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ABSTRACT

This paper presents a model of the curriculum development process that reflects curriculum project practices. Regularities found in the data from one case study were checked against reports of other project practices, and those regularities common to all the projects studied served as the model foundation. The model asserts that a curriculum project functions mainly to transform an initially vague, unsystematic, but strongly held vision of the educationally desirable into a concrete educational program. This transformation is accomplished first by attaining agreement on a platform -- a body of shared beliefs about curriculum. Then, using this platform, the project staff develops a plan of work, the completion of which requires discussion, debate, argument, or deliberation on crucial issues, and finally, the production of curriculum materials. (Author)

AN EMPIRICAL MODEL OF THE PROCESS OF CURRICULUM DEVELOPMENT

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Students of curriculum have been so busy prescribing how curriculum making should be done that we have not paid sufficient attention to discovering how it is done. Perhaps when we have examined current curriculum making techniques we will decide that these techniques are inferior to possible alternative methods. But before we can judge the worth of contemporary methods we must understand them thoroughly.

This paper presents a model of curriculum development as it is practiced in modern curriculum projects. It is an empirical model in two senses: it was constructed to exhibit phenomena and relations observed in actual curriculum projects<sup>1</sup>, and it is intended to facilitate further observation of the process of curriculum development. The model is not complete nor is it explicit enough to be programmed on a computer, but perhaps its possibilities will entice others to work toward its completion.

The field of curriculum can already boast an outstandingly successful model of curriculum development based on the work of a generation of curriculum theorists from Franklin Bobbitt to Ralph W. Tyler. The formal elements of that model -- the classical model -- are the objective and the learning experience. Its logical operations are determining objectives, stating them in proper form, devising learning experiences, selecting and organizing learning experiences to attain given outcomes, and evaluating the outcomes of those experiences. This model has undergone fifty years of continuous development and use. It has facilitated the systematic study of education, and it has served as the basis for a respectable and growing educational technology.

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For all its successes, however, the classical model seems not to have represented very well the most characteristic features of traditional educational practice.<sup>2</sup> I think it is fair to say, for example, that in most cases when teachers or subject matter specialists work at curriculum development the behavioral objectives they formulate are either a diversion from their work or an appendix to it, not an integral part of it. Now it may be the case, as some have suggested, that curriculum developers, to the extent that they deviate from the classical model, are wasting effort, or worse, misdirecting children's education.<sup>3</sup> But it is also possible that the classical model neglects or distorts important aspects of contemporary practice in curriculum development. If so, a model of curriculum development frankly based on practice should illuminate novel facets of the curriculum development process, correct misconceptions about that process, and enable us to understand both the failures and the successes of the classical model.

### The Empirical Model

The empirical model of the process of curriculum development consists of three elements: the curriculum's platform, its design and the deliberation associated with it.

The curriculum developer does not begin with a blank slate. He could not begin without some notion of what is possible and desirable educationally. The system of beliefs and values that the curriculum developer brings to his task and that guides the development of the curriculum I call the curriculum's platform. The word "platform" is meant to suggest both a political platform and something to stand on. The platform includes an idea of what is and a vision of what ought to be, and these guide the curriculum developer in determining what he should do to realize his vision.

The second formal element in the empirical model, deliberation, is aptly characterized by Schwab as follows:

(Deliberation)...treats both ends and means and must treat them as mutually determining one another. It must try to identify, with respect to both, what facts may be relevant. It must try to ascertain the relevant facts in the concrete case. It must try to identify the desiderata in the case. It must generate alternative solutions. It must take every effort to trace the branching pathways of consequences which may flow from each alternative and affect desiderata. It must then weigh alternatives and their costs and consequences against one another, and choose, not the right alternative, for there is no such thing but the best one.<sup>4</sup>

A curriculum's design<sup>5</sup>, like an automobile's design, is the set of abstract relationships embodied in the designed object. The design is the theoretically significant output of the curriculum development process. When it is embodied in a material form, a curriculum's design, like an automobile's design, presents itself to us as a single entity, a Gestalt, which must then be represented in some schematic way if we are to deal with it analytically.

