Association for Educational Communications and Technology

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About this issue...

A special section of formative evaluation, the conclusion of the series on cost-effectiveness analysis, and a look at ID in industry highlight this issue of JID.

Kaufman takes a broad look at the applicability of formative evaluation.

Dick points out problems in doing formative evaluation research and suggests areas in which research is still needed.

Gooler argues for the importance of formative evaluation in large-scale development projects and suggests strategies for enhancing its inclusion.

Carey and Carey explain how formative evaluation data can be used initially to select, and then to verify the selection of, instructional materials that have the best potential for affecting learning outcomes desired by a local or state education agency.

A case study by Klein and Doughty of the application of cost-effectiveness analysis ties together the models and pitfalls of this analysis procedure presented in the three previous issues of JID.

The impact of instructional development on training in business and industry—and five areas that must be attacked if that impact is to be increased—are described by Patton.

Wallington reacts to Patton's article, suggesting differences between business and education that instructional developers must be aware of in trying to increase their impact on the business sector.

The Book Review Department contains a review of the AECT award-winning Instructional Message Design and reviews from two different perspectives of Planning, Conducting, and Evaluating Workshops.

ERIC Reports, and another Instructional System Review round out this issue—the first which you are receiving at the beginning of its indicated season (e.g., spring) instead of at the end, a trend we hope to continue.—Kenneth H. Silber, JID Editor.
A Formative Evaluation of Formative Evaluation: The State-of-the-Art Concept

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Although Scriven and Markle got us thinking purposively about a type of evaluation that would help us know what was going right and what was going wrong as we moved toward desired educational results, the concept of formative evaluation has become more respected than used.

This section of the Journal of Instructional Development deals with the topic of formative evaluation and presents several views on the issues of what formative evaluation is, how formative evaluation might become a more useful tool of our trade, and where we might want to turn our future attentions.

Most authors (cf. this issue) define formative evaluation in terms of determining “en route” performance and making required changes in instructional materials. The emphasis has been on instructional design and development. However, it seems to me that the concept is far too useful, and far too important, to limit it to instructional materials or even instructional matters alone.

It is true that the formative evaluation of instructional materials increases the probability that materials will work, but it is also true that the concepts and tools make general sense. There is logic as well as rationality to the concept that if you want to achieve a given result, you should determine along the way whether or not you are in fact moving toward the target, and if you are not, that mid-course corrections should be made to assure the required results. This idea is sound for instructional development, and it is also important for higher-order interventions, such as school systems, corporations, and governments. Any time we want to make a change (tinker with the “natural order”) we are intervening. Schools are socially defined interventions; so are courses and training programs—they are intended to change behavior which otherwise would remain as it was before intervening. When we intervene on purpose it is helpful to: (1) know where we are going and why; (2) know how to get there; and (3) make sure that we are moving effectively and efficiently toward valid and useful objectives. What we do (or should do) for instructional design and development is also what we should do for organizations—whole organizations as well as parts of organizations.

We use formative evaluation every...
Formative Evaluation in Instructional Development

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ABSTRACT: A review of current literature indicates that very little research is being published in the area of formative evaluation. The difficulties of conducting meaningful research in this area are noted. Issues in the following areas are reviewed: administration of formative evaluation, breadth of applicability of formative evaluation, and theoretical bases of formative evaluation. The role of formative evaluation in the conduct of learning research is also considered. It is concluded that research is still required on the following topics: characteristics and profiles of students participating in early stages of formative evaluation, use of theory-based approaches to formative evaluation, and use of formative evaluation in instructional research.

While most instructional design writers credit Scriven (1967) with first defining formative evaluation and indicating its importance in the development of instruction, Markle (1967) described the procedures for developmental testing of instruction which were used by programmed instruction writers in the early 1960’s. These developmental testing procedures now tend to be considered as the operational definition of formative evaluation and are incorporated in nearly every current model for the design of instructional materials.

Andrews and Goodson (Note 1) have analyzed the components of 40 documented instructional design models. They found that all the models require the identification of desired outcomes. The second most common component, found in 38 of the 40 models, is the requirement for the tryout and revision of the instruction. Therefore, it is important to examine the constraints on the research base for formative evaluation and to describe the researchable problems often faced by developers.

Before examining research constraints and researchable problems, it may be beneficial to define and describe what is meant by formative evaluation. In general, formative evaluation is the process of collecting data about a product during its development. Its purpose is to improve the product prior to its final production. This concept can be applied to the development of a small unit of instruction or an entire multimedia training system. (The original context to which formative evaluation was applied was that of a course in an academic curriculum.)

Most writers refer to either two or three stages of formative evaluation (Dick, 1977; Markle, 1967; Baker, 1974). Some refer to an early, prototype stage and a later operational development stage; some, to one-to-one, small-group, and field-testing stages. In either case, the procedures and techniques are basically the same. An early version of a product is tried out with a few learners in an almost clinical setting. Obvious problems are detected, changes made, and further try-outs conducted. As the development progresses, large groups of learners and more realistic learning situations are employed. The final stage of testing in the field involves the next-to-final version of the product, and administrative feasibility of its use is determined. Final changes are made, and the product is released for use in the field.

Many questions arise as the developer undertakes the various stages of formative evaluation. In order to examine some of these issues, Baker and Alkin (1973) were commissioned by AECT and ERIC to prepare a comprehensive paper on formative evaluation. Their
report remains the most definitive description of the history and development of formative evaluation, as well as perhaps the most thorough review of the research dealing with this topic. Of the research results presented by Baker and Alkin, the ones which are most widely accepted are those which suggest that at least one revision of instructional materials results in significantly improved learning over no revision at all. Secondly, revisions based on knowledge of student data are better than revisions based on the subject matter expertise of the content writers. However, these generalizations are based on an extremely small number of studies.

Since the Baker and Alkin paper was published in 1973, there have been a number of examples of the application of formative evaluation in various instructional design contexts, but there have been very few empirical research papers published. Research journals published by AECT, AERA, and NSPI have included only a small number of articles on formative evaluation in the last few years. If formative evaluation procedures and techniques have been in use for almost 20 years and are included in almost every model for the design of instruction, why is there a lack of research on the effectiveness of these techniques? There are, unfortunately, some formidable barriers to that research.

Constraints on Research of Formative Evaluation

Described below are some of the factors which are limiting the amount of research which is being conducted on formative evaluation:

1. There are almost no funds available for research in the area of formative evaluation. This situation is true for almost all areas in education and deserves no further comment.

2. While formative evaluation is considered by most to be an integral component of a systems approach to instructional design, there are generic problems associated with attempts at conducting experimental research on the components of a system. When a component is removed from the overall system in order to conduct research to determine its affect, it is very difficult to have great confidence in the results that are obtained simply because it is no longer in context. A more reasonable approach is to do research on a particular component within the context of the operation of the total system. This is a preferable mode of research, but it greatly enlarges and complicates the research process and thus reduces the likelihood of such research being carried out.

3. At a more pragmatic level, it is apparent that, in order to do the large-scale research that might be desirable, it is necessary to have a relatively large pool of designers, all of whom, it is hoped, have similar skills and all of whom are designing the same instruction. If such designers were available, then various approaches to formative evaluation could be employed by different groups of designers and the effects could be assessed. However, in reality, pools of designers rarely exist, and when and where they do, they are employed on practical, ongoing, jobs. It is difficult to interfere with these ongoing responsibilities to conduct research.

4. In a number of organizations in which systematic design is taking place, and where there are pools of instructional designers, formative evaluation is either not being employed at all, or if it is, it is believed that there is no time to engage in research. (The author, for obvious reasons, prefers not to document this point by listing the organizations to which he is referring.)

5. It may be speculated that personal factors underlie the two preceding reasons for lack of research on formative evaluation, and that is the straightforward negative feedback which, if successful, is forthcoming from formative evaluation. Based upon the author's own experience and the experience of training instructional designers, it is often damaging to the ego to collect evidence that learners have not succeeded when we have given it our best effort. If reasons can be found for not conducting formative evaluations, then developers can be spared this negative professional experience.

In summary, there is very little research money for conducting research on formative evaluation. In addition, there are problems with the availability of participants (designers), problems in the actual design of the research, and problems in the application of the formative evaluation process in developmental settings.

It might be noted that Baker and Alkin concluded their 1973 summary of research on formative evaluation with this statement:

While the number of good examples of formative evaluation is expanding, the level of research into the process is relatively limited. Perhaps a compromise to the difficult task of accumulating research data on formative evaluation might be suggested. When formative evaluation activities have been successful in terms of program effects and staff satisfaction, then detailed technical work reports might be made available to the evaluation public. Formative evaluation might improve as a consequence of the technology developed in the course of finding solutions to development data problems. (1973, p. 413)

Current Issues in Formative Evaluation and Implications for Research

As suggested by Baker and Alkin (1973), it is worthwhile to examine the issues that practitioners are faced with as they conduct formative evaluation activities. These issues appear to fall into three areas. One area deals with the organization and administration of the formative evaluation process; the second area deals with the question of the breadth of applicability of formative evaluation to the instructional design process; and the third is related to the examination of the theoretical bases of formative evaluation. Each of these issues will be addressed in turn.

The first issue deals primarily with the question, "Who does what to whom in the formative evaluation process?" Who, in fact, should conduct the formative evaluation? In a number of organizations there is a difference of opinion as to whether designers or evaluators should carry out these activities. These are organizational questions and it is not who, but rather what is done, i.e., what functions are carried out that are of importance here. Therefore, the who would not appear to be a critical area for research.

