories listed

above, consequently are popular. There are definitions of curriculum which are broad enough to accommodate such combined theoretical frameworks. Taba (1962) defines curriculum simply as "a prescription for what pupils should learn and teachers should teach"; Beauchamp (1975) conceptualizes it as "a set of intended learning outcomes." Brown (1978) contends that curriculum content includes both existing and emergent knowledge, and that curriculum is inextricably linked with such substance as values and feelings.

A curriculum concept combining disciplines and a societal/cultural emphasis was espoused by Hutchins in 1953:

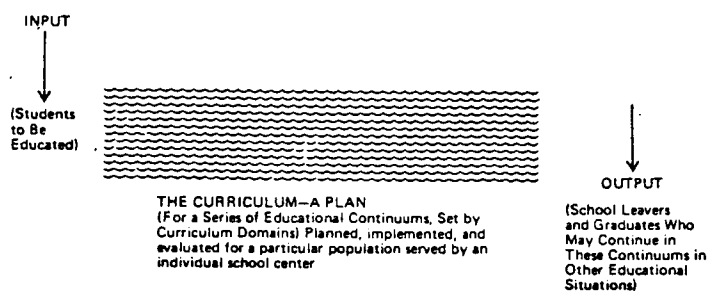
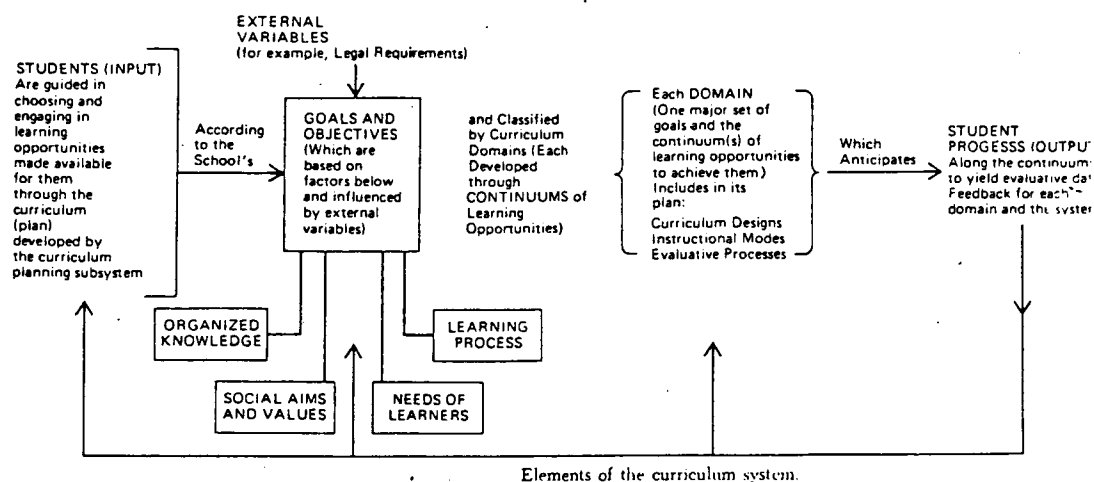
Liberal education consists of training in the liberal arts and of understanding leading ideas that have animated mankind . . . now, if ever, we need an education that is designed to bring out our common humanity rather than to indulge our individuality.

By recognizing the preparation of students for future roles in a rapidly changing, highly technological society as part of curriculum, King and Brownell (1973) temper their strongly discipline-oriented position with some societal focus. One of the most highly eclectic prospects is discussed by Bellack (1973): the mingling of disciplines to provide unique, interdisciplinary programs. Interdisciplinarity is a growing idea on many campuses, and its value in the complex modern world is gaining

recognition (Baum, 1979; Heckhausen, 1972; Petrie, 1976; Wilson & MacMurray, 1974). The movement away from purely discipline-oriented curricula toward more societally responsive curricula encompassed in the growth of interdisciplinarity is a reflection of the increasing complexity of society and the extremely competitive job market.

For the proposed study, curriculum will be conceptualized in an eclectic manner as a set of stated guidelines which describe a particular course of study in higher education; or, as in Rudolph (1977), as the arrangement and content of coursework taken to complete a degree. Interdisciplinary curricula are those which utilize methods and content from a variety of traditional disciplines in a set of guidelines designed to respond to the needs of individuals in the curriculum and to the segments of society which relate directly to the curriculum (e.g., employers of program graduates).

When curriculum has been defined, its basic elements must be identified to allow the application of systems principles. Some models of curriculum from the literature, and a preliminary model of the author's, are shown in Figures 1 and 2. These models focus on the structure of curriculum itself; the proposed study will focus instead on the process of curriculum change



The curriculum system concept.

FIGURE 1

MODELS OF CURRICULUM FROM THE LITERATURE

From Saylor, J. G., & Alexander, W. M. Planning curriculum for schools. New York: Holt, Rinehart and Winston, 1974.

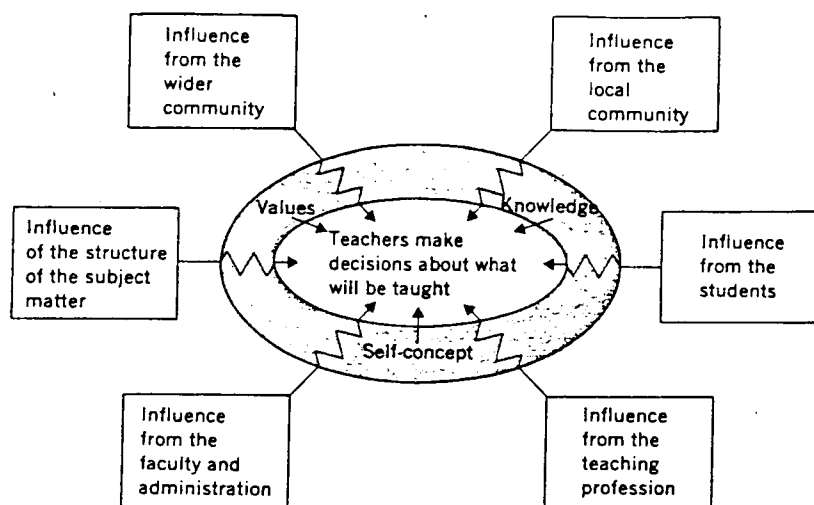


FIGURE 1 (Continued)

From Hough, J. B., & Duncan, J. K. Teaching: Description and analysis. Reading, MA: Addison-Wesley, 1970.

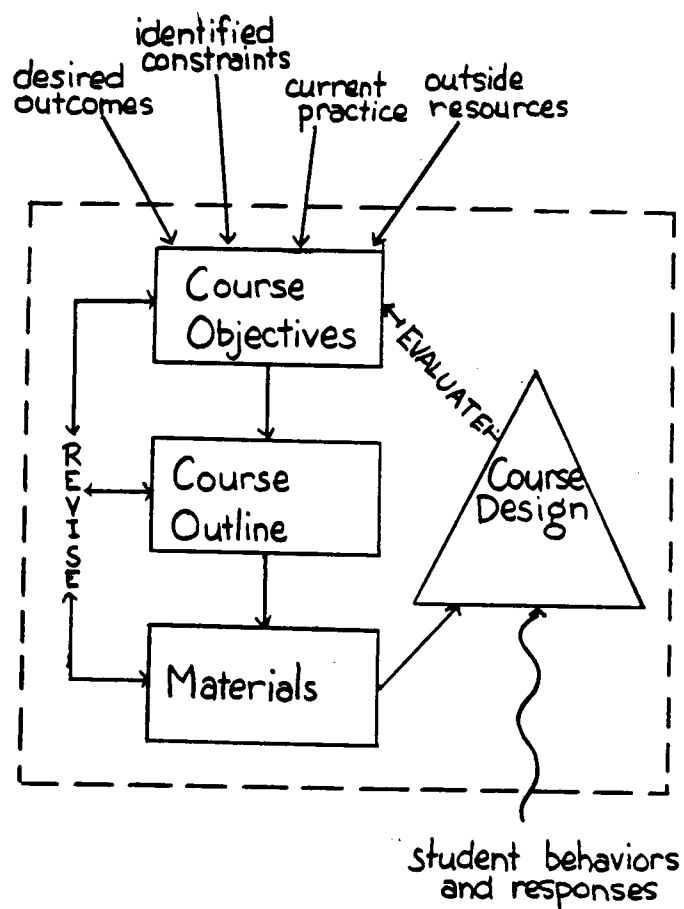


FIGURE 2

PRELIMINARY MODEL OF CURRICULUM

or development, in which the hierarchy of people involved is also important.

II. INTERDISCIPLINARITY

Wain Saeger (1976) calls it "that much abused word." Interdisciplinarity has certainly become an educational catchword, and is used to describe a wide variety of programs which are often considered innovative. The eagerness of educators to try interdisciplinarity may have resulted in too general a use of the term, however, without enough consideration for the consistency of its definition.

To define interdisciplinarity or reach an understanding of what it encompasses, it is necessary first to establish a definition of the related term "disciplinarity" or to specify what constitutes a discipline. This is a task not easily accomplished, as each person has his own understanding of the term which is based on his own unique set of experiences and observations.

In the literature, definitions of curriculum range from simple to complex. Baum (1979) defines a discipline as a specific body of knowledge with its own content, theory, and methods. Academic subjects which have long had autonomous existences (e.g., history or mathematics) are generally perceived as disciplines.

In Heckhausen (1972), "disciplinarity is the specialized scientific exploration of a given homogeneous subject matter producing new knowledge and making obsolete old knowledge." Heckhausen goes on to list seven "criterion levels" for determining the disciplinarity of an area of endeavor:

1. the "material field" (Piaget) of a discipline
2. the "subject matter" of a discipline
3. the "level of theoretical integration" of a discipline
4. the "methods" of a discipline
5. the "analytical tools" of a discipline
6. "applications of a discipline in fields of practice"
7. "historical contingencies" of a discipline.

Marcel Boisot (1972) attempts to develop a general, operative definition of disciplinarity. He begins by speculating that the

breaking down (of) knowledge into separate fields derives from two tendencies which have strengthened each other as these fields widened over the course of time: (man's) inclination to separate, classify for recognition and conceptualise the surrounding elements, (and) scientists' propensity to circumscribe the field of their investigations intellectually

to make definition of a specific problem possible. From this, he proceeds to a definition of a discipline as

a set comprising three types of elements:

1. observable and/or formalized objects, both manipulated by means of methods and procedures.
2. phenomena that are the materialisation of the interaction between these objects.
3. laws--whose terms and/or formulation depend on a set of axioms--which account for the phenomena and make it possible to predict how they operate.

The items in this set, which have internal and/or external relationships, are revealed through phenomena which subsequently confirm or invalidate the axioms and laws.

For the purposes of this study, the criteria defining an academic discipline are:

1. possession of a unique body of abstract knowledge created, organized, and transmitted by the discipline;
2. status as the accepted best provider of training in a particular area; and
3. limited scope.

Thus older, established academic areas such as biology, sociology, art, and literature are disciplines, as are newer fields of study (e.g., textile science, nutrition, and biochemistry) which currently have their own uniquely integrated bodies of knowledge and are gaining status as training grounds for professionals. As the number of academic disciplines increases, the necessity of limiting the scope of a discipline becomes more apparent. Within these criteria, home economics is, as liberal arts, a collective term encompassing several separate disciplines such as merchandising and early childhood education.¹

¹Based on arguments and criteria in Brown & Paolucci, 1978; Chapman, 1977; East, 1978; East, 1980; Etzioni, 1969; Flexner, 1915; Goode, 1969; and Jacox, 1978.