We are accustomed to speaking of curricula as if they were objects produced by curriculum projects. The trouble with this view is that the curriculum's effects cannot be ascribed to a particular set of materials, which, after all, are unique. Rather, the effects must be assigned to some property or design element shared by the thousands of sets of materials in use throughout the world. These design elements influence in some way the events that produce learning. The curriculum's design -- the set of relationships embodied in the materials -- rather than the materials themselves are the important concerns of the curriculum theorist, because only those effects that can be ascribed to design elements are generalizable to other students in other situations.

The trouble with the concept of design is that the curriculum's design is difficult to specify explicitly and precisely. A method is needed for representing a curriculum's design schematically so that design elements can be identified and treated analytically. One way to specify a curriculum's design is by the series of decisions that produce it. A curriculum's design would then be represented by the choices that enter into its creation. Just as an experienced architect could construct a model of a building from a complete record of the decisions made by the building's designer as well as from a set of blueprints, so a curriculum developer could substantially reconstruct a project's curriculum plan and materials from a record of the choices they made. It may seem awkward to represent a design as a series of decisions, but I hope to show that such a representation has many features that will appeal to both theorists and researchers.

In the development of any curriculum some design decisions will be made with forethought and after a consideration of alternatives. These decisions make up the curriculum's explicit design. But the curriculum developer adopts some courses of action automatically, without considering alternatives. In these cases it is awkward to speak of a decision, even though the result is the same as if a decision has been overtly made. These unconsidered choices make up the curriculum's implicit design.

A complete specification of a curriculum's explicit design consists of at least two parts: a set of decision points -- questions or issues which are the occasions of decision -- and a set of decision alternatives or options formulated at each decision point. The choice of one of these alternatives to guide the development of the curriculum materials determines the form of the curriculum materials. A curriculum's implicit design can never be

completely specified in this mode of representation because the number of conceivable decision points in any extended action is infinite. This limitation is not serious, however, for with accurate records any question that can be asked about the implicit design can be answered. In framing the question the questioner must ask how a particular issue was decided, and this characterization of the issue defines the decision point. Theoretically, at least, records of the curriculum makers' behavior should reveal the course of action he chose at that decision point even though he did not formulate the decision point himself.

In the empirical model the theoretically interesting output of the curriculum development process is not a collection of objects, not a list of objectives, not a set of learning experiences, but a set of design decisions. The process by which beliefs and information are used to make these decisions is deliberation. The main operations in curriculum deliberation are formulating decision points, devising alternative choices at these decision points, considering arguments for and against suggested decision points and decision alternatives, and finally, choosing the most defensible alternative subject to acknowledged constraints.

The animating principle in curriculum deliberation is the desire for defensibility, for justifiability of decisions.<sup>6</sup> The curriculum designer wants to be able to say he was forced or constrained either by circumstances or by his principles to decide as he did. To be constrained by circumstances is the curriculum designer's strongest possible justification, for then he has no genuine choice. If every decision was dictated by circumstances beyond his control, he would have no freedom to remake the world as he wished it to be. When all circumstantial constraints are considered, however, the curriculum designer finds he still has options left. It is his commitment

to making these remaining choices in a defensible way that leads him to search for additional principles which are not natural, but man-made. The curriculum developer expects that these man-made, or conventional principles, will be accepted not as facts of life but as expressions of a shared view of the way life can and should be. Taken together these natural and conventional principles provide enough constraints to enable the decision maker to resolve issues that arise and to justify his decisions on the ground that anyone who acknowledged his principles would choose as he choose.

Needless to say, the derivation of curriculum making constraints from natural and conventional principles and the application of these constraints to decision making is a horribly complicated job. We should not be surprised, therefore, to find that curriculum deliberations are chaotic and confused. Alternatives are often formulated and defended before the issue has been clearly stated. Feelings run high. Personal preferences are expressed in the same breath with reasoned arguments. But we must not be misled into believing either that such confusion is worthless or that it is the inevitable consequence of deliberation. Deliberation is defined by logical, not social psychological criteria, and it may take many forms. The most common form in current practice is argumentation and debate by a group of people. But it could be done by one person, and no logical barrier stands in the way of its being performed by a computer.