The question of with whom formative evaluations should be conducted does seem to be worthy of some research consideration. Most strategies for conducting formative evaluation suggest that at least three learners from the target population should be engaged in the first stages of formative evaluation and that representative groups be used in succeeding stages. Because the first phase, usually referred to as the one-to-one stage, is often the most critical in terms of modifying the instructional ap-
approach, it is important to know how the participants in the one-to-one are selected. A common technique has been to select above average, average, and below average students to go through the instruction on an individual basis with the formative evaluator. It would appear that identifying these learners on the basis of specific entry skills and knowledge would provide a sounder basis for comparisons of the error profiles and attitudes that they generate.

"... at least one revision of instructional materials results in significantly improved learning over no revision at all... revisions based on knowledge of student data are better than revisions based on the subject matter expertise of the content writers."

Such comparisons could be made to determine the usefulness of that data in the revision of the instruction. For example, comparing the effectiveness of instruction revised on the basis of the data from these three different types of "operationally defined" students could indicate which, if any, of the types provides consistently better data for instructional revision purposes.

A closely related concern deals with the usefulness, that is, the validity of doing revisions based upon the data from just one student. This position has been defended, if not espoused, by Komoski (1974) and challenged by others, including Engler (1976). This issue might be addressed on a large scale in combination with the issue of student profiles to provide more data and a better understanding of the usefulness of individual learner data. Komoski has already suggested that this type of research be supported (1974, p. 381).

The second set of formative evaluation issues are those dealing with the general applicability of the formative evaluation process to a wide range of instructional design settings. For example, the question has been raised as to how formative evaluation can be applied to a total curriculum, as opposed to a relatively small unit of instruction. There are a number of examples of this type of application currently available and it is, in fact, this context in which Cronbach (1963) identified the initial requirement systems, as opposed to paper and pencil instruction? It is true that much of the formative evaluation research has been conducted with paper and pencil instruction and is an outgrowth of the early research on programmed instruction. Several writers, including Thiagarajan (1978), have suggested that formative evaluation should be applied to complex multimedia instruction through the use of successively more complex media as the instruction is refined. For example, if the ultimate product were to be 16mm films, the designer might begin by doing formative evaluation with a storyboard and then use videotapes prior to actually developing the films. Projects employing these techniques should be encouraged to report their procedures and the data-based outcomes that are achieved.

The third area of interest is perhaps the one in which there is the greatest need for research. It is the area of a theory-based approach of formative evaluation. The idea to theory-based evaluation has been described well by Fitz-Gibbon and Morris (1975). They indicate the value of employing theory in the design and implementation of evaluation activities. Their basic thesis is that theory should be employed in the design of instructional interventions. Then, in the evaluation of the intervention, it should be determined whether or not the theory has, in fact, been implemented in the intervention process or product. In addition, the results of the intervention should be examined from the point-of-view of what would be predicted from the theory.

This approach, if applied to formative evaluation, would seem to begin to address the greatest limitation in formative evaluation today, namely the dilemma of what to do after a problem has been detected in instruction. Nearly all instructional design writers have indicated that after the data have been collected and summarized in a formative evaluation, the designer should "revise appropriately." However, in most instances, designers have already used their best knowledge of how to design the instruction, and therefore it is not always apparent what "revising appropriately" would be. However, if the theory was available to direct the data collection and interpretation efforts, it would be much more feasible to determine where either the instructional product or the theory has failed in terms of the lack of effectiveness of the instruction.

The State-of-the-Art

These are always the questions of what theories are available for consideration and if they are of sufficient quality to be called "theories." Snow (1977) has written about instructional theory and of the need to develop at least local theories that work for the designer in a particular situation. Snow refers to information processing as a theory that may have great significance for instructional designers. While this may be the case, others may prefer the older Skinnerian or Piagetian approaches or some other theory that has evolved on a local basis over the years.

Stated in another way, the state-of-the-art in formative evaluation at the present reflects a relatively mechanistic approach to the process. A set of prescribed data are collected from learners and instructors and are analyzed to identify problems. Problem areas are reviewed and changes are made which, it is hoped, will improve the instruction. What is needed is a more theoretical approach which would (a) suggest the kinds of data which should be collected and (b) suggest how the data should be interpreted by the designer and used to revise the instruction. Such an approach would indicate the extent to which the instruction reflects the theory and is instructionally effective and the ways in
which the instruction should be improved to better reflect the theory.

A final concern, which may be of greater significance than any of the preceding issues, is related not to the research on formative evaluation but rather to the effect of formative evaluation on research. Consider a typical "applied learning" study. Time and effort are often spent identifying the phenomena to be investigated, designing the

Summary

Instructional designers have been involved in formative evaluation since the early days of programmed instruction. It was officially labelled formative evaluation in 1967 and it has grown in its application since that time. While nearly all designers view formative evaluation as an integral component of the instructional design process, there has been relatively little research conducted to establish the extent to which formative evaluation reduces costs or increases the effectiveness of the instruction that is produced. A number of factors have been identified that reduce the likelihood that research will be conducted on formative evaluation. However, several areas were identified in which research would be worthwhile. These areas included an examination of the characteristics and profiles of the students participating in formative evaluations, the breadth of applicability of formative evaluation, the utilization of theory-based approaches to formative evaluation, and the use of formative evaluation in instructional research.

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"... it is often damaging to the ego to collect evidence that learners have not succeeded when we have given it our best effort."

... the state-of-the-art in formative evaluation at the present reflects a relatively mechanistic approach to the process."

Reference Notes


Formative Evaluation Strategies for Major Instructional Development Projects

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ABSTRACT: The paper contains three major sections. First, an attempt will be made to identify some general maxims that seem to shape major instructional development efforts and thus affect efforts to do formative evaluation within those projects. In the second section, I will seek to describe four major issues that must be addressed in any attempt to plan for and implement formative evaluation as part of a large development effort. The third section focuses on some simple but practical procedures that might enhance the probability of formative evaluation being effectively used as a part of a major instructional development effort. These procedures, taken together, constitute a strategy.

Introduction

The assimilation of new words into the vocabulary of a professional society makes for fascinating study. Take, for example, the term formative evaluation. One wonders if Michael Scriven had any idea that the term he described in his paper The Methodology of Evaluation would come to be a common word in the households of evaluators, developers, and technologists. Perhaps that’s just what he had in mind, but regardless of his intentions, formative evaluation is now a popular concept, providing the stimulus for a host of activities.

There are no prescriptions nor magic ways for doing good formative evaluation. Indeed, there will be a continuing debate about the value of formative evaluation in any setting. The debate is in some respects curious: evaluation, the theory at least, makes sense. We want to gather information that will help us do the best development job we can. Formative evaluation is not meant to be generalizable in nature but rather to be of direct and immediate assistance to those who have to make crucial decisions in a given situation. Formative evaluation is not evaluation intended to determine for all time the worth or value of the project being developed. Nor is it meant to make a major instructional development effort even more complex than it already is.

The working meaning of the term formative evaluation, however, may differ from setting to setting, from user to user. Similarly, the strategies and techniques used under the rubric formative evaluation may vary widely, due in some measure to differences among settings and to differences in the development process being used. The intent of this paper is to examine issues related to formative evaluation strategies as they occur in large instructional development projects, projects characterized by considerable complexity in purpose, participants, and possible impact.

There are two assumptions explicit in the title of this paper. The first assumption holds that formative evaluation is a part of a major instructional development effort, that it is normative and should be part of “competent” ID. While it is difficult to verify the assumption with any precision, there is at least a great deal of credence to it if one judge by the amount of attention given to formative evaluation in the theoretical literature on development. The results of formative efforts are seldom recorded for use beyond the project being evaluated, however. In a classification study recently completed by the author, only 21 of 225 evaluation studies of instructional technology, included in the ERIC system from 1970 to 1978, specifically cited (as the primary purpose of the evaluation) collecting data for the purpose of making revisions in courses or materials.

The second assumption, somewhat more implicit, is that major instructional development efforts may uniquely influence and be influenced by formative evaluation efforts, and because of this reciprocal influence, the strategies employed in these development efforts need to be examined carefully. In some respects, this paper represents an effort to verify this assumption. It is the contention of the author that major development efforts do in fact demand formative strategies that are different in some important ways from formative evaluation strategies used in smaller development efforts.

It is important for purposes of this paper to distinguish between formative evaluation strategies and techniques. By techniques, I refer to those methods or procedures used to gather, analyze, and report evaluation data to whomever needs or wishes those data. To talk about formative evaluation techniques is to discuss the use of rating scales, script review procedures, interview protocols, regression models, or a host of other data-gathering and analysis techniques. By strategies, I refer to more generic notions of how to conceptualize the evaluation issues at hand to establish the policies according to which the formative evaluation efforts will be planned, implemented, and assessed. To talk about strategies is to discuss the general milieu in which the program being evaluated operates, the broad purposes and desired impacts of the evaluation, and the general principles that will

Author’s note: This article was initially delivered as part of a symposium entitled “Formative Evaluation Issues and Applications” at the annual meeting of the Association for Educational Communications and Technology, New Orleans, March 1979.
govern the conduct and use of the evaluation. This paper is directed at strategy issues related to the use of formative evaluation in major instructional development projects.

The term major development projects also requires some definition. A major development effort is one which generally involves numerous participants in the development process. It involves programs that impact on a large number of people and that may encompass a range of goals. As the term major is used in this paper, for example, the development of a single course would not be considered a major development project, but the design of a new undergraduate curriculum, together with the development of a number of new courses as part of that curriculum, would be considered a major instructional development project. Planning for and implementing an educational radio and television system in a developing nation is a major instructional development effort by my definition; a single programmed instruction book is not. The familiar adage may apply here: It is tough to define, but you'll know a major development effort when you see it.