Between pure discipline and interdisciplinarity lies multidisciplinary. This may be defined as a combining of disciplines without establishing common areas of communication and methodology. In some programs described as interdisciplinary, disciplines are juxtaposed while responsibility for the integration of ideas is neglected. These programs are more correctly termed multidisciplinary.

True interdisciplinarity occurs when the disciplines involved exhibit cooperation with and understanding of each other. Often, some common methodology is found or created among the disciplines which unites them in their problem-solving effort. The different disciplines involved are set equal to one another. It is possible that the lines of communication between disciplines may become so strong that unique bodies of fundamental knowledge are developed and a new discipline results (cf. Heckhausen's (1972) unifying interdisciplinarity). An example of such an "interdisciplinary discipline" is biochemistry.

Heckhausen recognizes these variations in form as six different types of interdisciplinarity. Listed in ascending order of "maturity," they are:

1. indiscriminate interdisciplinarity, a superficial sampling of many disciplines which

- is closely akin to multidisciplinary;
2. pseudo-interdisciplinarity, that which is artificially created among disciplines sharing common analytical tools;
 3. auxilliary interdisciplinarity, which exists through cross-disciplinary use of methods;
 4. composite interdisciplinarity, which results when disciplines unite to find solutions for complex problems;
 5. supplementary interdisciplinarity, which develops from the overlapping of material (subject matter) from different disciplines; and
 6. unifying interdisciplinarity, which results when supplemental interdisciplinarity increases to encompass theory and methods.

Interdisciplinarity as the goal of a modern educational program usually falls within the concept expressed by Heckhausen's composite interdisciplinarity; that is, most interdisciplinary programs in educational situations are structured around the idea of finding solutions to a problem. Roy (1977) says that an inter- or multidisciplinary approach is essential for societal problem solving. Petrie (1976) recognizes the necessity of holding a single dominant idea as the focus of an

interdisciplinary project; the solving of a selected problem is an excellent focus for such work. When the centrality of the problem is subordinated to the idea of combining disciplines for interdisciplinarity's sake, the result is less than satisfactory. Some problems do not require an interdisciplinary approach for solution and should be handled in a traditional disciplinary manner.

Another important consideration when applying interdisciplinarity to an educational program is the amount of work involved. Since interdisciplinary efforts require communication among disciplines, program participants must know fundamental facts about each discipline involved. Saeger (1976) notes that "staggering amounts of reading and outside coursework" are often required, and Gallant (1972) points to the added burden on the teacher of an interdisciplinary course.

Finally, it must be recognized that a strong disciplinary background is essential before interdisciplinary work can be undertaken. Wilson and MacMurray (1974) state that interdisciplinarity should supplement, rather than replace, training in a specific discipline. There is some sentiment that interdisciplinary programs are only for those who are not competent in a specific discipline (Petrie, 1976): only by assuring disciplinary

competence can interdisciplinary practitioners avoid such charges.

The use of interdisciplinarity seems particularly appropriate in home economics, where there is a movement to equip members of each discipline to go into society with the ability to find solutions to problems facing individuals and families (East, 1980). In higher education, home economics seeks to achieve this aim partially through the use of core programs which expose students to home economics disciplines other than their own. While the level of interdisciplinarity in core programs may be low, the foundation for the introduction of interdisciplinary studies is there; what is needed is a model, a set of guidelines, to follow in developing such programs.

III. SYSTEMS THINKING

Systems theory and the closely related field of organization development have become firmly established change facilitators in diverse areas of business, industry, and government. The history of systems theory may be traced "from religion and magic through philosophy" (Land & Kenneally, 1976). The field has borne many names, including epistemology, ethology, and cybernetics. The use of systems concepts is intended

to facilitate the formation of an orderly view of the entity or process being studied, which in turn allows greater understanding and freer communication among the people involved (Kramer & deSmit, 1977). Organization development rests on the same principles, but is specifically concerned with the means of causing changes in the system (Hayman, 1977).

General System Theory (GST) and the theory of organization may be traced to work early in the twentieth century by Frederick W. Taylor and Mooney and Reiley. At that time, the concern was almost exclusively with describing the anatomy of an organization. The next step in the development of GST came when principles of behavioral science were integrated with previous theory (Hayman, 1977).

A modern version of GST did not appear until after World War II, largely because the intellectual climate in this country was not favorable for the advent of model building and abstract generalizations (von Bertalanffy, 1969). In post-World War II theory, general systems are characterized by their wholistic focus on the interrelatedness of objects and events (Hayman; Litterer, 1969; Silvern, 1971). Miller (cited in Hayman) states as the purpose of GST:

to produce a description of living structure and process in terms of input and output, flows through systems, steady states, and feedback, which will clarify and unify the facts of life. The approach generates hypotheses relevant to single individuals, types, and levels of living systems, or relevant across individuals, types, and levels.

A specific vocabulary has developed for use with systems theory. Following are some of the terms used in describing systems:²

1. closed system: an independent system completely impervious to external influence.
2. open system: a system which is influenced by, and in turn influences, the environment.
3. environment: that part of the universe which is not part of the system but which interacts with the system.
4. boundary: anything which limits or confines.
King (1977) gives four types:
 - a. physical, such as a fence around a mill;
 - b. temporal (time), such as the beginning and ending times of a scheduled conference;
 - c. social (defined by membership), such as membership in a profession; and

²Definitions adapted from King (1977); Kramer & deSmit (1977); Lievegoed (1973); Lippitt (1973); and Litterer (1969).

- d. psychological (determined by the portion of an individual's mental capacity actually devoted to a specific problem).
- 5. system parameters: the parts of the environment which exert unvarying influence on the system (Lievegoed, 1973).
- 6. system identify (stability): the ability of a system to continue to exist under the influence of a constantly changing environment.
- 7. input: anything which enters a system from the environment, such as information, energy, or material. Some input may increase the disorder within the system, and is known as entropy. Input such as information moves the system toward higher levels of order; consequently, information input is known as negative entropy (Litterer, 1969).
- 8. output: the results of the processes within the system, which flow from the system into the environment. (King 1977) says systems usually have multiple outputs, both desired and undesired.
- 9. equafinality: the principle that, in open systems, one specific output can result from several different initial states, and

conversely, that one initial state can produce several different final states. In closed systems that is not true; the final state can always be unequivocally determined when the initial state is known (King; Litterer, 1969). This difference emphasizes the influence of the environment on open systems.

A principal tool in the application of systems thinking is the model. In various forms, models are used in most disciplines. The approaches to model construction vary widely, yet the end result is always some representation of reality. Ian Ramsey (1964) describes this interdisciplinarity of model use as "a common feature of great significance."

Kaplan (1964) equates models with scientific theory, then differentiates between the two. The model he describes as "a structure of symbols interpreted in certain ways." An abstract concept, theory is perceived as a system of idealized entities which, it is hoped, will be found isomorphic to the system in reality. Theory systems, then, abstract reality; and models represent theories (Lievegoed, 1973). This corresponds to the more generally held conception of models as representations of reality. Kramer and deSmit (1977)

further point out that the model should be a simplification of the system it represents. For this reason, models are usually homomorphic rather than isomorphic (i.e., some entities from the "real" system are grouped in the model).

Lievegoed relates an anecdote which illuminates the relationship of models to theoretical systems:

"When Rutherford first showed me his model of the atomic nucleus I asked myself: has he discovered the atom or has he created it with this model?" At the time we could not understand what Eddington meant with this story. But if we remember that to create any system we have to choose from among many variables and that the model can answer questions only within the framework of the selected variables, then his anecdote makes sense. Thus every science is a prisoner of the systems and models it has itself created.

Models are important to the communication process, both as descriptors and facilitators. As descriptors, models show a chain of communication from sender to receiver (see Figures 3, 4, and 5). In Schramm (1971b), several models of the process of communication are given. Schramm (cited in Aaker, 1975) presents a model with five entities: source, encoder, message, decoder, and destination (Figure 3). Schramm also offers a verbal model of the process:

The communicator constructs, as best as he can, the signs which he hopes will call forth the desired responses-- whether verbal or nonverbal, auditory, visual, or tactile. That is the first

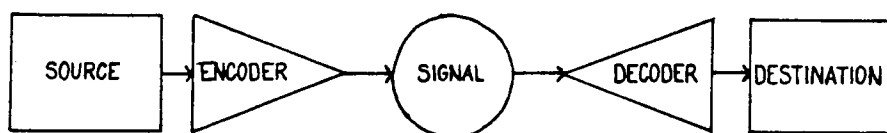


FIGURE 3

SCHRAMM'S MODEL OF COMMUNICATION

From Aaker, D. A. (Ed.) Advertising management: Practical perspectives. Englewood Cliffs, NJ: Prentice-Hall, 1975.

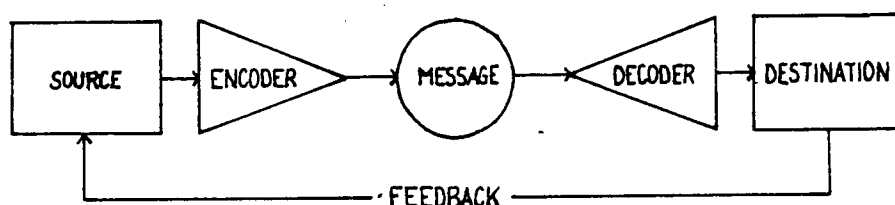


FIGURE 4

SHANNON AND WEAVER'S MODEL OF COMMUNICATION

From Schramm, W. The nature of communication between humans. In W. Schramm and D. F. Roberts (Eds.) The process and effects of mass communication (rev. ed.). Urbana, IL: University of Illinois Press, 1971.

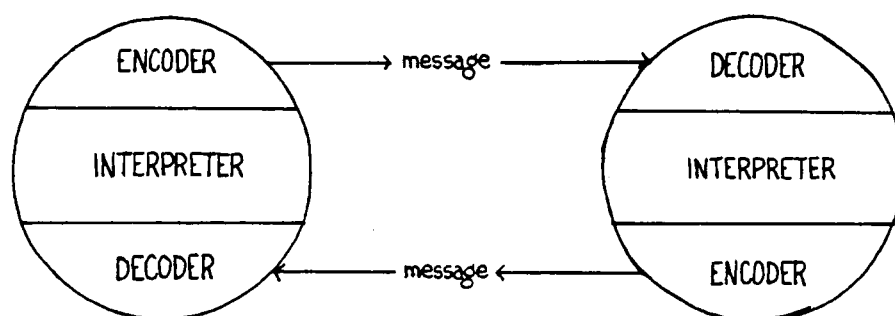


FIGURE 5

OSGOOD'S MODEL OF COMMUNICATION

From Schramm, W. The nature of communication between humans. In W. Schramm and D. F. Roberts (Eds.). The process and effects of mass communication (rev. ed.). Urbana, IL: University of Illinois Press, 1971.

act of the communication process. A receiver selects from the content of the message he chooses, interprets it and disposes of it as he is moved to do. That is the second act of the process (Schramm, 1971b).

Shannon and Weaver (cited in Schramm, 1971b) add to Schramm's five-entity model a feedback loop linking destination and source (Figure 4). In the verbal communication process, there is an immediacy to the feedback which creates a second, parallel chain, with the roles of source and destination reversed. This is recognized in the model used by Osgood (cited in Schramm, 1971b) which presents two multilevel entities each functioning as encoder, interpreter, and decoder. These two entities are linked by messages flowing in either direction (Figure 5). Johnson (cited by Schramm, 1971b) elaborates on this in his verbal model of a conversation between two people.

Of the symbols used in models, words and meanings are of paramount importance (Lippitt, 1973). It is necessary to be aware of the fact that meaning is not inherent in the word and number symbols one uses; rather, it is created during the process of perception (Hofstadter, 1979; Schramm, 1971b). Osgood refers to "denotative meaning," the relation between the word "apple" and the actual object which is an apple, and points to the arbitrary nature of the correlation (Osgood, 1963).