The heart of the deliberative process is the justification of choices. This justification takes the form "If you accept this, then you must choose that." In justifying a choice we appeal to that which is already accepted in order to secure approval for our choice. Those assumptions which the curriculum designer accepts and which serve as the basis for the justification

of his choices constitute the curriculum's platform. Almost anything that is accepted as good, true or beautiful can be part of a platform. Certainly beliefs about what exists and about what is possible are necessary parts of any platform. I call such beliefs conceptions. For example, "We believe there is a learnable strategy for discovering one's unspoken notions, one's unstated ways of approaching things" states a conception of what is learnable.<sup>7</sup> Beliefs about what relations hold between existing entities, i.e., beliefs about what is true, I call theories. For example, "The teacher imparts attitudes toward a subject and, indeed, attitudes toward learning itself" states a theory of the development of attitudes toward learning.<sup>8</sup> Beliefs about what is educationally desirable, i.e., beliefs about the good and the beautiful in education, I call aims. For example, "We teach a subject not to produce little living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as a historian does, to take part in the process of knowledge-getting" states an aim in general terms.<sup>9</sup> Educational objectives are one form in which aims can be stated.

These three platform components -- conceptions, theories, and aims -- are sophisticated products of reflection on life and on education. However, a curriculum maker's actions are frequently based on less carefully conceptualized notions. Two kinds of less explicit but nevertheless powerful platform components are worth our attention: images and procedures. Images specify the desirable simply by indicating an entity or class of entities that is desirable without specifying why or in what way it is desirable.<sup>10</sup> Heroes are cultural images. So are outstanding works of art or admired scientific theories. Procedures specify courses of action or decision that are desirable without specifying why or in what way they are

desirable. "Be honest" and "Minimize the time necessary to learn" are procedures since they specify a method of operation without specifying why or in what way that method is a good one.

Frequently the curriculum developer cannot decide among a set of alternatives either because all the alternatives are consistent with his platform or because none are, or because he does not have enough information to determine whether they are consistent with his platform. In these cases the curriculum designer must seek additional information in order to make a justifiable decision. Even when his platform principles make him confident that his choice is a good one the responsible curriculum maker will often seek empirical confirmation of his beliefs. Empirical data, while not part of the platform, can be a most persuasive basis for justification.

The curriculum designer may feel justified in a particular decision whenever he regards it as consistent with his platform and the information available to him. But judging the consistency of a decision alternative with a system of platform principles and a body of data is a complicated affair. Any decision point is likely to fall under the purview of several platform principles and be judged more or less desirable in their separate lights. Also, the platform itself is likely to contain conflicting tendencies, if not outright contradictions, which only appear when the consequences of various principles are thoroughly worked out. For both these reasons and more a curriculum designer may change his platform as his work progresses.

In current practice, however, such changes seem to be relatively minor. For the most part they consist of elaborations of existing principles and adjudications of unanticipated conflicts. There minor alterations are preserved and kept consistent through the action of precedent. When a situation arises that is substantially the same as one already encountered,

the curriculum designer need not laboriously justify the new situation in terms of platform principles; he can simply cite precedent. The application of precedent is such an important component of curriculum planning that I find it convenient to speak of the body of precedents evolved from the platform as policy, and reserve the word platform for principles accepted from the start.

This completes the empirical model. The diagram in Figure 1 shows the major components of the model and their relationships. The empirical model is primarily descriptive whereas the classical model is prescriptive. The empirical model is basically a temporal one: it postulates a beginning (the platform), an end (the design), and a process (deliberation) by means of which the beginning progresses to the end. In contrast, the classical model is a means-ends model. It postulates a desired end (the objective), a means for attaining this end (the learning experience), and a process (evaluation) for determining whether the means does indeed bring about the end.

The two models differ radically in the rules they assign to objectives and to evaluation in the process of curriculum development. In the classical model objectives are essential, since without an objective learning experiences cannot be rationally selected and assessed. In the empirical model, on the other hand, objectives are only one means among others for guiding our search for better educational programs. Objectives are not a starting point in the empirical model, but a late development of the curriculum maker's platform.