Maxims

The maxims described below comprise some general considerations that must be taken into account when contemplating the use of formative evaluation as part of large-scale development projects. These maxims are admittedly very global observations that probably do not apply in every case. Nonetheless, it seems useful to keep them central as one tries to formulate a plan for formative evaluation, for if they are even partially correct, these observations may heavily influence the appropriateness of various formative evaluation strategies.

Maxim 1: The bigger the instructional development project, the less agreement there will be on what the project actually is.

Maxim 2: The more people involved in some way in the instructional development project, the greater will be the pressure for things to remain as they are.

Maxim 3: The bigger the instructional development project, the more diffuse or unpredictable may be the impact of formative evaluation data.

Because of the complexity of large instructional development projects, it is difficult to obtain a critical mass of formative evaluation data that will impact in any controlled sense on the project. So many people want so many different kinds of data that the formative evaluation effort has a tendency to become fragmented. What makes the impact of such data unpredictable is that someone involved in the project may respond to a particular bit of formative data and use that data to champion a certain cause or position. If the person is in a key role in the project, that kind of impact could be great. Just as easily, however, it is possible that no one will use the data, thus rendering much of the evaluation effort futile. In smaller development projects, the evaluation effort is usually more clearly defined, with the impacts of formative data more predictable.

Maxim 4: Timing is just about everything.

As with most situations where decisions are being made, timing in an instructional development project is critical. Unless formative evaluation data are collected and reported when they are needed, the evaluation effort is for naught. Evaluation has a reputation in some circles for delivering too little too late. The problem for formative evaluators in large development projects is that it is extremely difficult to ascertain who will need what data when, and thus the difficulty in getting the timing right.

Within the context suggested by these maxims, it is possible to identify more specific issues germane to establishing formative evaluation strategies for large-scale instructional development projects. These issues are identified, in the next section of this paper.

Issues in Formative Evaluation

What is a Development Project?
As suggested above, the larger the instructional development project, the less certain we can be of exactly what that development project comprises. It is essential to the effective use of formative
evaluation that some clarity about the nature of the project being evaluated be attained. While the initial description of the development project may be somewhat vague, and while the project may change form as it develops, it is incumbent upon the formative evaluation specialist to obtain some preliminary ideas about: the proposed end products of the development project; the timelines that have been tentatively set, particularly as they relate to needs for evaluation data; the participants who will be involved in the development project and their particular roles in the project; and the instructional development process that will be used in the project.

Some development projects proceed according to a specified instructional development model. When this is the case, the formative evaluator must determine the expectations held for formative evaluation as part of that process. Such expectations about the role of evaluation may not be entirely clear in the minds of the developers. Furthermore, the formative evaluator may play a significant role in helping the developers to conceptualize the nature of the development process itself by asking a series of key questions which are ostensibly asked for purposes of guiding the evaluation activity but which may also assist in conceptualizing the overall development process.

Evaluation needs to occur early in the development process. In many respects, this is one of the defining characteristics of formative evaluation. There is some evidence, however, that many major development projects regard evaluation as an activity that occurs late in the project, and is essentially done for external audiences. To the extent that evaluation can be viewed as one mechanism for helping shape the parameters of the development project, that evaluation activity may have served a very useful purpose.

Who is the Audience for Formative Evaluation Data?

A critical issue confronted by most formative evaluators working in large development projects is: For whom are formative evaluation data intended? The question appears to be a simple one, yet the answer is often complex. There are many people involved in these development efforts who want or feel they have a right to some kind of evaluation data. The reverse sometimes happens as well: Those who should be using evaluation data don't want to see any. In almost all cases, the evaluator's resources are limited. The same formative evaluation data are not likely to be germane or relevant to everyone who might want some kind of evaluation data. The evaluator is often in the position of having to choose a primary recipient for his or her efforts.

Consider, for example, the case of a major instructional development project to redesign the entire undergraduate curriculum in arts and sciences. Who is the appropriate audience for evaluation data in this case? Is it the individual professor working to design a course in English literature? Is it the Dean of the college? Is it the arts and sciences curriculum committee? What about students? In a development project as large as this, there are many people who play key roles in determining the overall success of the development effort. The evaluator must clarify as early as possible primary constituents for data, or it is likely that no one will feel a sense of ownership of the data collected.

Ownership of data can be thought of in another way. Some kinds of formative evaluation data might be suitable for use by some audiences but may be detrimental if acquired by other audiences. Suppose those other audiences demand to see and/or use certain evaluation data? What policies will govern the use of data?

Knowing the primary constituents for evaluation data also assists the formative evaluator in determining which questions he will seek to address. The information needs of primary audiences may well be the primary consideration for determining what issues will be addressed by the formative evaluation.

What Will Be Acceptable as Evidence?

Having made a determination of questions the formative evaluation should seek to address, the evaluator is next confronted with the issue of evidence. That is, what will people accept as information or evidence relevant to the question being addressed? Different people have different opinions about what constitutes acceptable evidence. To some audiences, the results of interviews conducted with students in a program are acceptable as evidence germane to a given question. To other audiences, student opinions are of little value, and would not be treated seriously as evidence. Still others regard as legitimate only those data derived from an experimental research design. Others regard qualitative data as highly acceptable, perhaps even most desirable.
The evaluator must seek both to determine the acceptability of certain kinds of evidence to his intended audiences and determine the extent to which this evidence will meet technical standards. Once again, the formative evaluator is not likely to attain complete clarity on this issue. Many audiences will be unable to make judgments about the acceptability of evidence prior to seeing it. It is almost certain that no single body of evidence will be credible in involving a variety of data-gathering activities. The activities outlined below, then, might be viewed as precursors to actual data-gathering efforts.

An Evaluation Plan

An essential aspect of a formative evaluation strategy is the design of an evaluation plan. Too often, a great deal of attention is given to planning the overall development process, without a corresponding level of attention given to designing a plan for formative evaluation activities. There are many ways in which such an evaluation plan could be devised. Perhaps one of the most simple yet helpful approaches is to think of the evaluation plan as consisting of eight elements, each of which should be attended to in some fashion in the design of an evaluation plan.

1. Purpose: For what purpose(s) is this evaluation being conducted? What ends does the evaluation serve?
2. Audience: For whom are the evaluation data intended? If there are multiple audiences, who is the primary audience for these data?
3. Issues: What are the major questions to be addressed by the formative evaluation effort?
4. Resources: What resources will be needed to undertake this formative evaluation effort? What resources are presently available?
5. Evidence: What evidence will be acceptable in addressing the issues proposed?
6. Data-gathering techniques: What methods can be used to gather the evidence required by the formative evaluation? What are the potentials and limitations of these methods? What resources will be needed to utilize these methods?
7. Analyses: How will the data collected be analyzed?
8. Reporting: How will the data be reported, to whom, when, and with what follow-up activities?

If the evaluator attends to these eight components, he or she will have created the general structure of an evaluation plan, which will be useful in guiding the overall formative evaluation efforts. The formative evaluation plan may take a considerable amount of time to construct. One must have a certain belief in the function of planning to accept this as an important part of a formative evaluation strategy. Without such a plan, however, particularly in a larger instructional development effort, formative evaluation efforts could be dissipated to the extent they would have no impact on the development process. Planning cannot guarantee either successful implementation or positive impacts of formative evaluation activities. Without a plan, however, formative evaluation in a major instructional development effort is not likely to be successful.

Reactions to the Plan

Once the evaluator, working with the various participants in the development effort, has formulated a plan, he or she will want to share for critique that plan with as many participants in the development effort as possible. It must be kept in mind at this point that the evaluator has been the clearinghouse for different people's perceptions of what would constitute acceptable evaluation efforts. Sharing the completed plan serves the purpose of asking each participant if the issues they feel are important are in fact going to be addressed by the evaluation, whether the proposed evidence will be acceptable and in general whether the plan as proposed is likely to yield usable and timely data.

By sharing the evaluation plan, the evaluator enhances the probability that each of the participants in the development effort will feel some ownership of that plan. The formative evaluation effort is thus likely to be viewed less as an extraneous activity, and more as a very central part of the development effort, because the people for whom the data are intended have had a part in shaping the nature of the evaluation effort.

Data Scenarios

Some of the people involved in a major instructional development effort will not have had experience using formative evaluation data. They may have difficulty envisioning what such
data might look like and will therefore have a difficult time specifying what kinds of data they might find useful. The formative evaluator may wish to develop some data samples, or scenarios, to be shared with those individuals who might eventually be asked to use formative evaluation data. That is, the evaluator can physically construct some alternative ways certain kinds of data might be presented, and attempt to demonstrate how those data might be related to typical decisions in a development project. In so doing, the evaluator tries to give participants a better idea of what they can expect from the evaluation effort.

This technique is not used very often, primarily because it takes some effort on the part of the evaluator to create data scenarios. As part of an overall strategy, however, scenario building and sharing may be extremely useful in facilitating the eventual use of formative evaluation data.

The formative evaluator may need to accept, among others, a teaching role, particularly in a major instructional development effort. He or she simply cannot assume that all those involved in the development effort will either know about or be supportive of the concept of formative evaluation. In some cases individuals will be antagonistic toward the whole concept. In other instances, however, participants in development may be ignorant of the procedures and purposes of formative evaluation. The act of sharing data scenarios is one way the formative evaluator can carry out this important teaching responsibility.

Mechanisms for Changing the Evaluation Plan

Formative evaluation must always be responsive to the information needs of developers and others involved in the development project. Because the information needs of participants in a large development effort will not always be known in advance, it must be expected that decisions or events will be made as development progresses that will alter the fundamental nature of the development project itself and thus the formative evaluation requirements. While developing a plan for evaluation is an important part of the formative evaluation strategy, that plan must be tempered with the realism of how development gets done.