The imperfect translation of thoughts and perceptions into symbols may create a disparity between reality as it is perceived by participants and expectations created by a model (Ramsey, 1964).

Some messages seem to have a degree of inherent meaning (Hofstadter). The use of these messages reduces misunderstanding; examples are similes and metaphors. Ramsey links these to two types of models and states that models and metaphors are to be used to further understanding when words alone prove inadequate. Similes ("He's green as a leaf.") are verbal pictorial models. Metaphors ("Old age is the autumn of life.") are disclosure models, which reveal multiple possibilities for further thought (Ramsey). Petrie (1976) also relates metaphor and model:

"metaphor" is conceived of broadly as encompassing visual metaphors and even theories--models as they are often called in the sciences . . . through use and assimilation, metaphors die and take on simply an alternative technical meaning. When disciplinarians fail to realize that terms which they use in a technical sense--as dead metaphors--may be taken as quite live metaphors by their students, communication problems are almost certain to result.

In his discussion of theological models, Ramsey lists three functions of models: as builders of discourse; to enable one to make sense of discourse, the logical structure of which is difficult to understand;

and to facilitate discussion of that which is not easily put into words. Lippitt (1973) gives a list of seven model functions: representation, guidance, interpretation, visualization, prediction, recreation ("professional doodling"), and communication. Lippitt's functions center on the processes of communication and clarification, as do those specified by Ramsey.

Thus models may be viewed as facilitators of the communication process. Schramm (1971a) states that "when we communicate we are trying to establish a 'commonness' with someone" and that "the essence (of communication) is being 'in tune' with each other, focusing on the same information" (Schramm, 1971a). Models serve the important purpose of aligning perceptions to reinforce the commonality of meanings assigned to a situation by members of a group, a function especially vital when the group involved is an interdisciplinary one.

Others classify models by type rather than function. If any representation of reality is considered a model, it is easy to see that such diverse things as dolls, paintings, and mathematical equations are all models. Theoretical models also exist, such as Freudian psychology. Ramsey postulates the existence of pictorial and disclosure models in theological discourse (Ramsey, 1964).

Of greater importance to this study are the two types of models described by Hayman (1977). In his discussion of the history of organization development and General System Theory, Hayman describes the process approach and the content approach to systems. In the process model, the purpose is "to change organizational characteristics, not to solve a particular problem nor to meet particular substantive challenges." Conversely, the content model is concerned with process only in understanding how the system functions, and concentrates on dealing with particular situations in an attempt to reach specific goals and objectives. Applied to interdisciplinary curriculum change, the process model emphasizes a change in patterns of faculty organization and faculty attitudes, while the content model deals specifically with changes in the subject matter of a program of study.

Similarly, Ackoff (1981) divides systems analysis into two groups: ends planning and means planning. The former focuses on specific goals, objectives, and ideals, as does Hayman's content model, while the latter is similar to Hayman's process model in its concentration on changing organizational characteristics rather than on achieving solutions to specific problems. Ackoff recommends the formulation of an "idealized design" of

the system under study. Such a design (model) facilitates participation in planning, allows participants to incorporate aesthetic values, eases the generation of consensus, improves the commitment of participants to the system design, and stimulates and focuses the creativity of participants.

To date, there have been few facts collected on the effectiveness of systems thinking in changing educational programs (Hayman). This may be due in part to the attitude held by Silvern (1971), who seemingly views the planning of curriculum as a link between the educational system and its environment. If this is the case, the concept of inverse studies, in which relations become entities and vice versa (Kramer & deSmit, 1977), may provide the key. Process and content models of the same system, as proposed in this study, may also be considered inverse forms, and so provide an interesting and informative double view of the system of curriculum in higher education.

IV. TEAMING

W. G. Dyer (1977) notes that "team development is one process for revitalizing a . . . system." In this sense, it becomes evident that teaming is a valuable tool in the change process. Particularly when the change

is directed at an increase in program interdisciplinarity, the synthesis of ideas resulting from the effort of a cohesive group of individuals is important.

One of the greatest advantages of teamwork is the opportunity it provides for discussion and refinement of ideas. Dyer states that a properly developed team works to clarify members' assignments and to improve interpersonal relations and communication. He also notes that group work increases the level of interest and involvement in the project for all group members. Additionally, the basic nature of interdisciplinary inquiry dictates the use of a team of practitioners from a variety of disciplines united by the particular project undertaken.

Not every group of individuals constitutes an effective team. The characteristics of a good team listed by McGregor (1960) are:

1. comfortable working atmosphere;
2. pertinent discussion, with most group members participating;
3. complete understanding of the task by group members;
4. listening;
5. disagreement;
6. decisions made by consensus;

7. frequent and frank criticism;
8. free expression of individual feelings;
9. clear assignments of activities;
10. shifting leadership; and
11. frequent self-review.

In Likert (1961) the characteristics of an effective team include:

1. loyalty of members to the group;
2. high degree of confidence and trust;
3. values and goals held by the group are similar to those held by individual group members;
4. supportive atmosphere; and
5. full and frank communication.

Teaming is an ideal element of interdisciplinary inquiry, since it facilitates the combining of various disciplines to work toward a common goal. Similarly, communication theory functions as an aid to interdisciplinary teaming, because a thorough understanding of the mechanics of communication within a group serves as a bridge between the disciplines and facilitates the exchange of ideas. Communication may be the greatest problem area in group functioning, and poor communication may create the appearance that teaming is not an effective means of producing change. However, this apparent disadvantage may be overcome when the barriers to effective communication are understood.

V. COMMUNICATION BARRIERS AND FACILITATORS

In Schramm and Roberts (1971) the role of communication in the change process is identified as:

1. providing information about the need for change, alternatives, methods, and benefits;
2. persuading and opening channels among people; and
3. teaching skills necessary for the success of accepted changes.

The need for open communication is especially apparent in the process model proposed by Hayman (1977), which hinges on a change in the attitudes and practices of the people implementing the curriculum.

Bradford (1976) lists many barriers to effective communication in groups evoking change. Among them are:

1. feelings and emotions;
2. individual purposes;
3. interpersonal relations;
4. feelings of dependence or antagonism toward the leader of the group;
5. group moods;
6. outside pressures;
7. past experiences in the same group;
8. "fear of experimenting";
9. time; and
10. tradition.

Aaker (1975) gives four factors for "message effectiveness":

1. attention on the part of participants;
2. the use of common signs meaningful to all;
3. the arousal of needs in participants; and
4. an understanding of the constraints imposed by group norms.

In addition, Aaker notes that the principal barrier to effective communication occurs in the decoding process, as people focus on different aspects of a message or assess its meaning differently. There is also a "response hierarchy" in the decoding process which dictates that the probability of occurrence of a given decoding step depends on the probability that the preceding step occurred. Thus, the more complex a message is, the greater the likelihood that the response will be incongruous.

Schramm (1971b) similarly lists four factors affecting communication:

1. physical communication ("body language");
2. the "particularities" of the situation, such as time of day, background noise, etc.;
3. relevant groups, which affect the communicators through past experience or outside pressures; and

4. the norms and constraints of society.

The influence of groups and societal norms on communication in the change process is discussed by Festinger (1963):

Opinions which a person holds are usually not very easily changeable and so, in attempting to reduce dissonance, a person may seek to obtain social support from others for some new opinion which he would like to accept.

The literature focuses on the barriers to effective communication. It may be assumed that a list of communication facilitators comprises the antithesis of each barrier. For example, if Aaker's (1975) decoding flaw is considered a barrier, the corresponding facilitator is a model which, through words or pictures, serves to focus group attention on the same aspect of the problem under consideration. In addition, there may be some facilitators which do not correspond directly to the barriers. Examples are strong leadership and a strong sense of common purpose.

The literature provides plentiful information on the discrete areas of knowledge presented in this chapter. What is lacking is an integrated application of systems thinking and interdisciplinary inquiry to educational situations. In Chapter 3, process and content models for interdisciplinary curriculum change will be presented and discussed as facilitators for the application of systems concepts in education.

CHAPTER 3

THE PROCESS AND CONTENT MODELS

Both curriculum itself and the process of curriculum change may be approached through systems thinking. Many models of the curriculum system are available in the literature. This study focuses instead on the curriculum change system: not on what constitutes curriculum, but on how the curriculum may be changed. While the process and content models differ in composition, there are some commonalities.

Both of the models presented in this study are open systems, subject to influence from the environment. The near environment of the system, that part of the total environment which interacts most consistently with the system, includes the constraints of current practice in education; the backgrounds, attitudes, and expectations of people relating to the system; money; time; and the current social climate in the nation or a particular region. These constraints may be considered the parameters of the system.

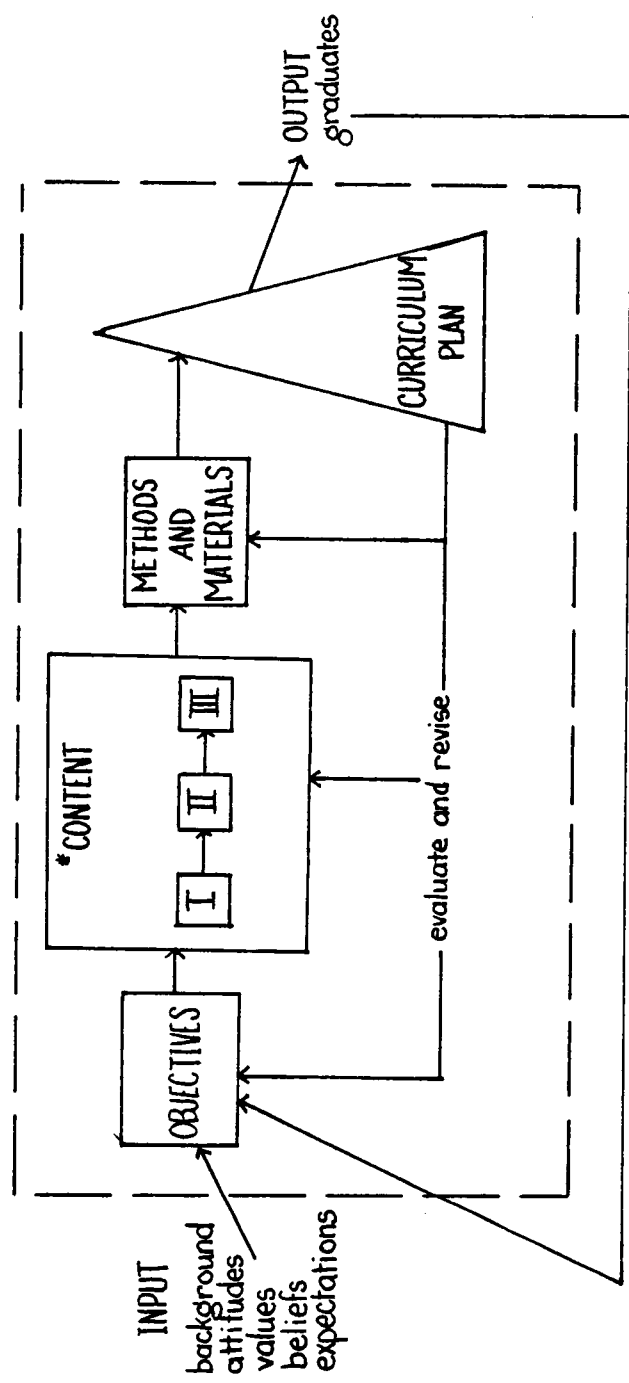
The boundaries of the system are permeable; that is, information flows into the system from the environment and influences changes within the system. It is also possible for information to flow from the system

into the environment. An example is a grant application submitted to a government agency by the curriculum planners requesting funds for materials development. A favorable response from the agency results in an opposite flow of information, i.e., money travelling from the environment into the system.