Evaluation in the classical model is a self-corrective process for determining whether learning experiences lead to the attainment of given objectives.<sup>11</sup> Without it all is speculation. In the empirical model this

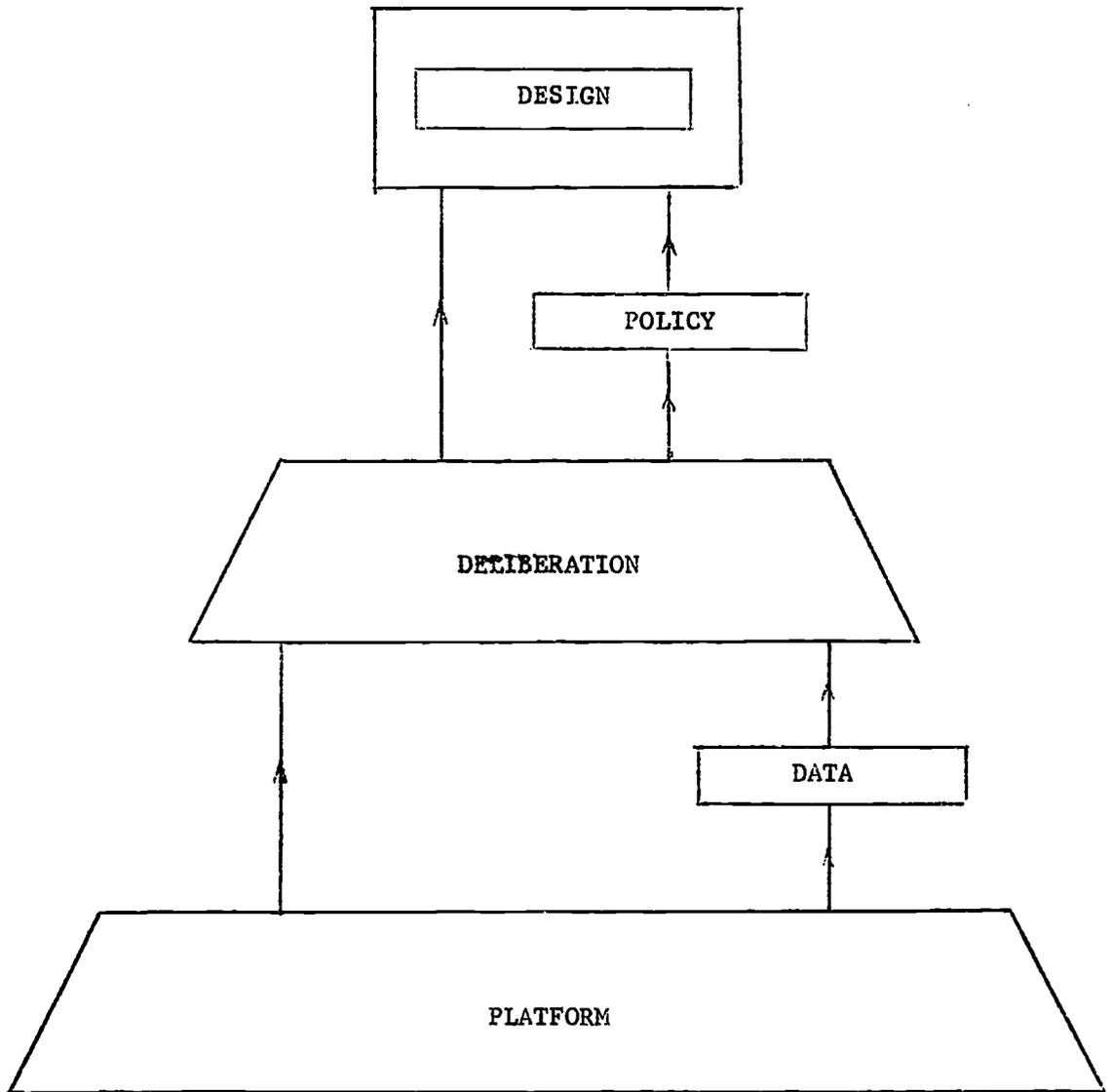


Figure 1: A Schematic Diagram of the Main Components of the Empirical Model.