Responsiveness is thus a critical characteristic of good formative evaluation. How is an evaluator to be responsive? The answer is not simple. A part of the overall strategy for formative evaluation must be to define a mechanism whereby changes in the purpose and procedures of formative evaluation can be initiated. The difficulty here is that the formative evaluator may find himself or herself serving many masters, each of whom may be making critical decisions, initiating changes, and insisting that the formative evaluation efforts also change.

It is recommended that the evaluator and the development team agree upon some procedures whereby alterations in initial evaluation plans can be made. Such procedures may be as simple as to agree that only the head of the development effort will make requests for changes in the evaluation plan. Without such agreements, the formative evaluator in a major development effort is in trouble right from the start. This issue, together with other issues (such as who will get what kind of data) should be settled before the formative evaluation gets started. It is easy to presume that the trust level among all those in the development project is high and therefore such agreements are not necessary in advance. More often than not, this assumption will turn out to be wrong. When people are backed into corners by timelines and other pressures, they will not always act sensitively or rationally. Early agreements can prevent later catastrophes.

Some Closing Thoughts

It might be argued that the formative evaluation strategy described above applies to small development efforts as well as to major instructional development projects. This may be the case, but such an argument does not lessen the need for such a strategy in a major development effort. The real differences between small and large projects lie in the complexity of the ends being sought, the number of people that have some role in the development effort, and thus in the scope or range of decisions that must be made. These important differences suggest that formative evaluation in a complex development situation may be a fundamentally different activity than occurs in a small development situation.

The strategy outlined above is a common sense one. To be effective, it is useful to try to plan what you are doing, to identify the needs of individuals within the project, to get some ownership in the plan, to be responsive, to help educate people about how to use data, and to be prepared through some predetermined mechanism to be responsive.

Although these things seem to be very simplistic, I have seen numerous instances in which the strategy outlined herein has not been applied in a major development effort. That bothers me. The results have not been good. The strategy may be worth trying.
Using Formative Evaluation for the Selection of Instructional Materials

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ABSTRACT: Instructional materials selection practices vary widely in the way they are administered and conducted. The criteria that are used, and the precision with which they are carried out, in this paper a two-phase instructional materials selection process is presented. The process is based on considerations from the design and formative evaluation of competency-based instruction. The purpose of the first phase is to select materials that have the best potential for affecting learning outcomes desired by a local or state educational agency. The purpose of the second phase is to verify decisions made in Phase 1, and make recommendations to teachers about how the materials can be used most effectively. The paper also includes a comparison between the guidelines for materials selection published by the State of Florida and the considerations recommended in this paper.

The production and sale of instructional materials and equipment for public schools has become a highly competitive, two-billion dollar industry. The decisions required of materials selection committees have been made more difficult than ever by curriculum diversification and proliferation of competing instructional products. Not only are there more products to look at, but the majority of the market is controlled by large, often diversified, corporations capable of developing broad curriculum programs and supporting sophisticated promotional campaigns for their products (Jacobs, Maynard, McMahon, Miller, Priest, Rico, & Snyder, 1975, pp. 511-526). Instead of reviewing several different third-grade readers, a selection committee may now find itself judging complete elementary school language development programs designed for use across several grade levels.

But how critical is instructional materials selection? Do instructional materials really have that much effect on what students learn? Jovanovich (1964, p. 65) contends that, "The book makes the course as often as the course makes the book." In a school district evaluation report, Banks (1973) concluded that adopted textbooks were the principal planning source for instruction in both elementary and secondary grade levels. This effect on curriculum is also long lasting, for once textual materials have been purchased they are normally used for 4 to 8 years. Additionally, Kirst and Walker (1971) estimate that up to 75 percent of a child's classroom time and as much as 90 percent of the homework time are spent using text materials. If instructional materials play this prominent a role in curriculum planning and implementation, then materials selection practices do contribute significantly to the educational process. In this paper, current selection practices will be summarized briefly, then suggestions will be made for using systematic, formative evaluation techniques for selecting instructional materials.

Current Practices in Materials Selection

One characteristic common throughout state and district selection practices is the lack of standardized, systematic procedures. Practices vary widely from state to state, from district to district, and from curriculum area to curriculum area within a given state or district.

Selection and Adoption Procedures

Adoption is a process through which a state or district board of education certifies that a given instructional material is appropriate for use in that state or district. Several materials will usually be adopted for each curriculum need so that schools have a choice. After adoption is complete, a school will select among the approved choices and make its purchase. In about 20 percent of the states, schools are legally required to use state-adopted texts and in another 20 percent, state adoption is conducted but purchase of approved materials is optional. Another 20 percent of the states have a mixture of state control and local autonomy that varies with grade level and size of district. Finally, 40 percent of the states have no adoption legislation, thereby leaving all decisions about instructional materials to the school districts or schools (Jacobs et al., 1975, pp. 513-16). The variety found in the way adoption and selection are administered is equally apparent in the way adoption and selection are conducted. (For simplicity, the term selection will be used in the rest of this paper to mean both adoption and selection, except at points where specificity is needed.)

That selection is done by committee is the factor most common among selection practices; however, the commonality goes little further. The process can be as informal as three high school teachers comparing notes after a publishers' "book fair," or as formal as a legally constituted state evaluation committee using input from a state-wide sample of all partners in public education. Committees are usually temporary rather than standing and may be convened as seldom as every 1 or 5 years. The potential is thus high for inconsist-
many in philosophy, procedure, competency, and perceived purpose. The criteria used for judging the quality of materials are also inconsistent.

**Selection Criteria**

Criteria for judging the quality of materials can be thought of in two categories: (a) those criteria that address the characteristics of the materials, such as size and shape, scope of content, use of objectives, and inclusion of tests, and (b) those criteria that address the effects of the materials, such as student achievement, teacher attitude, and implementation costs. Scriven (1973) refers to these two types of criteria as intrinsic and payoff, respectively.

Intrinsic criteria are used almost exclusively in materials selection. Application of intrinsic criteria, however, is quite uneven. Many selection committees use well conceived evaluation checklists and suggested instruments are common in the professional literature in most content areas (e.g., Breifert & Menna, 1974; Dykstra, 1969; N.E.A., 1973). Often, however, selection criteria are generated by the review committee and vary widely according to the committee members' backgrounds, skills, interests, and philosophical approach to the content area and the educational process. Even in evaluation checklists where intrinsic criteria have been systematically derived, the congruence among criteria is seldom questioned. For example, it is not enough to ask whether objectives, content, activities, and tests exist in an instructional material; one must also ask whether the content and activities match the objectives, and whether the tests measure the objectives. An evaluation checklist that includes this concern is provided in the SWRL Product Selection Kit (SWRL, 1975).

Payoff criteria are almost never used in materials selection. One reason is that data are not available. Komoski (1974) estimates that only 1 percent of all instructional materials have been verified by even a single learner. Komoski and Elliott (1973) recommend a learner verification and revision (LVR) procedure for collecting payoff data that could then be used for improving the materials and for selection decisions. LVR is perhaps better known to instructional developers and evaluators as formative evaluation. Proof of LVR and/or plans for future LVR are currently required in California and Florida before commercially published materials can be reviewed for state adoption. LVR legislation has been criticized as being vague, difficult to enforce, too costly, and a threat to creative teaching, teacher autonomy, student and teacher privacy, and the commercial viability of small publishers (Jacobs et al., 1975). Some publishers do use formative evaluation in developing instructional materials and there is research that indicates that formative evaluation is an effective way to detect and correct weaknesses in materials (Baker and Alkin, 1973). Economic and philosophical constraints, however, would seem to predict that in the near future formative evaluation will not be used widely in commercial publishing.

**Using Formative Evaluation for Selection**

The purpose of formative evaluation is to collect data about the effectiveness of instructional materials during development, and then to use the data to guide revisions that will improve the materials before they are released for general use. Both intrinsic and payoff data are collected and there is evidence to indicate that the process does work. If formative evaluation is effective in detecting weaknesses in materials under development, could the process be used for detecting weaknesses in commercially published materials submitted for selection? Could intrinsic and payoff data be collected by a state or district selection committee? If the answers are "Yes," then the use of a systematic formative evaluation model for materials review might be a positive step toward eliminating some of the inconsistency found in current materials selection practices.

**A Procedure for Selection and Verification of Instructional Materials**

This section of the paper will describe a two-phase selection and verification procedure that is based on contemporary practices in formative evaluation. The first phase of the procedure prescribes expert judgment of instructional materials (intrinsic data) and is recommended for the materials selection process. Data collected during the selection process would be used to judge the merits of all of the proposed materials, to rank the materials, and to choose the best materials for adoption. Learner trials of materials that have been selected (Payoff data) are suggested for the second phase, the verification process. During the verification process, data would be used to confirm the effectiveness of the materials, to detect weaknesses in the materials, and to develop recommendations for teachers about how the materials could be used most effectively. Table 1 contains a summary of the selection and verification phases.

This reality leads to the suggestion that full LVR procedures are too expensive, time consuming, and technically difficult for most materials selection committees. By eliminating the payoff data from those data normally collected during a formative evaluation, the process becomes feasible for use by a materials selection committee. It is thus assumed that Phase II (see Table 1) would seldom be undertaken by a selection committee. Omission of Phase II would obviously result in a loss of precision in decisions about the effectiveness of materials; however, there are two general benefits to using Phase I alone.

First, the intrinsic data that one would collect in a formative evaluation reflect the considerations and components that an instructional designer would build into competency-based materials. If one accepts the competency-based model, then it is logical to evaluate materials using criteria that reflect that model. In effect, one would be asking, "How closely do these materials conform to a competency-based ideal?" Thus one would be selecting materials according to a set of principles, and some theory, about what "good" instruction should be. Second, collecting a full range of intrinsic data could help ensure that an appropriate range of relevant questions and criteria are used to judge the merit of commercial materials. Effects of rater bias and lack of training in materials design or selection could be diminished.