The principle of equifinality is of great importance to the applicability of these two models. Equifinality states that different sets of input may produce the same output, ensuring that the models may be applied by different groups in different settings yet still be expected to produce interdisciplinary programs.

I. THE CONTENT MODEL

This model of the curriculum change process focuses, as suggested by Hayman (1977), on an attempt to reach specific goals and objectives with minimal attention to the specific functioning of the system. An interdisciplinary content change attempts to restructure the curriculum through the addition of new courses, or through new combinations of courses, to achieve a specific, predetermined goal; in this case, graduates uniquely prepared to fit the requirements of the modern job market (Figure 6).



*CONTENT:
 I = subject matter areas
 II = priority listing
 III = specific courses

FIGURE 6

THE CONTENT MODEL FOR INTERDISCIPLINARY CURRICULUM CHANGE

The model begins with system input: in this case, the background, expectations, attitudes, values, and beliefs of the person or group initiating change. These factors combine to produce a concept of the output of the system which is the basis for the setting of objectives within the system. Once the curriculum has been implemented, this hypothetical concept of the output is replaced by a concrete, empirical form. A change in program objectives may be necessary if the concrete differs greatly from the hypothetical.

The first step in the change process itself is problem recognition or statement of purpose. Here, the purpose is to train students to fill a particular societal need. A need arises at this point for the definition of adequate training. Standards may exist (for example, the knowledge needed by accountants to earn CPA status, or by law students to pass the bar), or the planning team may be called upon to create them. Next, the planners must consider alternative solutions. How can students best be trained? It is vital that the group proposing interdisciplinary change face this question honestly; it is possible that the best training in a particular field may not be interdisciplinary in nature, in which case interdisciplinary curricula will provide disappointing results. The processes of defining the

problem and alternative solutions result in the creation of a set of objectives for the curriculum determined by the projected output of the system, the job-ready graduate.

If interdisciplinary training is the chosen alternative, the next step is that of determining which disciplines are to be included. These disciplines must be weighed against each other to determine their relative importance to the interdisciplinary topic. Then specific courses from each area may be selected for inclusion in the curriculum, or new courses created to fill recognized need. Such new courses may be disciplinary or interdisciplinary in nature; if the latter, the entire process described here may be followed for the creation of each course (an example of Hofstadter's (1979) nested systems).

The change/planning process then progresses to the selection of methods and materials for use in teaching the content previously selected. Here another opportunity for the introduction of interdisciplinarity presents itself: the use of teams or the utilization of guest lecturers in teaching a specific course. In addition, projects and classwork may be assigned to give students experience with interdisciplinarity.

When objectives have been set and content, methods, and materials selected, the curriculum plan is ready for implementation. This engages the feedback loop of the system, evaluation of the curriculum and resulting revision of the content, methods, materials, and perhaps the objectives set by the planning team. It is important that the processes of evaluation and revision continue, especially in a curriculum focused on responsiveness to societal needs.

II. THE PROCESS MODEL

In contrast to the content model of curriculum change, the process model is not concerned with changes to solve a particular problem defined by the planning team (Hayman, 1977). Consequently, the hypothetical conception of the system output plays no role in determining the objectives of the curriculum. The part of system input is taken instead by the stated goal or objective of the change process, which is defined as the introduction of interdisciplinarity into the system (Figure 7).

The first step toward process change is education in the concepts and methods of interdisciplinarity of the faculty involved. Harris (1983) states that the lack of interdisciplinarity in colleges is "squarely

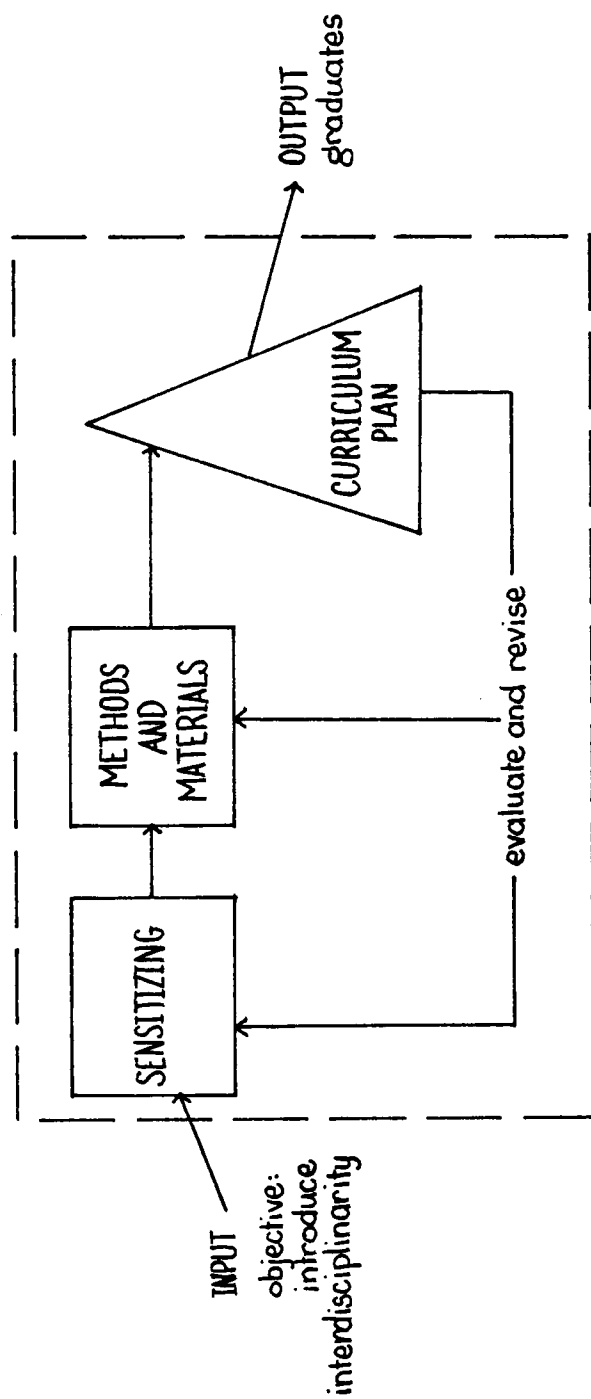


FIGURE 7

THE PROCESS MODEL FOR INTERDISCIPLINARY CURRICULUM CHANGE

the fault of the faculties themselves, which are structured to discourage, rather than promote, a holistic understanding of the way the world really works."

Since the faculty are relied upon to guide the students, the commitment of faculty to interdisciplinary education is essential to its accomplishment. A process of faculty sensitization to the benefits and demands of interdisciplinarity will lead toward this essential commitment. This sensitization process may include problem solving techniques, group dynamics, team teaching methods, etc. These new methods and the materials suggested by them are then used to restructure the curriculum plan within the existing framework of courses and programs of study.

Because the objective of this model is the introduction of interdisciplinarity and not the education of students to a particular end, there is no feedback loop from the output to the system. The output here, as in the content model, is expected to be graduates responsive to the job market, but the output no longer appears in both hypothetical and concrete forms. The ongoing processes of evaluation and revision are still integral parts of the system, as they were in the content model.

III. HYPOTHETICAL APPLICATIONS

The College of Home Economics at The University of Tennessee, Knoxville, is the site of an ongoing interdisciplinary program for doctoral students. The commitment of the college and its departments to interdisciplinarity is demonstrated in the Textiles, Merchandising, and Design Department self-review where it is noted that program integration has already begun. In particular, the benefit to interior design majors from exposure to textile science and merchandising, or to merchandising majors from field experience and business courses, is noted. Additionally, the department professes an emphasis on "depth and flexibility" in undergraduate programs and reports that students have indicated a need for improvement in coordination of course content, a need which the department terms "a priority" (Department of Textiles, Merchandising, & Design, 1982).

The models proposed in this study could be applied by faculty and administrators in the College of Home Economics in their efforts to expand and improve interdisciplinary undergraduate programs. Adequate planning of programs will also satisfy the expressed objectives of providing flexibility and improving coordination of courses in the department's programs. Following are examples of hypothetical applications of the models to

a specific situation within the College of Home Economics, especially the Department of Textiles, Merchandising, and Design.

In outlining the potential application of the models, three basic assumptions have been made:

1. Development of the new curriculum plan will be undertaken by a faculty team.
2. While the example given is based on a real situation, the actual input and output of the model may differ, even when applied within the Department of Textiles, Merchandising, and Design: this is a hypothetical example.
3. The faculty and administration want a change toward interdisciplinarity, believe in its effectiveness, and are willing to support proposed changes.

Content Model

The merchandising program in The University of Tennessee, Knoxville, College of Home Economics provides an excellent starting point for interdisciplinary curriculum innovation. Using data from the Department of Textiles, Merchandising, and Design Departmental Self-Review (1982) and The University of Tennessee

Record General Catalog with the content model, interdisciplinary curriculum changes may be made in the structure of the existing programs.

Input to the model comes from background, values, attitudes, beliefs, and expectations. To determine background, the question "What is current practice?" may be answered. As detailed in Table 1, merchandising students currently take courses in textiles and clothing, communication, business, consumerism, and science, as well as general education requirements (including home economics core, English composition, and social sciences) and electives chosen from a list revised periodically by the faculty.

Values may be defined by the priorities set by faculty members. Among faculty concerns set forth in the departmental self-review are:

1. assurance that textiles and clothing courses do not overlap in content those courses offered in other departments within the university;
2. training of students for the job market;
3. integration of department offerings;
4. provision of both depth and flexibility in programs;
5. development of close linkages with other departments; and

TABLE 1
MERCHANDISING--OPTION 1, DISTRIBUTION OF
COURSE AND CREDIT HOURS*

Requirements	Credit Hours	T & C	Business	Social Science	Communications	HE Courses re lated to Major	HE Courses	Other Liberal Arts Courses	Physical Science	Electives
TC 1160	2	2								
TC 1170	4	4								
TC 2110	3	3								
TC 2170	3	3								
TC 3410	3	3								
TC 3420-29	4	4								
TC 3480	3	3								
TC 3510	3	3								
TC 4010	3	3								
TC 4110	3	3								
TC 4120	3	3								
TC 4230	3	3								
TC 4620-30-40	17	17								
TC 4650	3	3								
Econ 2110-20-30	9		9							
Acctg 2110	3		3							
Marktg 3110-20	6		6							
Advert 3000 or Marktg 4150	3		3							
Sociology 1510	4			4						
Psychology 2500	4			4						
Anthropology 2530	4			4						
Sociology 3130	4			4						
English 1010 or 1011; 1020, 1033	9				9					
Journalism 2210	3				3					
Speech 2311 or 2361	4				4					
CFS 3420	3					3				
CFS 4830	3					3				
HE 1510	4						4			
HE 1520	4						4			
HE 2510	4						4			
HE 3510	4						4			
Literature Elec	4							4		
Humanities Elec	8							8		
Math 1540	4							4		
Math 1550	4							4		
Chem 1510-20-30 or Chem 1110-20-30	12								12	
Electives 3000, 4000 or 5000 level	20									20
Electives	6									6
Total	190	57	21	16	16	6	16	20	12	26
Percentage	100	30	11.1	8.4	8.4	3.2	8.4	10.5	6.3	13.7

*From Department of Textiles, Merchandising, and Design. TM&D Academic Program Review, 1982.

6. coordination of course content across the department.

Faculty attitudes (How do faculty members feel about the introduction of interdisciplinarity in departmental programs?) and beliefs (Do faculty members truly believe interdisciplinarity can accomplish the purposes set for it?) are, for the purposes of this study, set forth as assumptions. If there is serious doubt or disagreement among faculty members, serious study and discussion are necessary; this falls within the scope of the process model discussed below.