kind of evaluation is not logically necessary. Design decisions can be justified by reference to the platform only. However, the empirical data that evaluation can provide on the effects of design decisions can be compelling evidence in a justificatory argument. In other words, in the empirical model evaluation is a useful tool for justifying design decisions, even though it is quite possible and, although probably unwise, not nonsensical for a curriculum developer to neglect systematic evaluation. (He cannot avoid evaluating his work informally.)

#### The Empirical Model and Curriculum Research

Before this model can be of value in guiding research it must be more fully elaborated and developed. But this elaboration and development itself requires research. In particular a large investment of intellectual labor is necessary to create research techniques that will permit the study of curriculum designs and their platforms and deliberations. Assuming that such techniques can be developed, the empirical model could contribute to curriculum research in several distinct ways.

First, the model itself contains propositions that need to be tested. According to the model curriculum designers have platforms which strongly influence their deliberation and their final design. Do curriculum development groups in fact share a greater body of common beliefs than one would expect of groups of similar composition? Do the curriculum developer's justifications appeal to this body of shared beliefs? Do curriculum making groups with similar platforms conduct similar deliberations and produce similar curriculum designs?

Second, the model provides a conceptual basis for descriptive studies of curriculum development. Despite a decade and a half of unprecedented

activity in curriculum development we know very little about the methods of operation of curriculum development groups. In what ways have the platforms of the different groups operating within a subject matter area differed? How have the platforms of groups in one subject field differed from those in the other fields? What platform elements are common to most contemporary curriculum projects? What kinds of issues arise in curriculum deliberations? How many alternatives does a curriculum development group typically examine in deciding a question? On what data sources do they draw in formulating and justifying decision points and decision alternatives? It is too late for us to ask these questions of the projects which are now having such a great influence over what children learn, but we can resolve to do better. Until we can answer such basic descriptive questions we cannot hope to make much headway on deeper questions in curriculum theory.

Third, the model provides a conceptual basis for studies of the effectiveness of various design elements. Studies of the effectiveness of contrasting educational "treatments" have been notoriously sterile. Yet if different curriculum designs do not produce different results, curriculum development is a futile enterprise. One of the most pressing empirical tasks in the field of curriculum is the rigorous establishment of connections between curricular variables (i.e. design elements) and learning outcomes. At present we are in a position to say with some confidence that an algebra course produces learning that would not have occurred had the student not taken a course in algebra. Evaluation studies of the new curricula have given us evidence which shows that students who take algebra courses with somewhat different aims will do better on those aims emphasized more in their course and worse on the aims given more attention in the other course. But we need

evidence that some of the subtler design features to which curriculum makers give so much thought have observable effects on students' achievement.

For example, many of the new courses in mathematics and science have students manipulate physical materials as a means of teaching abstract concepts and relations. Since these materials are relatively expensive a systematic determination of the additional learning ascribable to this design feature would help justify the costs of the materials. Furthermore, an understanding of the role of manipulation in facilitating learning would be of great scientific importance. An evaluation study would normally consider the curriculum as an undifferentiated "treatment." What is needed, however, is a determination of the effects of a single design element. One possible approach to the difficult research problem of isolating the effect of a single design element might be to excise the element (in this case manipulation) from the curriculum's platform and deliberation in all cases where it can possibly be removed. When necessary the omitted design element could be replaced by a reasonable but much less costly alternative.<sup>12</sup> (Thought experiments or imaginative visualization might serve as alternatives to manipulation of materials.) If small scale intensive studies show no important differences in the learning of groups exposed to the design element and groups given a comparable curriculum without the design element then the value of this element is called into question. If differences are found, the nature and extent of these differences should be valuable clues to the learning process by means of which the design element produces its effects.