**Phase I: Selection of Materials**

The intent of this paper is not to develop instruments for selection committees to use in materials selection. Rather, the intent is to suggest a manner in which formative evaluation criteria can be used to make systematic comparisons between educational agency expectations and materials submitted to that agency for adoption.
TABLE 1. A procedure for selection and verification of instructional materials

<table>
<thead>
<tr>
<th>Phase I: Selection</th>
<th>Purpose</th>
<th>Type of Data</th>
<th>Sources of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select materials that have the best potential for affecting learning outcomes desired by the educational agency.</td>
<td>Intrinsically</td>
<td>Considerations from formative evaluation, agency documentation, expert opinions, proposed materials, and publisher’s documentation.</td>
<td></td>
</tr>
</tbody>
</table>

Phase II: Verification
Verify decisions made in Phase I and make recommendations to teachers about how the materials can be used most effectively; i.e., as published, with additions, or with revisions.

The column on the left side of Table 2 is a list of intrinsic factors that one could consider in conducting a formative evaluation. The column on the right side of Table 2 lists general questions that are drawn from those intrinsic factors and could be used to guide a review of instructional materials.

**Philosophy**

The first consideration to be reviewed in developing selection criteria is the philosophy of the educational agency. The question of importance is whether the philosophy of the agency is reflected in the instructional materials. For example, if a state were to decide to increase individualization in instruction, then materials selected should enable the learner to work independently. If a district were developing a “back-to-basics” program, then materials would not be expected to include much enrichment instruction. The current trends in a state or district may be reflected in statements that describe the philosophy of the agency. These statements can often be used to generate guidelines that can be used as criteria to assess the compatibility of proposed materials with existing philosophies.

**Learner Characteristics**

The characteristics of the learner can be used to develop criteria for materials selection. The age, interests, ethnicity, achievement level, and other factors that describe target students should all be considered when evaluating the appropriateness of materials. For example, specific statements describing the intended learners will be valuable in determining whether the vocabulary used in the materials is appropriate, the practice activities will be interesting and challenging, the students can identify with children pictured in the materials, and whether the length of each lesson and unit is appropriate for students in that age range. An accurate description of the students for whom the materials are intended will facilitate the work of the selection committee throughout the evaluation process.

**Instructional Goals**

Instructional goals can be used to help focus on relevant selection criteria. The committee will need to determine whether the goals established by the agency are congruent with those in the proposed material. Information on instructional goals can generally be found in the publisher’s promotional materials, table of contents, the preface, or in third-party evaluations such as those conducted by the Educational Products Information Exchange Institute (EPIE). The goals found in the materials can be compared with those published in the agency’s scope and sequence statements or curriculum guides.

**Instructional Objectives**

Criteria related to instructional objectives are valuable in assessing the appropriateness of materials. A major question is whether the objectives specified in agency curriculum guides and by content experts are included in the materials in the prescribed scope and sequence. In addition to this compatibility criterion, objectives should also be evaluated for such characteristics as whether they are worthwhile, clearly stated, and measurable.

**Content**

There should be congruence between content specifications found in the agency’s curriculum guide or provided by subject matter experts and those included in the materials being evaluated. Some other questions related to content include whether it is bias free, well-organized and sequenced, worthwhile, contemporary, accurate, comprehensive, authentic, motivational, and objective-referenced. Sometimes when instructional objectives are not explicitly stated in the materials, it is possible to infer them from well-developed content. However, it is very difficult to develop good objectives from incomplete or disorganized content.

**Instructional Strategy**

Another design point that is useful in developing selection criteria is whether a research-based instructional strategy can be identified in the materials. Components of strategy to assess are:

- the manner in which learners are motivated to study the materials;
- whether learners are reminded of similar material they already know;
- whether material is presented clearly with ample examples, rules, and demonstrations;
- whether relevant practice exercises are included;
- whether students receive feedback on the quality of their performance on practice exercises;
- whether feedback is presented in a manner that enables students to use it to adjust their performance on subsequent practice activities;
- whether opportunities are provided for summaries and reviews at logical points throughout the materials; and
- whether suggestions are provided for enrichment and remediation.

If students are intended to use instructional materials independently, then the instructional strategy should be well developed and student guidance should be included in the materials. Materials intended to be teacher-managed often leave much of the instructional strategy to the resourcefulness of the teacher. If the strategy is to be implemented by the teacher, then explicit directions for doing so should be included in the teacher’s manual.

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TABLE 2. Questions for review of instructional materials

<table>
<thead>
<tr>
<th>Considerations from formative evaluation</th>
<th>General questions for state and local selection committees to use in reviewing instructional materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Is the educational philosophy of the agency (state, district, school) congruent with the philosophy and procedures in the materials?</td>
</tr>
<tr>
<td>Learner characteristics</td>
<td>Are the learner characteristics of the target population congruent with learner accommodations in the materials?</td>
</tr>
<tr>
<td>Instructional goals</td>
<td>Are the instructional goals outlined by agency administrators and stated in curriculum guidelines congruent with the scope and emphasis of goals in the materials?</td>
</tr>
<tr>
<td>Instructional objectives</td>
<td>Are objectives specified in agency curriculum guides and by subject matter experts compatible with those included in the materials?</td>
</tr>
<tr>
<td>Content</td>
<td>Is the content specified in agency curriculum guides and by subject matter experts consistent with that in the materials?</td>
</tr>
<tr>
<td>Instructional strategy</td>
<td>Are research-based instructional strategies reflected in the instructional materials?</td>
</tr>
<tr>
<td>Student assessment</td>
<td>Are valid, reliable, criterion-referenced tests included in the instructional materials for pre-, practice-, and post-assessment?</td>
</tr>
<tr>
<td>Instructional guide</td>
<td>Is there sufficient guidance for installation and management of the instructional materials?</td>
</tr>
<tr>
<td>Utilization</td>
<td>Are costs and format, as well as requirements for time, personnel, media, facilities, and equipment acceptable to the agency?</td>
</tr>
<tr>
<td>Consistency within instructional materials</td>
<td>Is there consistency within the instructional materials; e.g., are content and instructional strategies appropriate for the objectives; do tests measure achievement of the objectives; and are all components appropriate for the target population?</td>
</tr>
<tr>
<td>Developmental documentation</td>
<td>Are data included that provide evidence that the materials have been used successfully in a variety of instructional settings?</td>
</tr>
</tbody>
</table>

Student Assessment
Provisions for student assessment should be evaluated. The committee should determine whether criterion-referenced tests for pre-, practice-, and post-assessment are included with the material. In addition to the requirement that tests be criterion-referenced, good test construction procedures are necessary. The clarity of directions and items, the response behavior expected, and the length of tests are only a few of the facets that can be reviewed to assess the adequacy of tests included with materials.

Instructional Guide
Well developed instructional materials should include an instructional guide to provide teachers and administrators with the information they need to use the materials with a variety of learners in different classroom settings. These guides should be checked to determine whether they include such information as record-keeping procedures, group and individual pacing and management plans, suggestions for implementing a sound instructional strategy, and background references. Ideally, the guide should provide the teacher with all the information needed to use the instruction successfully with target-group students.

Utilization
There are several design points that should be considered relative to using instructional materials in a classroom. Some of them include: cost of the original and supplementary materials; the durability and expected life; the amount of supplementary or expendable materials necessary to support the instruction and practice activities; special equipment needed to use the materials; the number of professional and staff personnel needed to manage the materials; special environmental considerations such as lighting or soundproofing; and the acceptability of the format and instructional strategies to the intended users.

Consistency Within Instructional Materials
All of the considerations listed above are interdependent. Like the components of the systems design model on which they are based, the importance of this consideration must be emphasized. For this is a critical point at which the materials evaluation approach presented in this paper differs widely from other systematic models, such as those by Morrisett and Stevens (1967) and Eash (1970). After considering the merits of each component of the instructional materials, the overall consistency among components should be evaluated. The instructional goals should be based on the philosophy of the agency, and the objectives and content should be derived from the goals. The instructional strategy should be appropriate for the content and the type of skills specified in the objectives. Tests included with the materials should measure performance specified in the instructional objectives. All components of the instructional materials should be appropriate for the intended learners. Often it is necessary to evaluate the internal consistency of the materials on an objective-by-objective basis or at least by sampling enough objectives in different parts of the materials to determine whether consistency exists.

Developmental Documentation
If developmental documentation is available, it should be evaluated to determine whether intended learners are similar to those used for LVR during the original developmental process. Conditions under which the materials were evaluated should be assessed as well. A few examples of information that should be available in an LVR report are: the design of the verification study, the procedures that were followed in
<table>
<thead>
<tr>
<th>Considerations from formative evaluation</th>
<th>General questions for state and local selection committees to use in reviewing instructional materials</th>
<th>State of Florida documents A¹</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Is the educational philosophy of the agency (state, district, school) congruent with the philosophy and procedures in the materials?</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Learner characteristics</td>
<td>Are the learner characteristics of the target population congruent with learner accommodations in the materials?</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Instructional goals</td>
<td>Are the goals for instruction outlined by agency administrators and stated in curriculum guidelines congruent with the scope and emphasis of goals in the materials?</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Instructional objectives</td>
<td>Are objectives specified in agency curriculum guides and by subject matter experts compatible with those included in the materials?</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Content</td>
<td>Is the content specified in agency curriculum guides and by subject matter experts consistent with that in the materials?</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Instructional strategy</td>
<td>Are research-based instructional strategies reflected in the instructional materials?</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Student assessment</td>
<td>Are valid, reliable, criterion-referenced tests included in the instructional materials for pre-, practice-, and post-assessment?</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Instructional guide</td>
<td>Is there sufficient guidance for installation and management of the instructional materials?</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Utilization</td>
<td>Are there constraints within the agency to adoption of the instructional materials?</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Consistency within instructional materials</td>
<td>If there consistency within the instructional materials: e.g., are content and instructional strategies appropriate for the objectives, do tests measure achievement of the objectives, and are all components appropriate for the target population?</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Developmental documentation</td>
<td>Are data included that provide evidence about successful use of the instructional materials?</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

¹State of Florida Documents:
A — Florida Law 233.07 through 233.48
B — General Criteria for the Selection of Instructional Materials in all Subjects, Florida DOE
C — Criteria for Instructional Materials Selection in English/Language Arts, Florida DOE
D — Criteria for Instructional Materials Selection in Mathematics, Florida DOE
E — Criteria for Instructional Materials Selection in Elementary Schools, Florida DOE

*Degree to which the consideration is included in Florida Documents:
4 = Standard is clearly stated in document, and explanations exist to ensure its effective use by committees.
3 = Standard was directly mentioned in document, but no explanation was included for committee interpretations.
2 = Standard was implied, but probably would not be recognized by committee.
1 = Standard was omitted from document.