Finally among the input, what does the faculty expect of the new curriculum? In the Department of Textiles, Merchandising, and Design, two major expectations emerge:

1. strength in general education and the specific discipline chosen as a major area; and
2. depth in coursework in the major area.

To reconcile the expectations of breadth and depth, interdisciplinarity is an especially viable option.

Utilizing this input the faculty committee will set up objectives to structure the new curriculum. These objectives may be stated behaviorally, and may be directed toward faculty or students. Objectives for faculty may be stated as:

Faculty, in planning, should ensure:

1. no serious overlap with programs in other departments;
2. utilization of supporting courses from other majors and departments; and
3. coordination of the curriculum to aid advising and prevent major scheduling conflicts.

However, these behavioral objectives, with their focus on the process of curriculum change, more correctly fall within the scope of the process model. The content model therefore dictates behavioral objectives for students:

Upon completing the curriculum, students should be able to:

1. demonstrate depth in their chosen major areas (i.e., merchandising);
2. demonstrate integrated supporting knowledge from other areas within the department; and
3. demonstrate integrated supporting knowledge from areas outside the department.

The next question facing the faculty planners is that of specific content to accomplish the objectives. In the content model, this is divided into three segments: subject matter areas, prioritizing, and specific courses.

The subject matter areas are defined by the objectives as:

1. major area;
2. departmental areas outside the major; and
3. non-departmental areas.

Specifically for the merchandising curriculum, and using current practice as a basis, these three categories may be broken down thus:

1. merchandising courses, such as merchandising mathematics, buying, and consumer issues;
2. textiles, construction, design, fashion, historic costume and textiles, display, etc.; and
3.
 - a. general education requirements,
 - b. home economics core courses,
 - c. economics, accounting, marketing, advertising, sociology, psychology, journalism, speech, consumer economics, etc.

Logically, first priority among the identified subject matter areas is assigned to the merchandising courses. Other departmental courses may be prioritized according to the criterion of direct applicability: Which are the most necessary to the analysis of the commodities with which the students are concerned? In this case, the most important departmental courses are

basic textiles, construction, fashion, and design. Other courses, historic costume and textiles or display, are possible electives to individualize the program.

Extra-departmental courses may be ranked by individual student needs and used to further individualize the course of study. Basically, the courses designed to furnish an understanding of business practices and consumers are high priority, while courses in speech, journalism, and advertising may be selected on a more individual basis. General education and home economics core courses are university and departmental priorities, as they provide the foundation for other coursework.

Prioritizing provides the data needed to select specific courses for the curriculum within the restraints of time (the number of quarter hours of credit required for graduation) and existing resources (faculty, facilities, and course offerings), and to design new courses to fill gaps in existing offerings. The actual courses utilized in the curriculum will be dictated by the university's offerings when the curriculum is implemented, the amount of time and money available for development of new courses, and the electives chosen by students.

The methods and materials chosen to implement the curriculum and assess the fulfillment of the objectives set by the committee can be divided into two categories:

1. those used for the curriculum as a whole;
and
2. those used in specific courses.

Methods used to implement the curriculum as a whole are those most closely related to assessment of the curriculum objectives. A final or "senior" paper demonstrating the student's ability to integrate his knowledge; a comprehensive final examination; and field study experience, in which the student applies knowledge gained in the classroom, are three methods which might be used, alone or in combination. The second category of methods and materials, those used in specific courses, is determined by the faculty teaching the courses. Decisions involving this category are largely outside the authority of the curriculum team; indeed, this category of methods and materials more correctly belong in a level of planning not included in the content model because of its broad focus.

The curriculum development team, having followed the content model thus far, now has the data necessary to create a curriculum plan. This plan, a map of the

overall program students will follow to obtain a merchandising degree, will provide the framework within which specific faculty members will teach particular courses, and within which individual students will choose the electives and required courses they will take. Such an overall plan will provide clarity and integration in a degree program combining a wide variety of educational experiences.

Process Model

In applying the process model to the merchandising curriculum in the Department of Textiles, Merchandising, and Design, the planning team utilizes the same source materials used with the content model to provide information about current practice as a basis for change, i.e., the Departmental Self-Review (1982) and The University of Tennessee Record General Catalog. However, it is important to remember that here the changes will be made in the attitudes of people and the processes involved in implementing a curriculum rather than in curriculum content.

The input for the process model is a specific objective; in this case, the introduction of interdisciplinarity into the existing merchandising program. The first step in the model is sensitization of the faculty; the desire to work toward interdisciplinarity

has originated with one faculty member, or perhaps with a small group. Now other members of the faculty and administration need to learn about interdisciplinarity before program changes will work. At this point, strong leadership and a high degree of leader commitment are essential. A knowledge of communication mechanics and great persuasive ability are the leader's most valuable tools.

Sensitization can be accomplished through private discussions between the advocates of interdisciplinarity and others. While this may be a viable option when the faculty group is small, it is at best time consuming and inefficient. Perhaps a more valuable alternative is a series of workshops or seminars for faculty and administrators. This could begin in discussion held at regular faculty meetings. Then workshops are set up to expose the faculty to interdisciplinarity and lead to development of a common understanding of interdisciplinarity as it relates to the merchandising curriculum and of what implementation of interdisciplinary curriculum changes will involve.

The methods and materials for implementing the process model center on the communication process. Faculty learn problem solving techniques, group dynamics, and teaming concepts, including team teaching.

Gaming, role playing, and other techniques are used for faculty training. Source materials such as L. P. Bradford's Making Meetings Work: A Guide for Leaders and Group Members (1976) and W. G. Dyer's Team Building: Issues and Alternatives (1977) may be suggested as readings. The result will be a faculty committed to interdisciplinarity, with a set of program goals and objectives outlined.

Where interdisciplinary teams are to be utilized in implementing curricula, the sensitization process also includes an introduction to group dynamics and team functioning. Teams of persons from different areas are ideally suited to the conduct of interdisciplinary inquiry, but it is important the problem determine the team's structure, not the reverse, and that members of the team learn to function as a unit.

In the hypothetical curriculum for merchandising teams might be used to teach:

1. field experience: business (marketing), clothing (design and social science of), art (display), communication (advertising), and retailing.
2. textile science: polymer engineering, agriculture, and textiles.

3. clothing and textile history: history, social sciences, art, and clothing design.

The sensitization of faculty and administration will lead to a new plan for the merchandising curriculum utilizing existing courses. The changes will be in the methods used for teaching and advising. Team teaching, such as the teaching of a basic textiles course by faculty trained in textiles, polymer engineering, and chemistry; and gaming, which may be utilized to help prepare merchandising students for field study, are primary examples of new methods. These methods do not rely on traditional disciplinary boundaries. This type of interdisciplinary change places emphasis on the role of faculty in integrating differing fields of knowledge and in advising students about ways in which they can combine a variety of experiences to form their own unique educational programs to accomplish the goals they set for themselves.

CHAPTER 4

METHODOLOGY FOR MODEL EVALUATION

In the first stage of dissertation research, the emphasis of this study lay on the theoretical effort involved in creating two models for use by educators in implementing interdisciplinary curriculum change. While empirical implementation or evaluation of these models lies outside the scope of the present project, it is recognized that impartial evaluation and comparison of the models can best be accomplished through review by persons unconnected with the theory construction. To this end, an informal survey regarding the relative merits of the two models was conducted.

While designing the survey, the researcher had in mind the following assumptions to be substantiated or refuted:

1. Generally, an unfamiliarity with the tenets of interdisciplinarity exists, accompanied by a possible indifference to, or dislike of, this philosophy in education.
2. Generally, respondents will show no strong preference for one model over the other.
3. A combination process/content model will emerge as an additional option for consideration.

As a prelude to the actual survey, the materials relating to the models were submitted to a group as a pretest. Then, following revision, the materials were presented to the actual sample for review. Comments received as a result of this survey were utilized in evaluating and revising the models.

I. PRETESTING

The sixteen members of the College of Home Economics Interdisciplinary Doctoral Core class were selected as the pretest group on the recommendation of the instructor and on the basis of the class' focus on systems thinking and interdisciplinary modes of inquiry. Members of the class were given a packet containing drawings of the two models with an introduction and verbal explanation of the individual models (Appendix A, page 94). In the accompanying cover letter, they were asked to study the models and answer four questions about each model:

1. Are there other areas (entities) which should be included in the model? Please list and explain.
2. Are there areas (entities) which are not important and should be removed?
3. Does the sequence of the model seem logical? If not, what suggestions do you have for improvement?

4. Is the model understandable (i.e., is it useful as a guide for persons or committees engaged in curriculum development)?

The comments made by pretest participants fell generally into two categories:

1. the models require additional information and guidance for those participating in the curriculum change process; and
2. the output of the models, especially the process model, might be more appropriately expressed as "curriculum" rather than "graduates."

With respect to the first group, the variety of definitions of interdisciplinarity among a group engaged in curriculum planning was cited as a stumbling block to model usage. Additionally, a need for further guidance in setting objectives was expressed. The primary concerns with the output were the difficulty in evaluating it, and that intangible input cannot result in tangible output.

II. DESIGN OF QUESTIONNAIRE AND MATERIALS

For this study a primarily unstructured questionnaire design was desired. Because the respondents would be contacted by mail, it was necessary to design an information packet to summarize the research without making the

resulting material too bulky for mailing. The accompanying questionnaire was to be brief, with questions designed to solicit opinions. Because the study was a non-statistical one, easy coding of responses was not a priority. Questions were chosen to gather opinions on the completeness and viability of the models.

To improve the appearance and reduce the bulk of the information packet, the material used in the pre-test was reworked before its administration to the test sample. The primary revision was a shortening of the verbal material accompanying the illustrations of the models. Proposed sections outlining the relative merits of committee or team work in curriculum design, the barriers and facilitators in the communication process, and the suitability of interdisciplinary curricula in preparing graduates for the job market were omitted, as was the outline of hypothetical applications for the models.

The resulting information packet consisted of the two models, with an introduction and verbal descriptions in outline form of the two models. The outline description highlighted the similarities and differences in the two models by defining the focus, means, goal, input, and steps in the change process for each.

Accompanying the information packet was an expanded version of the pretest questionnaire, with the four questions used in the pretest and two additional questions to pinpoint the need for additional information to accompany the models and to compare the models' effectiveness. The questionnaires were color coded to permit identification of group differences in response to the models.

A cover letter was distributed with the information packet and questionnaire. The letter briefly described the research project, and asked the participation of the respondent as "an educator concerned with curriculum development." A brief follow-up message was prepared for distribution after the initial deadline for response as a means of increasing the response rate (Appendix B, page 101).

III. SAMPLE SELECTION

A non-random sample of questionnaire respondents was chosen to evaluate the two models designed in this study. Three target groups were chosen for participation: College of Home Economics faculty, Department of Educational Curriculum and Instruction faculty, and general University of Tennessee faculty. From the College of Home Economics, members of the Educational Programs and Policies Committee were identified as

potential respondents. Members of the general education committee of The University of Tennessee Faculty Senate were chosen to represent the faculty across the university. After duplications were eliminated, seven names remained on each of the two lists. Seven members of the Educational Curriculum and Instruction faculty were then chosen as the third group of potential respondents.

Each member of these three groups of seven subjects (twenty-one respondents total) was sent a copy of the cover letter, information packet, and a color coded questionnaire (see Appendix B, page 99). The responses were tabulated and analyzed in a non-statistical manner to locate repeated comments about the models and constructive comments for changes in the models.