The empirical model could facilitate curriculum research in a fourth way by making it possible to formulate succinctly certain questions that have not received enough attention from curriculum specialists. A model

suggests certain kinds of questions for research simply because they are so easily framed in the model's terms. The classical model, for example, has encouraged studies of the best form for objectives, and of the results of various ways of formulating objectives. The empirical model, because it employs different terms, suggests other questions. Consider two examples. Justification is an important component of the empirical model. But the same choice can be attacked and defended on many different grounds. Which grounds are appropriate? Which kinds of grounds should be accorded greater weight? Which in fact receive greater weight in curriculum developers' deliberations? Suppose trial lessons indicate that one of two alternatives is preferred by teachers and students and that the short term effects of the two are essentially the same, but that arguments based on research findings indicate that the other alternative helps children learn other related information more readily. Which alternative would and should be preferred? Or are generalizations impossible in these matters? The study of the logical and empirical foundations of the process of justifying curriculum decisions is an important and neglected problem in the field.

Another neglected problem in curriculum concerns the ordering of decision points. Considering some questions before others can make a tremendous difference in the final design. A curriculum developer in his early work can so restrict the scope of his remaining decisions that whole fields of options are unnecessarily closed off. Should the curriculum developer make the choices he regards as crucial at an early stage in his work? What are the consequences of bringing different kinds of questions into the deliberations at different points? What areas of decision are interrelated in such a manner that making decisions of one kind reduces options in related areas in ways other than through reduction of resources?

Finally, the model should help to identify problems from other fields whose solution would facilitate curriculum development. Curriculum designers rely explicitly and implicitly on natural and conventional principles in their platforms and their deliberations. Frequently these principles are not tested propositions. They are condensations of practical experience, conventional wisdom, speculative hypotheses, or simply hunches. Perhaps curriculum developers should avoid such "principles," but they do not. We have insufficient experience with curriculum development to assess the extent to which these unverified principles prove to be true, so we cannot say whether curriculum makers are wise to rely on such principles. But it seems that the recent wave of curriculum projects, by operating on hypothetical psychological principles about such phenomena as discovery learning has stimulated psychologists to investigate some questions they had not raised before. A more systematic study of the platforms and deliberations of curriculum development groups should uncover more such principles in need of investigation by our colleagues in other fields.

An example of a principle that curriculum projects seem to employ implicitly, but which has received little disciplined attention, is the role of consistency of experience in attaining certain kinds of long term learning. A curriculum developer interested in fostering inquiry will avoid any suggestion of dogmatism or arbitrary closure in his curriculum plans and materials because he believes it will detract from the course's effectiveness in developing an inquiring approach to learning. He fears that one or two experiences inconsistent with this attitude would destroy weeks of effort spent demonstrating the value and usefulness of the inquiring mode. To my knowledge this problem has been neither formulated nor investigated by educational psychologists.

### Summary

What is curriculum planning? It is the process of designing educational programs. But what is the nature of this process? Is it science or art or politics? Or is it something altogether new and unique?

The creation of concrete teaching materials is certainly an art of sorts. But I have argued that the part of the curriculum development process that is of theoretical interest is not the objects created but the choices which lead to those objects. It is reasonable to expect a curriculum planner's work to be consistent with established scientific laws, but the planner uses those laws to guide his work. He does not, except by chance, discover new laws or verify doubtful ones. And in the present state of social science he is unlikely to find a generally accepted theory that would help him in the way that physics or chemistry helps the engineer. Since he does not find, and, I would argue, can never find, a system of natural laws from which to deduce the appropriate form for his product, the curriculum planner necessarily makes decisions that other reasonable men could dissent from. Therefore his task is political as well.

A curriculum's platform normally contains artistic, scientific, ethical and political elements but once the platform is established the development of a design and a set of materials based on that platform is not in any sense a scientific or ethical or political endeavor. It is, as Schwab realized, a practical endeavor. The standards appropriate to this practical task are not those appropriate to a theoretical one. Justification plays the role in practical affairs that verification plays in the theoretical. In the practical matter of curriculum planning a question is resolved by deliberation based on a platform whereas in theoretical matters questions are resolved by deduction from a set of axioms.