Choosing subjects and administering the study, and a description of revisions that were made in the materials.

The considerations and questions included in Table 2 are not intended to comprise a checklist that could be to evaluate instructional materials. Rather, these items form a framework from which evaluation checklists could be developed. Such checklists could be used to review and rank order a large number of materials. The product of this first phase of selection would thus be a list of the instructional materials that the committee believes are acceptable for purchase and use in the schools. In most instances, the selection procedure would end after Phase I. The state or district may not feel a need to continue to the second phase, or (even recognizing a need) may lack resources.
To an experienced educator, it might seem logical that selection committee members would already be using the considerations listed in Table 2. After all, these are not new considerations. Anyone who has worked in instructional development has used them extensively. To provide some information on the extent to which the considerations in Table 2 are already being used, a comparison was made between those considerations and the guidelines for selection of instructional materials published by the State of Florida. The Florida guidelines were chosen for analysis, because Florida is one of two states that has enacted LVR legislation. It was hoped that Florida's position on LVR might be reflected in its guidelines for selection committee members.

Five Florida documents were analyzed in this comparison. They were: Florida Law 233.07-233.48, the law related to instructional materials selection; general state criteria for the selection of instructional materials in all subjects; and specific subject area criteria related to English and language arts, mathematics, and elementary schools. The latter four documents were published by the Florida Department of Education for use by state-level materials selection committees. Each of the five documents was analyzed to determine whether it directly or indirectly included any of the 11 formative evaluation considerations proposed in this paper (see Table 2). The degree of inclusion of each consideration was rated at one of four levels:

1. Consideration absent.
2. Consideration implied but not specified.
3. Consideration specified as a criterion for selecting materials.
4. Consideration specified as a criterion for selecting materials, including standards and explanations for application.

The results of the comparison are included in Table 3. There were no fourth level ratings for any of the Florida documents. This can be interpreted to mean that all of the documents studied would need to be revised if relatively naive committee members were to use the documents effectively as guidelines for instructional materials selection. Two formative evaluation considerations were directly specified in all five documents: "instructional goals" and "content." They were rated as third level, however, because there were no guidelines on ways to use them for materials selection. The majority of the documents had a second level rating on the formative evaluation considerations. However, two considerations ("instructional objectives" and "developmental documentation") were mentioned in only two documents, and two other considerations ("utilization" and "consistency") were absent from all documents (level one).

It is apparent from this comparison that in Florida, the guidelines published for use in materials selection do not closely reflect principles of competency-based instruction. Thus, in one state at least, these principles that seem so familiar to an instructional developer have probably had little impact on the practice of materials selection.

Before beginning a discussion of the second selection phase, it may be useful to point out that another use of the considerations listed in Table 2 could be to guide the appointment of selection committee members. Committee members should be chosen to provide the expertise needed to answer the selection questions. A content expert and content teacher should be included to provide information to the committee concerning the scope, sequence, timeliness, and accuracy of the content in proposed materials. A content expert and a content teacher would also be able to compare the materials with the scope and sequence in the agency's curriculum guides. Teachers and parents of students for whom the materials are intended should be included to provide the committee with information on student characteristics like interests, behavior, attention span, and typical achievement levels of students in the subject. Persons should be included on the committee who can adequately represent the interests of both sexes and all concerned cultural and ethnic minorities. An instructional designer should be included to provide the committee with information related to objectives, instructional strategies, criterion-referenced tests, and other design considerations. Finally, administrators should be included who are familiar with the goals and philosophy of the agency as well as the resources for and constraints or use of the materials.

Phase II: Field Trial

The second phase of the instructional materials selection process includes the use of field-trial procedures to collect LVR information about materials that have been selected for agency adoption. Materials selected during the first phase should represent the best available, but the best available may not necessarily be systematically designed or effective in causing learning. Rarely does an agency select only one set of materials. Generally several different sets of materials are adopted; the district or school is then free to choose among them for purchase. Phase II could be applied most effectively after adoption but before purchases are made. At that point field trial evaluation of the materials could take either a formative direction or a summative direction, if LVR data were already available on the materials, this phase probably would not be conducted.

Formative Field Trial

It is anticipated that the most practiced form of field-trial evaluation would be formative. Through the committee review process, intrinsic data would have been used to identify the best materials. Then through field trial, payoff data could be used to identify requirements for making the materials as effective as possible.

The procedures and types of data collected would be similar to those used in a typical, small-scale field trial; however, the purpose would be somewhat different. In a normal field trial, the purpose is to collect data for use in revising the instruction. It is obvious that one does not have much room for revision when working with commercially published materials. The purpose of the field trial would therefore be to collect data for use by potential buyers and users, about how to adapt and/or supplement the materials for optimum classroom use.

Data from field trials could be used in several ways.

1. If more than one set of materials were field tested, potential buyers could see how well each program's own goals were met, how well students and teachers liked each program, and what recommendations were made for supplementing and/or adapting each program.
2. For potential users, field trial results could be an aid in planning how to use materials in their own classrooms.
3. If the state or district conducting the field trial had sufficient resources, supplementary materials could be prepared based on instrumentation done
for the trial and on trial results. Such materials then could be sold or given to
the schools.

4. Field trial results could also be supplied to publishers for consideration in later editions.

In the absence of LVR data from the publisher, a small scale formative field trial may provide valuable information about how well materials work with learners. If a heavy investment will be made in a particular set of materials, then the expense of a field trial may be well justified.

Summative Field Trial
The possibility of conducting a summative field trial during Phase II is mentioned here for the sake of completeness. A summative trial may be undertaken if a state or district wishes to compare several different materials and then adopt or recommend the best one. Summative comparisons among competing programs require careful experimental controls to ensure program fairness and the validity of conclusions. Because of the time and cost required and the variety of threats to valid conclusions, summative comparisons should be approached with caution.

Summary
Instructional materials selection practices vary widely in the way they are administered and conducted, the criteria that are used, and the precision with which they are carried out. In this paper a two-phase instructional materials selection process was presented. The process is based on considerations from instructional development and formative evaluation. In the first phase, the instructional completeness of the materials is evaluated by a selection committee. In the second phase, field-trial data are used to evaluate the classroom effectiveness of the materials.

The use of field trials by state or district selection committees would require time, resources, and expertise that are not normally expended for materials selection. Formative trials have been proven successful in improving instructional materials during development, but would the field trial suggested in Phase II provide better adoption or selection decisions than the committee deliberation in Phase I? One position on

this question has been that there is no substitute for an actual trial (Rothkopf, 1963). However, Merrill (Note 1) recently reported high correlations between actual student performance and predictions of student performance that were based on expert reviews of the instructional strategies employed in the materials. Research should be continued in this area to develop guidelines for using intrinsic data for recognizing quality instructional materials, and for determining when the additional data available through a field trial is worth the additional expense.

Ultimately, however, the viability of a systematic selection process, or any selection process, will depend on how state and district officials perceive the role of instructional materials in education, and how they value that role.

Reference Note

References
Cost-Effectiveness Evaluation: A Case Study of an Innovative Program in Higher Education

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This case study and the project upon which it is based (Klein, 1978) reflect in many ways the professional values of faculty members and administrators of a single graduate institution. Although the intent of this article is to present an example of a generalizable set of cost-effectiveness evaluation procedures applied to a development project, this particular institution and its personnel are probably not representative of conventional academic. It is a tribute to both faculty and administrators that a level of mutual trust existed allowing faculty to focus upon institutional mission and professional roles and not be concerned about the potential for misuse of faculty time allocation data. Energies devoted to course and program development endeavors were highly regarded by all parties thus allowing free and usually willing reporting of faculty time. Developers and evaluators should be reminded that this pleasant circumstance is not always to be expected.

Overview

The 1970's saw dramatic changes in higher education. Student enrollments declined, budgets were reduced, and a different student population emerged—a population in which many of the students were adults with family and job responsibilities. Consequently, it is very possible that higher education's major mission in the 1980's will be to provide inexpensive, easily accessible educational programs to the working adult. As universities and colleges respond to these changes and begin redirecting their efforts and resources to meet this mission, cost-effectiveness evaluation will play an important role in designing appropriate instructional systems.