CHAPTER 5

RESULTS AND DISCUSSION

I. SUMMARY OF QUESTIONNAIRE RESPONSES

A total response rate of 33% (7 responses) was achieved for the questionnaire sent to the sample of faculty and administrators. This included 43% rates of response (3 responses) for each of the groups representing College of Home Economics faculty and Department of Educational Curriculum and Instruction faculty and a 14% response rate (1 response) for the University of Tennessee at-large group. While this was a low rate of response for the questionnaire, it was sufficient for the purpose of this study: to solicit comment on the models from individuals not involved in the research. The actual number of questionnaires completed was not of primary importance, as this study was not designed for statistical analysis. The responses received for yes/no questions are summarized in Table 2.

In general, there appeared to be no difference in responses between groups in the sample. Some questions elicited unanimous response, while others provoked almost equally divided response. The exceptionally low response rate from the university faculty

TABLE 2
RESPONSES RECEIVED TO YES/NO QUESTIONS (IN PERCENT)

Question	HEC 1		UT 2		C&I		Total	
	Yes	No	Yes	No	Yes	No	Yes	No
1. Are there other areas (entities) which should be included in either model?	33	67	---	---	67	33	50	50
2. Are there areas (entities) which are not important and should be removed from either model?	---	100	---	---	50	50	20	80
3. Does the sequence of each model seem logical?	100	---	---	---	100	---	100	---
4. Are the models understandable (i.e., are they useful as guides for persons or committees engaged in curriculum development)?	33	67	---	---	100	---	67	33
5. In introducing a planning model such as this to persons interested in program development, is there additional information needed?	67	33	100	---	100	---	86	14

1HEC faculty = Educational Programs and Policies Committee.

2UT faculty = general education committee of the Faculty Senate.

at-large group prevents comment regarding opinion by that segment of the population.

Model Construction and Sequence

The first three queries on the questionnaire asked the respondents' opinions of the actual construction and sequence of the models. Responses indicated an unequivocal opinion that the sequence of the models is logical. Opinions were divided as to the desirability of adding other entities to the models, but there was little expressed feeling that any of the existing entities should be deleted.

Considerable comment was directed to the input for the models. Other sources of input suggested for inclusion in the models were broad resources, organizational factors, background of the target group, philosophy, and people. A comment also suggested the addition to the process model of a step in which objectives and content are established before methods are chosen. In the content model, Content Area II (priority listing) was targeted as a weak link which might be eliminated from the model.

Model Feasibility

Two questions asked of respondents focused on the practical application of the models. Responses

indicated a general belief that the models are useful, but also expressed a real need for further information to accompany the models.

In demonstrating the need for more detailed information to accompany the models, respondents noted that the models are simplistic and open to interpretation by users, and that many who might become involved in interdisciplinary curriculum change have no background in the field. Suggestions were made that a clearer statement of the application of the models, an example of the functioning of the models, and a more exact definition of curriculum would improve the usefulness of the models.

The final question asked respondents to compare the process and content models for effectiveness, and provided the opportunity to consider whether a combined model, incorporating concepts from both the process and content models, would be an effective alternative. There was a small response in favor of the content model, but the majority of responses indicated interest in the possibility of a combined process/content model, which one respondent termed "an expanded model."

II. DISCUSSION

The comments received in response to the questionnaire fall generally into one of two categories: requests

for further information and notations of weaknesses in the models. As a rule, the further information requested is contained in parts of the dissertation not included in the questionnaire packet, and many of the weaknesses noted by respondents can be solved or circumvented by utilizing a combined process/content model.

Within the first category (requests for further information) fall the following comments:

1. use an example of how the model functions (see pages 43-45 of the dissertation);
2. make application of the models clearer (pages 43-45);
3. develop planning questions to be used at each stage in the model (page 43);
4. define curriculum (page 12); and
5. relate the terms "educating" and "sensitizing" (pages 45-47).

The application and functioning of the models are elaborated in the discussion of hypothetical applications of the models, and the relationship between "educating" and "sensitizing" is established. Planning questions are suggested for many steps in the models as their application is outlined. An operational definition of

academic curriculum is included in the discussion of curriculum in the literature review.

Within the second category of responses (weaknesses in the models) fall the following:

1. for the process model, establish objectives and content before developing methods;
2. "process model seems incomplete";
3. "process model is essentially a faculty development model which is focused on creating whatever goes into the content model . . .";
and
4. utilize an expanded model.

III. CONCLUSION

As a result of the responses received through the questionnaire, the researcher's expectation that a combined process/content model should be developed is reinforced. Both the process and content models require real understanding of and commitment to interdisciplinarity on the part of the people involved in development (process model) and execution (content model) of the new curriculum. The mechanics of the communication process, the barriers to and facilitators of understanding, are especially important in the process model, with its focus on faculty sensitization. Solid leadership and strong commitment to the project are essential.

The content model for curriculum change puts the major responsibility for integration of material on the student, while the process model leans more heavily on faculty for integration. Because students ordinarily will not have a great knowledge of interdisciplinarity per se, the content model may thus easily become merely multidisciplinary, without the higher level of integration essential to true interdisciplinarity. Finally, the steps in the content model produce more tangible results, so at first glance it may appear the better of the models. For reasons of time and budget, however, the process model may actually prove more efficient.

It is relatively uncomplicated to visualize the process model as a subsystem within the content model. The sensitization of faculty becomes one step in the total effort of planning a new or updated curriculum. The next chapter presents the proposed combined model and summarizes the research leading to its development, which indicates that interdisciplinarity can best be fostered in curriculum by utilizing both process and content considerations in planning.

CHAPTER 6

THE PROCESS/CONTENT MODEL

The response engendered by the review of the process and content models indicated the possibility of a combined process/content model to fill areas left unaddressed by the two individual models. Additionally, questions were raised about the output of the models and the need for testing and review of the curriculum plan.

As Jacobs and Spradlin (1974) noted, change in one component of a system, or in its relationships to other units in the system, without corresponding changes in other components of the system, results in the failure of the system. Since both the hard content of the curriculum (content model) and the people who will design and implement the curriculum (process model) are components of the overall system of curriculum, it follows that attention to both areas is essential to effective curriculum change.

Presented in this chapter is a more complex model which utilizes elements of the two earlier models in an attempt to address the concerns expressed with the individual models.

I. THE MODEL

The process/content model is actually a picture of two systems, one a subsystem of the other (Figure 8). The larger of the systems is the "curriculum system" and includes the plan of the actual curriculum as well as the development process leading to it. The smaller system illustrates the development process, and is called the "curriculum planning system." It is within this subsystem that the process and content models are combined.

Within the curriculum planning system, the first step is problem recognition. This component of the curriculum planning process involves four steps: the statement of a purpose for the curriculum (here, the preparation of job-ready graduates), the definition of standards for evaluating the output of the system, the development of a list of alternative solutions to accomplish the purpose, and the selection of one alternative to be applied to the situation. If interdisciplinarity is the chosen alternative, the planning/change group proceeds with the remainder of the model.

The next step is the setting of objectives. In this combined model, both objectives for students

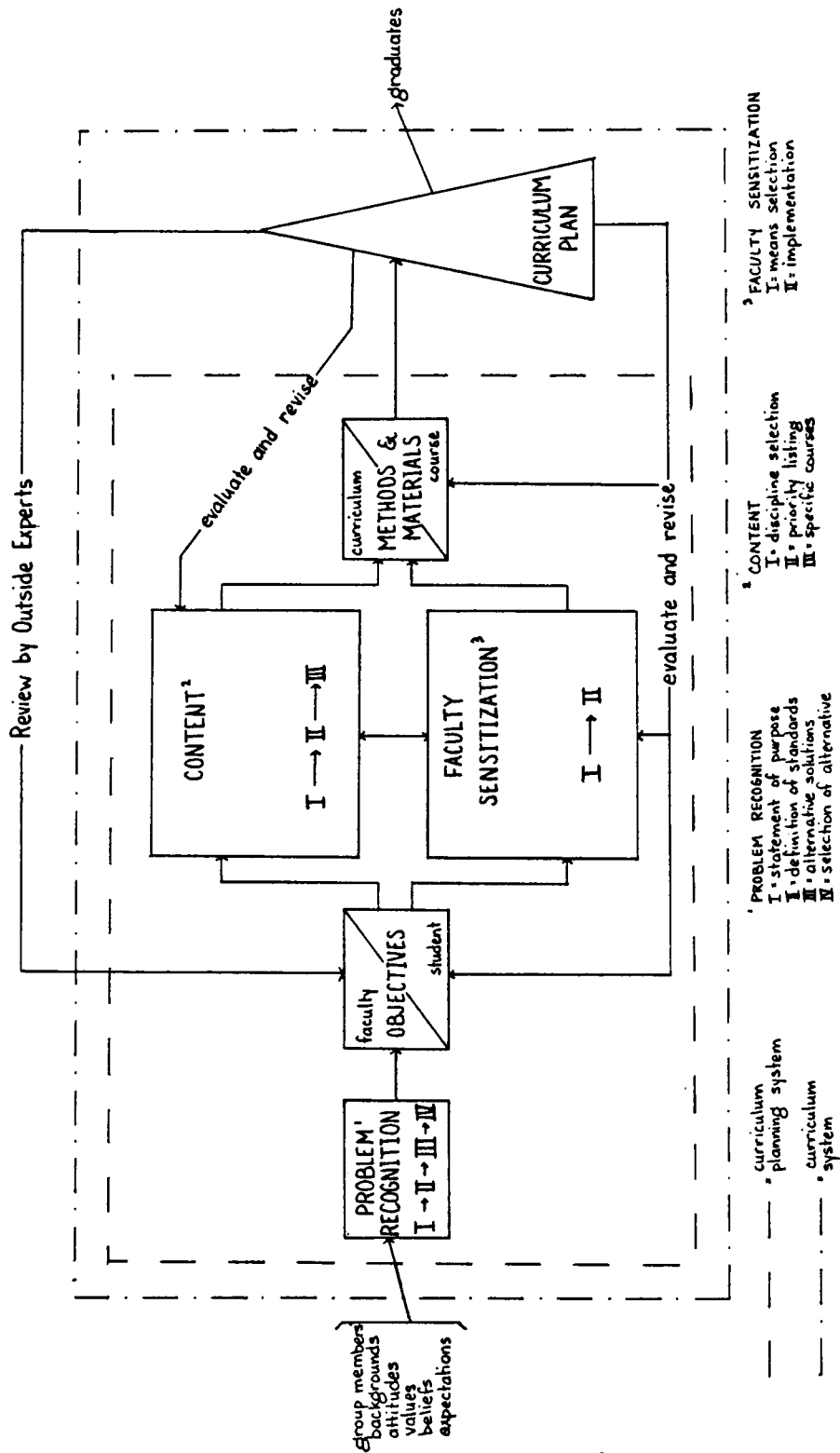


FIGURE 8
THE PROCESS/CONTENT MODEL FOR INTERDISCIPLINARY
CURRICULUM CHANGE

and objectives for faculty will be set. Faculty objectives will be determined by priorities stated in self-reviews such as that of The University of Tennessee College of Home Economics Department of Textiles, Merchandising, and Design (Department of Textiles, Merchandising & Design, 1982). Student objectives will be set by the curriculum developers and, on a more detailed level, by the faculty teaching individual courses.

The objectives set for students will lead the developers into one channel of the planning system: content. As in the content model, the determination of content for the curriculum follows three steps: the selection of disciplines for inclusion, priority listing of the disciplines, and the selection of specific courses to constitute the curriculum.

The objectives set for faculty will lead developers into the second channel of progress, faculty sensitization. Here the process model comes into play. Faculty will be exposed to principles of interdisciplinarity and means for producing it, and a commitment to interdisciplinarity will be fostered. In addition, the priorities set by the self-review team will be presented to faculty so that they may be acted upon.