The outcome of curriculum deliberation is a set of choices of courses of action. These choices determine the form the concrete curriculum product will take. The chief intellectual problem in the field of curriculum is how these choices should be made, i.e., how are we to determine the justifiability of curricular choices?

February 17, 1970

REFERENCES

1. The model is based on reports of projects such as William Wooton's SMSG: The Making of a Curriculum (New Haven: Yale University Press, 1965), Merrill and Ridgway's CHEM Study: The Story of a Successful Curriculum Project (San Francisco: W. H. Freeman and Sons, 1969), and Arnold Grobman's The Changing Classroom (BSCS, Bulletin No. 4, Garden City: Doubleday and Company, Inc., 1969) and on the author's first-hand observation and study of one project as reported in "Toward Improved Curriculum Development Projects in Art" (Studies in Art Education, Winter 1970, in press) and in "A Case Study of the Process of Curriculum Development" (mimeograph, Stanford University, July 1969).
2. The classical model is, of course, intended to be prescriptive rather than descriptive, but those who recommend it as a norm imply thereby that practice guided by the model does what ordinary practice does, only better. The following articles are only a small sample of the rather sizeable literature on the shortcomings of the classical model when it is applied to the classroom teaching or traditional curriculum development efforts.

Atkin, J. Myron, "Some Evaluation Problems in a Course Content Improvement Project", Journal of Research in Science Teaching, Vol. 1, No. 1, 1963.

Eisner, Elliot, "Educational Objectives: Help or Hindrance?" School Review, Vol. 75, No. 3, Winter 1967.

Jackson, Phillip and Belford, Elizabeth, "Educational Objectives and the Joys of Teaching", School Review, Vol. 73, No. 3, 1965.

Macdonald, James B., "The Person in the Curriculum", in Robison, Precedents and Promise in the Curriculum Field. New York: Teachers College Press, 1966.

3. This view is expressed most explicitly in Mager, Preparing Instructional Objectives (Palo Alto: Fearon Publishers, 1962).
4. Schwab, Joseph, "The Practical: A Language for Curriculum", School Review, November 1969, pp. 1-23. Also see Gauthier, Practical Reasoning, Oxford University Press, 1963 for an excellent philosophical treatment of deliberation.
5. The term 'curriculum design' first explicated by Virgil Herrick (see Herrick, "The Concept of Curriculum Design", in Herrick and Tyler (eds.) Toward Improved Curriculum Theory. Chicago: The University of Chicago Press, 1950.) and used to mean the major distinctive features of a curriculum is closely related to, but distinct from, the phrase 'a curriculum's design' used here. My usage applies the latter term to the complete set of abstract relationships embodied in the curriculum materials whereas Herrick's usage confines the former term to the prominent and distinctive features of what I have called the curriculum's design.
6. Scheffler, Israel, "Justifying Curriculum Decisions" The School Review, Winter 1958, pp. 461-472.
7. Bruner, Jerome. Toward a Theory of Instruction. Cambridge: The Belknap Press, 1966, p. 93.
8. Ibid, p. 123.
9. Ibid, p. 72.
10. The idea that vague notions can nevertheless be effective by virtue of being represented in a concrete model I got from Thomas Kuhn's notion of paradigm (The Structure of Scientific Revolutions, Chicago: The University of Chicago Press, 1962). The idea that the force of such vague ideas arises from our admiring them, but not knowing why comes from

Morris Weitz's essay "The Nature of Art" (in Eisner and Ecker, Readings in Art Education, Waltham, Massachusetts: Blaisdell Publishing Company, 1966).

11. The concept of evaluation involved in the classical model and the only type of evaluation directly relevant to the process of curriculum development is what Scriven has called formative evaluation ("The Methodology of Evaluation" in Perspectives of Curriculum Evaluation, Chicago: Rand McNally and Company, 1967).
12. Michael Scriven (op cit, pp. 68-69) has suggested a similar procedure for obtaining a valid control "treatment" for comparison with exposure to a curriculum produced by a project. Scriven suggests that cut-rate "new curricula" be created, whereas I suggest here that one design element be improvised in this way.