Conditions and Preparation of the Study

The West Virginia College of Graduate Studies (CGS) received a grant from the Fund for the Improvement of Post-secondary Education (FIPSE) to develop a model for providing graduate programs to adults in remote locations. The major activities of the project were directed at designing a system for delivering courses in remote locations by enhancing the present rather innovative efforts of the college. CGS was established in 1972 and given the mission of providing a viable graduate curriculum to citizens of central and southern West Virginia. The college has no campus and offers only post-baccalaureate work. Regular full-time faculty are located in leased facilities at undergraduate institutions in Charleston and Beckley and all courses are held in the evening at locations throughout the region. The college also relies heavily on the use of

EDITOR'S NOTE

This is the fourth in a series of articles on the use of cost-effectiveness analysis to evaluate instructional programs. The first article (Doughty, JID, 2(4), summer 1979, pp. 17-25) provided an overview of conceptual and practical criteria for judging and designing cost-effectiveness studies. The second article (Lent, JID, 3(1), fall 1979, pp. 26-33) provided a detailed model of the methods of cost-effectiveness analysis as it is used to inform decisions about instructional development efforts and other applications of educational technology. The third article (Deiby, JID 3(2), winter 1979-1980, pp. 29-34) went into more detail about Phase IV ("Determine Costs") of Lent's cost-effectiveness model. It presented a model and procedures for cost analysis. The present article, the concluding one of this series, presents an applied case study of cost-effectiveness analysis in an instructional development context that demonstrates many of the features, methods, and problems of the kind of studies described in the first three articles.
part-time adjunct faculty and the basic
mode of course delivery requires that
faculty drive to various locations and
conduct 3-hour classes.
Prior to the project, CGS had been in
evidence for 2 years when both faculty
and administrators began to experience
difficulties in delivering courses and
programs, and alternatives were being
proposed. Within this context, the
FIPSE project was undertaken to
demonstrate the feasibility of one alternative
- to guide administrators and faculty in
focusing upon a range of decision vari-
ables reflecting program costs, in-
structional effectiveness, academic
quality, and other benefits than were
previously being considered. (It was
determined, for instance, that most
college faculty had a rather limited view of "costs" and "good instruc-
tion");
- To assist administrators and faculty
in understanding, deriving, analyze-
ing, and comparing viable alterna-
tives in program design and delivery;
and
- to provide a framework for identi-
ifying costs, personnel, and organiza-
tional structures required to support
alternative instructional delivery
models.
These purposes suggest that the project
staff (two instructional designers) as-
sumed that they could have a significant
impact on the decision-making process
within the institution. This assumption
proved valid throughout the entire proj-
et.

Identifying Alternatives
The second phase of the cost-effec-
tiveness model involved the derivation
of program characteristics and restric-
tions of alternatives to be considered
and compared in the study. With
respect to this phase, the project
was quite fortunate. As mentioned
above, problems and alternatives
were being presented by a variety of groups
and individuals. In the year prior to
the project, academic deans had requested
written reports on problems and
alternatives from faculty, and meetings
had been conducted to discuss the
problems and alternatives. Consequently,
there was a comprehensive set of fairly
well articulated concerns, objectives,
and constraints that had consensus
among faculty and administrators.
Early project efforts were thus focused
upon formally stating these goals and
constraints. The primary goals were to
deliver academically sound courses and
programs in remote locations and to
meet the needs of adult students in terms
of time constraints imposed by full-time
employment and family obligations.
The primary constraints were to keep
program costs at acceptable levels, re-
duce faculty travel time, and maximize
use of available resources.
In the initial stages of the project, two
alternatives were considered for com-
parison: the present CGS model of
course delivery and the FIPSE-funded
model of course delivery. As noted
above, the CGS model involved having
regular or adjunct faculty drive to a
given location and conduct instruction
in the traditional lecture/discussion
form. The FIPSE model involved the use
of predesigned courses that would per-
mit students to complete assignments
and instructional activities on an inde-
dependent basis through the use of medi-
ated and printed materials housed in
various locations (centers). Courses
would then be conducted and managed
by CGS faculty visiting the centers as
necessary. Throughout this paper, the
term CGS course will be used to denote
courses conducted via the CGS model
discussed above, and FIPSE course will
denote courses conducted according to
the FIPSE project model of instruction.

In deriving alternatives based on sys-
tems-oriented technology, several rele-
vant comments seem appropriate here.
With respect to instructional develop-
ment in this higher education content it
appeared that faculty found it difficult
to conceive of a real alternative to pro-
fessors delivering instruction. Most fac-
ulty simply viewed the use of technol-
ology as a different way of getting the
teacher's message to the student. Conse-
quentially, techniques such as brainstorm-
ing that are presumably designed to gen-
erate alternatives did not result in real
"alternative" alternatives. Instead, we
found that additional new approaches
surfaced during the design, develop-
ment, and implementation of a given al-
ternative. Hence, it was imperative that
designers be open, public, and low-
kayed in conducting their activities, and
thus let things evolve. For instance, in
meeting with the academic deans, one
dean remarked that the use of prede-
signed courses seemed to be an excellent
way to maintain academic quality of
courses taught by adjunct instructors.
As a result, an additional dimension
was given to the project: that of designing
courses that could be delivered by
adjunct faculty.

A second set of issues which impacted
the creation of feasible alternatives re-
lated to faculty attitudes about driving the so-called West Virginia "turnpike" through the mountains in winter, their image of graduate instruction, and their evolving concerns about potentially low enrollment in repeated offerings of any single course offered in relatively remote locations. These, combined with the prespecified course recommendation, led to discussions about single faculty members managing several courses at once in more than one location. Once relieved of being the sole source of content and structure as well as skill-practice exercise supervisor, faculty (and administrators) were then able to create reasonable and acceptable instructional delivery alternatives.

The Cost Effectiveness Comparison

The third phase of the cost-effectiveness evaluation was to articulate the specifics for the cost-effectiveness comparisons including defining the various evaluative criteria. The criteria employed in the present study fell in two categories: cost factors and outcome factors. The basic cost-related criterion centered around the standard (and easily understood) efficiency comparison of cost-per-course offering. In addition to this cost-efficiency criterion, others of importance were development cost of FIPSE courses, operating costs of FIPSE courses and CGS courses, and faculty time utilization on both FIPSE and CGS courses.

Although collected and available, student learning outcome measures were not considered in the comparison of alternatives. There were several reasons for this decision. FIPSE courses were developed according to the systems approach which included the specification of learning objectives, design of instruction with field tests, and revision until students achieved the prespecified objectives. Standard CGS courses did not employ such development strategies. Second, there was not an opportunity to compare two forms of the same course. Outcome criteria collected but not compared included student attitudes, convenience to students, amount of instructor-student contact time, number of students served per course, and faculty acceptance.

Two forms of cost-effectiveness analysis were employed. The first was what Lent (1979) refers to as the ratio model. In our study, the ratio was simply the mean cost per course delivery in which FIPSE course development costs were averaged over a 5 year period. In addition to the ratio model, it was decided that ranges and means would be reported of faculty hours spent on development of FIPSE courses, dollar costs for materials and printing, travel costs and time, faculty time spent on various course functions including planning, instruction, evaluation, and travel, and scores on an instrument measuring student attitude toward course methods.

In summary, the cost-effectiveness evaluation model was designed to address the following questions:

- How much does it cost to develop a FIPSE course?
- How much does it cost to operate a FIPSE course?
- How much does it cost to operate a CGS course?
- How do faculty use their time in both FIPSE and CGS courses?
- Does the FIPSE model reduce faculty travel time?
- What are the student attitudes toward the FIPSE model?
- Will faculty accept the FIPSE model?
- Can adjunct faculty conduct a FIPSE course with the assurance that course objectives will be met and result in positive student attitudes?
- What will be required in terms of personnel and funds to continue to develop FIPSE-type courses on a long-term basis?

"It seems to us that cost-effectiveness analysis in addition to providing useful data in and by itself, will result in several side effects."

Determining Costs and Outcomes

Phases four and five of the study involved determining costs and outcomes of various alternatives. As recommended by Beilby (1979), in order to determine costs and faculty use of time on both FIPSE and CGS courses, data were classified along two dimensions: resources used and various course development and operation activities. In addition, data on total course and total CGS time were collected on participa-

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A. Planning, preparing, researching, designing instruction, lectures, activities, tests, evaluation

B. Large group, class lectures, presentations, discussions, films
   One-to-one, small group interactions, instruction, feedback

C. Evaluation of student, grading, administering tests

D. Travel (to __________________ )
   Number of trips __________________

E. Other
   (number and specify on back)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mon</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total time on course _________
Number of hours devoted to all COGS activities this week _________

FIGURE 1. Faculty time log.

including courses conducted by CGS faculty who participated in the design of the course, CGS faculty who were not involved in the design of the course, and adjunct faculty.

Cost and outcome data were collected for five FIPSE courses and four CGS courses.

Assembling and Reporting the Findings

The final phase of the project involved the synthesis, analysis, and reporting of the findings. In this study preliminary results were reported to deans and faculty concerning the general costs and outcomes of FIPSE courses. The final written report contained findings which compared FIPSE and CGS courses (Klein, 1978).

In a preliminary report, project staff were able to specify the nature and estimates of the costs involved only in designing and developing a course. However, findings with respect to student attitudes could and were reported as an indication of project effects. Preliminary information was presented in several settings including: a large group faculty meeting in which the project staff presented the rationale, processes, outcomes, and implications of the FIPSE project; private discussions with the president and deans; a report to the long-range planning committee; a report to the college reorganization committee; report to the faculty affairs committee; and report to the deans for financial affairs and admission/records.

In the final report, several types of information were presented. With respect to development, costs figures were reported for developing six courses specifying the various cost categories mentioned above. The actual findings are shown in Table 1. In reporting costs and faculty use of time in operating courses, mean faculty hours spent, and percentage of faculty total semester time were reported for various course functions. These data are shown in Table 2. In addition, mean course operating costs for FIPSE and CGS courses were reported. These data are shown in Table 3.