Here the two channels again combine and lead to development of methods and materials for implementing the curriculum. In this step, teaching methods, textbooks, study aids, examination materials, etc. are chosen or fabricated. By careful selection of methods and materials the development team can foster interdisciplinarity. As pointed out earlier, final decision about the methods and materials used in specific courses is in the hands of teaching faculty members. However, the curriculum planners may have to increase their influence in this area in the interest of interdisciplinarity. Previewing of materials chosen by instructors, and evaluation and review of courses on the basis of non-traditional guidelines such as amounts of written work and oral recitation by students, are two possibilities. Commitment to interdisciplinarity on the part of faculty members is essential to the success of even the best plan.

The output of this curriculum planning system is a completed plan for the interdisciplinary curriculum. Once the curriculum plan is completed and implemented, the feedback loops of the curriculum system are engaged, resulting in evaluation and possible revision of all the steps in the planning process. An additional, external feedback loop also comes into play: review

of the curriculum by an impartial panel of individuals well versed in the workings of interdisciplinarity. While the internal feedback loops should be continually utilized, this external review is instead a periodic check on the curriculum's effectiveness.

II. SUGGESTIONS FOR FUTURE RESEARCH

The focus of this research has been the development of models intended to assist in the development/change process for interdisciplinary curricula. Logically, the construction of models is not the final step in the process. Some unanswered questions and unexplored issues are listed in this section which may provide a basis for further research leading toward final implementation of the models. First are presented issues dealing with refinements in the models themselves; then empirical research and application are discussed.

Model Refinement

If output is not expressed in terms of graduates from the new curricula, how should it be expressed?

Comments received on the models suggested that the curriculum itself may be the system output, or some other entity may be found appropriate. If graduates of the

curricula are to be considered the output, some means of measurement (i.e., determining the quality of the graduates or measuring their success) must be developed.

How should the process of faculty sensitization be undertaken? An entire study could easily be based on this issue. An exploration of communication, psychology, group dynamics, and team functioning (perhaps an interdisciplinary study?) leading to the development of a plan or model for the educating of faculty in the rudiments of interdisciplinarity would provide a valuable adjunct to the models proposed in the present study.

How should a panel of experts to review the curriculum be chosen? Thought must be given to establishing requirements for a curriculum review panel. Especially, it must be decided which areas of expertise are appropriate to carry out the review, and which individuals from each area can be considered expert.

How can the models be adapted to include technological innovations? With the current onslaught of computers and information technology, it will become imperative that technological innovations be taken into account in educational planning. Further research may focus on the means for including these innovations in

the new curricula, or on creating options in the models as allowances for continually increasing the use of computers, information storage and retrieval systems, simulations, etc. as new technology becomes available.

Empirical Research

Implementation. The most obvious aspect of further research is the actual implementation of one or more of the models presented in this study. To fully evaluate the model(s), a setting must be found in which the researcher can observe the entire process of curriculum change and follow its consequences through to some measurable end result.

Adaptation. The models in this study are purposely general in scope. It is intended that they serve as the basis for curriculum change in a variety of areas. Consequently, further research may also focus on the changes needed in the models to facilitate their use in settings other than The University of Tennessee's College of Home Economics, especially settings outside higher education.

III. IMPLICATIONS

The research involved in this study has led the researcher to the conclusion that true interdisciplinarity

is a rarity in higher education. Perhaps this is a result of the relatively recent development of interest in interdisciplinarity and the natural slowness of change in education, or perhaps it is a function of the difficulty of interdisciplinary inquiry.

Furthermore, interdisciplinarity is a situation-specific entity, so an interdisciplinary program created at one educational institution cannot simply be transferred whole to another situation. Interdisciplinarity lies between the usual prioritizing of disciplines (as a major area of study, a minor area, and miscellaneous supporting courses) and the formation of a new discipline. When a group of interdisciplinary curricula begin so closely to resemble one another that they cease to be situation-specific, a new discipline is being or has been formed.

Why then should anyone attempt interdisciplinarity? It is difficult to accomplish, but there are many benefits along the road to true interdisciplinarity. Any educational program moving toward an interdisciplinary goal will open new opportunities for teaching and research by broadening the knowledge bases and perspectives of faculty and students. More alternatives will result in an increase in the number of programs tailored to individuals without all of the costs of

establishing many new programs; for example, an interdisciplinary program in home economics can train educators, businessmen, and scientists. Any movement toward interdisciplinarity serves to overcome some of the rigid barriers separating traditional disciplines, and facilitates the kind of communication among professionals which is vital to research in modern problem-oriented situations.

The development of models for interdisciplinary curriculum change is one step toward the implementation of truly interdisciplinary curricula. Complete educational specialization no longer fully meets the needs of society as expressed through the job market, and higher education has a responsibility to respond to society. As colleges and universities recognize the importance of interdisciplinary programs, these models may serve as a foundation for the efforts necessary to bring the new programs to fruition.

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APPENDIXES

APPENDIX A

INFORMATION PACKET AND QUESTIONNAIRE

USED IN PRETEST

To assist a fellow doctoral student with dissertation research, please study the attached models and their verbal descriptions and answer the following questions with regard to each model and verbal explanation. Your assistance will be greatly appreciated.

No bibliography has been included with the accompanying excerpt, but I will be happy to supply further information on request.

Rebecca Kemp

Questions for Evaluation of Models

1. Are there other areas (entities) which should be included in the model? Please list and explain.
2. Are there areas (entities) which are not important and should be removed?
3. Does the sequence of the model seem logical? If not, what suggestions do you have for improvement?
4. Is the model understandable (i. e., is it useful as a guide for persons or committees engaged in curriculum development)?

Note: Appendix A is a reduced duplication of the material given to the Interdisciplinary Doctoral Core class as a pretest of the models.

PROCESS AND CONTENT MODELS
FOR INTERDISCIPLINARY CURRICULUM CHANGE

Introduction

Both curriculum itself and the process of curriculum change may be approached through systems thinking. Many models of the curriculum system are available in the literature; this study focuses instead on the curriculum change system. While the process and content models differ in composition, there are some commonalities.

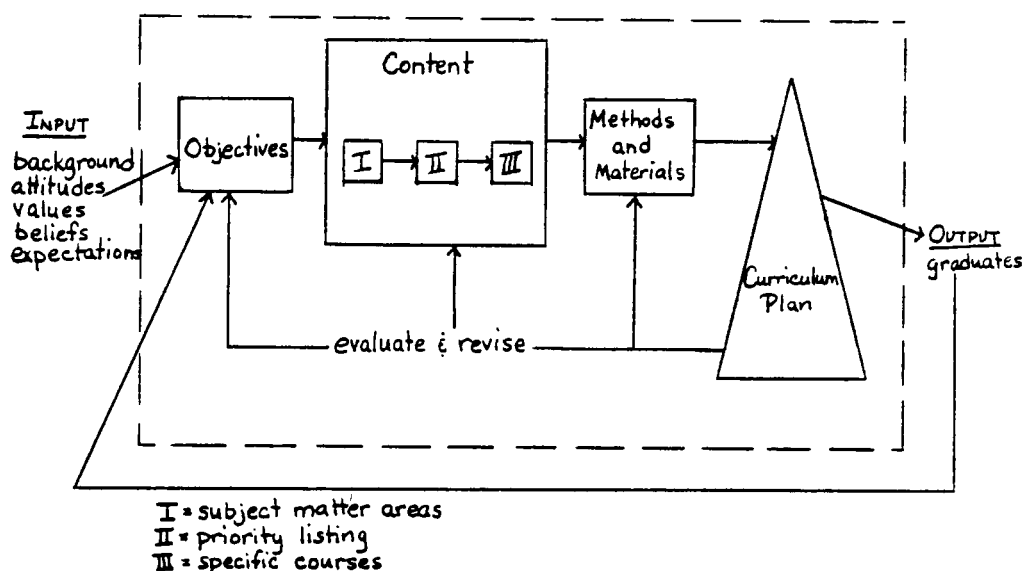
Both of the models presented in this study are open systems, subject to influence from the environment. The near environment of the system, that part of the total environment which interacts most with the system, includes the constraints of current practice in education; the backgrounds, attitudes, and expectations of people relating to the system; money; time; and the current social climate in the nation or a particular region. These constraints may be considered the parameters of the system.

The boundaries of the systems are permeable; that is, information flows into the system from the environment and influences changes within the system. It is also possible for information to flow from the system into the environment. An example is a grant application submitted to a government agency by the curriculum planners requesting funds for materials development. A favorable response from the agency results in an opposite flow of information, i. e., money travelling from the environment into the system.

The principle of equifinality is of great importance to the applicability

of these two models. Equifinality states that different sets of input may produce the same output, ensuring that the models may be applied by different groups in different settings yet still be expected to produce interdisciplinary programs.

The Content Model



This model of the curriculum change process focuses, as suggested by Hayman (1977), on an attempt to reach specific goals and objectives with minimal attention to the specific functioning of the system. An interdisciplinary content change attempts to restructure the curriculum through the addition of new courses, or through new combinations of courses, to achieve a specific, predetermined goal: in this case, graduates uniquely prepared to fit the requirements of the modern job market.

The model begins with system input: in this case, the background, expectations, attitudes, values, and beliefs of the person or group initiating change. These factors combine to produce a concept of the output of the system which is the basis for the setting of objectives within the system. Once the curriculum has been implemented, this hypothetical concept of the output is replaced by a concrete, empirical form. A change in program objectives may be necessary if the concrete differs greatly from the hypothetical.

The first step in the change process itself is problem recognition or statement of purpose. Here, the purpose is to train students to fill a particular societal need. A need arises here for the definition of adequate training. Standards may exist (for example, the knowledge needed by accountants to earn CPA status, or by law students to pass the bar), or the planning team may be called upon to create them. Next, the planners must consider alternative solutions. How can students best be trained? It is vital that the group proposing interdisciplinary change face this question honestly; it is possible that the best training in a particular field may not be interdisciplinary in nature, in which case interdisciplinary curricula will provide disappointing results. The processes of defining the problem and alternative solutions result in the creation of a set of objectives for the curriculum determined by the projected output of the system, the job-ready graduate.

If interdisciplinary training is the chosen alternative, the next step becomes that of determining which disciplines are to be included. These disciplines must be weighed against each other to determine their relative importance to the interdisciplinary topic. Then specific courses from each area may be selected for inclusion in the curriculum, or new courses created to fill recognized need. Such new courses may be disciplinary or

interdisciplinary in nature; if the latter, the entire process described here may be followed for the creation of each course (an example of Hofstadter's (1979) nested systems).

The change/planning process then progresses to the selection of methods and materials for use in teaching the content previously selected. Here another opportunity for the introduction of interdisciplinarity presents itself: the use of teams or the utilization of guest lecturers in teaching a specific course. In addition, projects and classwork may be assigned to give students experience with interdisciplinarity.

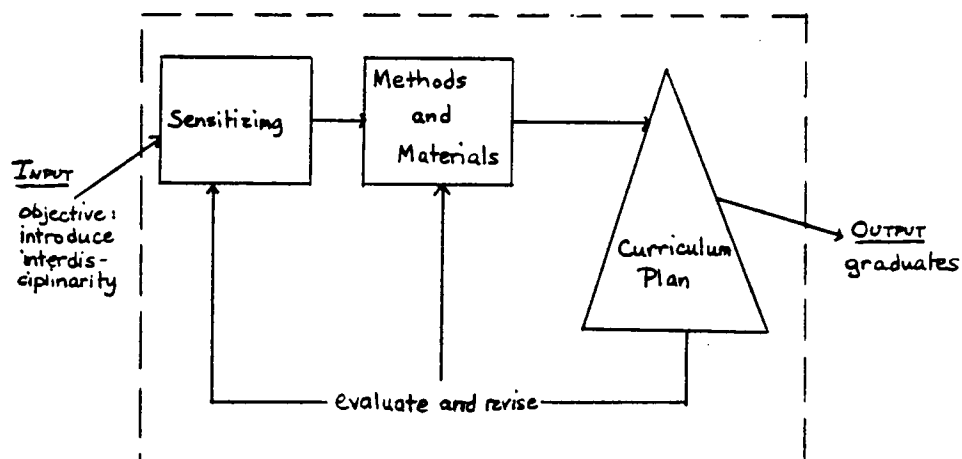
When objectives have been set and content, methods, and materials selected, the curriculum plan is ready for implementation. This engages the feedback loop of the system, evaluation of the curriculum and resulting revision of the content, methods, materials, and perhaps the objectives set by the planning team. It is important that the processes of evaluation and revision continue, especially in a curriculum focused on responsiveness to societal needs.

The Process Model

In contrast to the content model of curriculum change, the process model is not concerned with changes to solve a particular problem defined by the planning team (Hayman, 1977). Consequently, the hypothetical conception of the system output plays no role in determining the objectives of the curriculum. The part of system input is taken instead by the stated goal or objective of the change process, which is defined as the introduction of interdisciplinarity into the system.

The first step toward process change in education is the concepts and methods of interdisciplinarity of the faculty involved. This sensitization process

may include problem solving techniques, group dynamics, team teaching methods, etc. These new methods and the materials suggested by them are then used to restructure the curriculum plan within the existing framework of courses and programs of study.



Because the objective of this model is the introduction of interdisciplinarity and not the education of students to a particular end, there is no feedback loop from the output to the system. The output here, as in the content model, is expected to be graduates responsive to the job market, but the output no longer appears in both hypothetical and concrete forms. The ongoing processes of evaluation and revision are still integral parts of the system, as they were in the content model.

APPENDIX B

INFORMATION PACKET, QUESTIONNAIRE, AND LETTERS
DISTRIBUTED TO FACULTY FOR COMMENT



Textiles, Merchandising & Design

COLLEGE OF HOME ECONOMICS / THE UNIVERSITY OF TENNESSEE KNOXVILLE 37996-1900 / (615) 974-2141

October 4, 1982

Dear Faculty Member:

As a student in The University of Tennessee College of Home Economics Interdisciplinary Doctoral Program, I am engaged in a dissertation project involving theory development in the area of interdisciplinary curriculum change. Specifically, my work encompasses the creation of two models intended to provide guidance in producing such change in the setting of higher education.

It is important at this point in the research to assess the effectiveness of the models in their role as facilitators of change. Would you, as an educator concerned with curriculum development, take a moment to look at the enclosed models and descriptions and to complete the accompanying questionnaire?

Please return the questionnaire with your comments to me by campus mail (in care of the Department of Textiles, Merchandising, and Design, Home Economics Building) by Monday, October 11. Your time and cooperation will be greatly appreciated.

Sincerely,

Rebecca G. Kemp

Enclosure

Note: Appendix B is a reduced duplication of the materials distributed to the faculty sample for comment.

PROCESS AND CONTENT MODELS
FOR INTERDISCIPLINARY CURRICULUM CHANGE

Introduction

Both curriculum itself and the process of curriculum change may be approached through systems thinking. Many models of the curriculum system are available in the literature. This study focuses instead on the curriculum change system: not on what constitutes curriculum, but on how it may be changed. While the process and content models differ in composition, there are some commonalities.

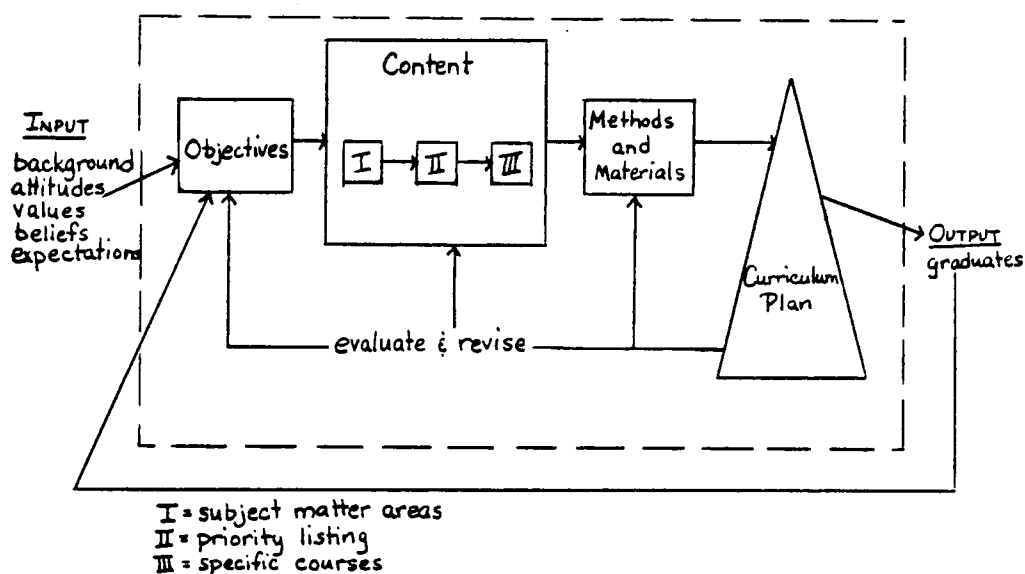
Both of the models presented in this study are open systems, subject to influence from the environment. The near environment of the system, that part of the total environment which interacts most consistently with the system, includes the constraints of current practice in education; the backgrounds, attitudes, and expectations of people relating to the system; money; time; and the current social climate in the nation or a particular region. These constraints may be considered the parameters of the system.

The boundaries of the systems are permeable; that is, information flows into the system from the environment and influences changes within the system. It is also possible for information to flow from the system into the environment. An example is a grant application submitted to a government agency by the curriculum planners requesting funds for materials development. A favorable response from the agency results in an opposite flow of information, i. e., money travelling from the environment into the system.

2

The principle of equifinality is of great importance to the applicability of these two models. Equifinality states that different sets of input may produce the same output, ensuring that the models may be applied by different groups in different settings yet still be expected to produce interdisciplinary programs.

The Content Model



Focus: an attempt to reach specific goals and objectives with minimal attention to the specific functioning of the system.

Means: addition of new courses or recombination of existing courses.

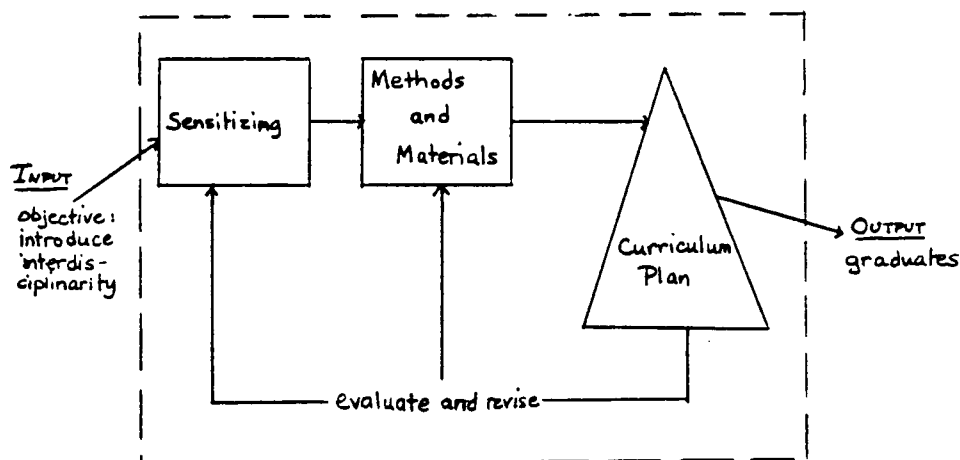
Goal: graduates uniquely prepared to fit the requirements of the modern job market.

Input: background, expectations, attitudes, values, and beliefs of the person or group initiating change.

Steps in the Change Process:

1. Define the problem and enumerate alternative solutions to create a set of objectives for the curriculum.
2. Determine which disciplines are to be included in the interdisciplinary program.
 - a. Select specific courses to include in the curriculum.
 - b. Create new courses to fill recognised needs.
3. Select methods and materials to be used in teaching the content.
4. Implement the curriculum.
5. Evaluate and revise as necessary.

The Process Model



Focus: an attempt to change the functioning of the system without special focus on a particular problem.

Means: sensitization of faculty and administrators to the concept of interdisciplinarity.

4

Goal: the introduction of interdisciplinarity into the curriculum system.

Input: the stated goal or objective of the change process, i. e., the introduction of interdisciplinarity into the curriculum system.

Steps in the Change Process:

1. Educate the faculty involved in the concepts and methods of interdisciplinarity, e. g., problem solving techniques, group dynamics, team teaching methods.
2. Utilize interdisciplinary methods and materials suggested by them to restructure the curriculum plan within the existing framework of courses and programs of study.
3. Implement the curriculum.
4. Evaluate and revise as necessary.

Questions for Evaluation of Models

1. Are there other areas (entities) which should be included in either model?

_____ Yes

_____ No

If yes, please list and explain.

2. Are there areas (entities) which are not important and should be removed from either model?

_____ Yes

_____ No

If yes, please list and explain.

3. Does the sequence of each model seem logical?

_____ Yes

_____ No

If no, please list your suggestions for improvement.

4. Are the models understandable (i. e., are they useful as guides for persons or committees engaged in curriculum development)?

_____ Yes

_____ No

5. In introducing a planning model such as this to persons interested in program development, is there additional information needed?

_____ Yes

_____ No

If yes, what additional information do you suggest?

6. In your opinion, which would be most effective in applying the models to a real situation?

_____ Content model alone

_____ Process model alone

_____ Some combination of the process and content models

_____ Other (please explain)



Textiles, Merchandising & Design

COLLEGE OF HOME ECONOMICS / THE UNIVERSITY OF TENNESSEE KNOXVILLE 37996-1900 / (615) 974-2141

October 25, 1982

Dear Faculty Member:

On October 4, 1982, you were sent a packet of materials entitled "Process and Content Models for Interdisciplinary Curriculum Change" and asked to complete and return a questionnaire on the material.

If you have returned your questionnaire to me, I thank you. Your cooperation is greatly appreciated.

If you have not yet completed and returned the questionnaire, please do so immediately. Send the completed questionnaire to me in care of The Department of Textiles, Merchandising, and Design, Home Economics Building.

The responses I receive will be used in formulating an evaluation of the process and content models developed during my dissertation research. It is important that I receive your response to ensure a broad review of the work.

Sincerely,

Rebecca G. Kemp

VITA

Rebecca Grace Kemp was born in Columbus, Georgia on September 18, 1959. She attended elementary schools in West Point, Georgia and Lanett, Alabama, and attended Lanett High School for three years. In August 1976 she entered The University of Alabama, and in May 1979 received a Bachelor of Science degree (summa cum laude) with a major in clothing and textile design. In September 1979 she accepted a teaching assistantship at The University of Tennessee, Knoxville, and began working toward the Doctor of Philosophy degree in Home Economics. This degree was awarded in June 1983.

The author was a national Merit Scholar in 1977 and an Outstanding Young Woman of America in 1981. She was the recipient of the S. Z. Mitchell Scholarship and an International Studies Scholarship at The University of Alabama, and received the Phi Upsilon Omicron Award and Alpha Lambda Delta Book Award. She is a member of Phi Kappa Phi, Phi Upsilon Omicron, Omicron Nu, Alpha Lambda Delta, and Phi Eta Sigma.