It may be of some interest here to note several items of information not represented in these particular tables. For instance, one faculty member teaching CGS courses discovered after carefully maintaining his log that he spent more time traveling than in conducting instruction. Second, the FIPSE model as implemented appeared to lead to a reduction in operating costs and faculty travel time. One of the most interesting observations was that the FIPSE-systems approach to course design and implementation substantially reduced faculty time devoted to conducting a course but yet there was only a slight difference in direct instruction or student instructional contact time between CGS and FIPSE courses.

Benefits and Problems of Cost-Effectiveness Evaluation

In reflecting on the project, it appears that several important statements can be made with respect to the role of cost-effectiveness evaluation in instructional systems design.

First, it appears that the project had significant impact on the decision-making process within the institution and the cost-effectiveness component con-
### TABLE 1. Development cost per course

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Percentage of CGS semester time</th>
<th>Cost</th>
<th>Materials</th>
<th>Printing</th>
<th>Photocopy</th>
<th>Total</th>
<th>Total faculty + Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed. 530</td>
<td>201</td>
<td>23</td>
<td>2,300</td>
<td>1,770.50</td>
<td>97.37</td>
<td>222.41</td>
<td>2,090.28</td>
<td>4,390.28</td>
</tr>
<tr>
<td>Ed. 535/332</td>
<td>165</td>
<td>20</td>
<td>2,000</td>
<td>851.50</td>
<td>60.57</td>
<td>9.71</td>
<td>921.58</td>
<td>2,921.58</td>
</tr>
<tr>
<td>Ed. 500</td>
<td>32</td>
<td>4</td>
<td>400</td>
<td>1,399.70</td>
<td>231.03</td>
<td>237.03</td>
<td>1,868.17</td>
<td>2,268.17</td>
</tr>
<tr>
<td>Ed. 531</td>
<td>322</td>
<td>40</td>
<td>4,000</td>
<td>855.15</td>
<td>84.91</td>
<td>1.94</td>
<td>942.00</td>
<td>4,942.00</td>
</tr>
<tr>
<td>Ed. 540</td>
<td>110</td>
<td>14</td>
<td>1,400</td>
<td>0</td>
<td>32.32</td>
<td>55.38</td>
<td>87.70</td>
<td>1,487.70</td>
</tr>
<tr>
<td>Ed. 536</td>
<td>128</td>
<td>17</td>
<td>1,900</td>
<td>2,868.66</td>
<td>29.20</td>
<td>24.37</td>
<td>2,922.23</td>
<td>4,822.23</td>
</tr>
<tr>
<td>Mean</td>
<td>159</td>
<td>20</td>
<td>2,000</td>
<td>1,290.89</td>
<td>89.23</td>
<td>91.96</td>
<td>1,471.99</td>
<td>3,471.99</td>
</tr>
</tbody>
</table>

*Based on $10,000/semester including salary and benefits.

### TABLE 2. Mean faculty hours and mean percentage of faculty time per semester on FIPSE and CGS course functions

<table>
<thead>
<tr>
<th>Course function</th>
<th>FIPSE courses</th>
<th>CGS courses</th>
<th>FIPSE</th>
<th>CGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=5</td>
<td>n=4</td>
<td>n=5</td>
<td>n=4</td>
</tr>
<tr>
<td>Planning</td>
<td>14</td>
<td>69</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Large group instruction</td>
<td>8</td>
<td>31</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Small group instruction</td>
<td>21</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Evaluation</td>
<td>16</td>
<td>36</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Travel</td>
<td>33</td>
<td>58</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Total course time</td>
<td>84</td>
<td>198</td>
<td>13</td>
<td>22</td>
</tr>
</tbody>
</table>

### TABLE 3. Mean course operating cost for FIPSE and CGS courses offered at a distance

<table>
<thead>
<tr>
<th>Category</th>
<th>Operating cost (dollars)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean FIPSE n=5</td>
</tr>
<tr>
<td>Development (Averaged over 5-year period)</td>
<td>$694</td>
</tr>
<tr>
<td>Travel Expenses</td>
<td>136</td>
</tr>
<tr>
<td>Faculty salary</td>
<td>439</td>
</tr>
<tr>
<td>Total</td>
<td>642</td>
</tr>
<tr>
<td>Instruction Faculty salary* for planning, instruction, and evaluation</td>
<td>899</td>
</tr>
<tr>
<td>Materials, printing, and photocopy</td>
<td>87</td>
</tr>
<tr>
<td>Total</td>
<td>$2303</td>
</tr>
</tbody>
</table>

*Costs for faculty were based on $10,000/semester including salary and benefits.

Contributed to this impact. In discussing this impact it should be noted that as a result of the project, a college-wide committee for reorganization requested that a new position be established for instructional development. Funds for this position were submitted in the asking budget to the Board of Regents as well as funds to support the activities. Deans in two of the college's four divisions requested positions for their own instructional designers to continue FIPSE-type efforts, and indicated that they would trade a faculty position for the instructional design position.

It seems to us that cost-effectiveness analysis in addition to providing useful data in and by itself, will result in several side effects. It will likely cause a variety of groups of people to focus on "real" costs of current practices. For instance, most faculty had not previously shown much concern about determining how they actually spent their time. In conducting this study, the importance of this variable became salient. In this instance, as a result of faculty logging their time, the faculty affairs committee initiated actions aimed at weighing various faculty activities and developing an instrument to collect faculty time data devoted to these functions. This kind of information has been useful in setting and revising faculty promotion and tenure policy.

One of the most important benefits of conducting a cost-effectiveness evaluation as part of this instructional development effort was that it provided the course designers with both access and insight into the decision-making process within the institution. By considering economic criteria, project staff were required to determine real dollar costs and...
values as well as consider areas of concern from the viewpoints of a variety of groups of people. It was important to note that each group had an investment in the institution and shared or wished to share in the decision-making process. In fact, conducting such a credible cost-effectiveness evaluation likely placed the designers in a leadership role in deriving and evaluating instructional and organizational alternatives that will have a long-term impact on the organization.

In this project, it was evident that cost-effectiveness evaluation had multiple benefits for various audiences, but there were also several problems that must be considered. An individual conducting such a study must consider his or her role and purpose for the study. If, as in our case, the study is part of an instructional development project, the project staff will have to determine if they are conducting the study to "prove" the worth of their project or to truly determine the cost-effectiveness of viable alternatives. In the present study, the project staff were more inclined toward the former role and hence a more cost-effective instructional delivery model might have been designed. Secondly, there still appear to be several methodological problems in determining, analyzing, and reporting dollar costs in a valid and meaningful way.

Cost-effectiveness analysis applied to instructional development is still in its infancy and considerable efforts will be required to gather reliable and useful cost information. Unlike collecting many outcomes-oriented data, most instruments, procedures, data gathering techniques, and reporting procedures will basically have to be invented during the process of the study. This invention process will require additional personnel time and other resources and concerned parties should devote time during the early stages of project planning to determine if the costs of a cost-effectiveness evaluation are worth the variety of benefits to be gained. This then represents the process being used upon itself to consider alternatives and trade-offs—not an altogether inappropriate activity for instructional developers and evaluators.

Final Observations

It would be improper if this article (and by implication its authors) stopped here with this Walt Disney-like ending. Several final comments about purity and precision are required. Using several of the tradeoff and pitfall issues discussed in the initial article of this series (Doughty, 1979), it is fairly easy to identify several major "threats to validity" that plague and beset most development-cum-evaluation studies.

One of the areas of concern in this study (and most all other cost-effectiveness studies in higher education) is the use of throughput measures as indicators of efficiency and, by inference, effectiveness. The typical case employs the cost-per-enrolled student or even student-credit-hour ratio as a principal measure. A primary focus of this project was course quality and not enrollment, so the useful, if somewhat misleading, ratio of cost-per-course offering was used to convey comparative data to the many decisionmakers.

A related but even more complex set of concerns focuses upon the recommendation—some say requirement—to fix one of the two variables in a comparison of the cost-effectiveness of instructional alternatives. Careful review of the several instructional delivery methods employed in the CGS and FIPSE courses reveals that there were considerably more than two variables considered for each and one was fixed. Although a fairly reasonable case can be made for assuming that the different classes of enrolees were essentially similar, cursory inspection exposes differences in course content, instructors, and instructional approaches which included considerable variances in student class time, faculty time, and student study time.

A standard set of functional cost-analysis procedures, a la Belby (1979), does permit some reasonable comparison of development and operation costs but these were also different across alternatives. The range in total dollar costs can be attributed primarily to differences in the instructional delivery options which require markedly different absolute (total hours) and relative (percentage of available) faculty time.

So, what conclusions can a developer turned part-time cost-effectiveness evaluator draw from such a case study—or even from this four article series? It should be fairly obvious that a Fantasia equivalent in the cost-effectiveness literature has yet to be created—and that there is still ample room for researchers, developers, evaluators, and animators to improve the process.

References


A Third Dimension: The Future of Educational Technology in Industry

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ABSTRACT: Educational technology has had a significant influence on the field of training in business and industry; the greatest impact has been upon the analysis phase of course development. Need, task, and target population analyses are used more and more to define course content. Five improvements are needed, however, if educational technology is to further its influence on business and industry training: (a) course development time must be shortened without adversely affecting course quality; (b) subject matter experts must be used more effectively; (c) educational technology techniques must be applied in the field of management development; (d) the scope of educational technology must be expanded to include the maintenance of behavior; and (e) greater attention must be given to the differences between the adult learners found in business and industry and learners in other age-group settings. Cooperation between trainers in the private sector and academicians will be required if major advances are to be made in these areas.

In recent issues of the Journal of Instructional Development, the future of educational technology has been discussed and debated by those in the academic world who are concerned with its future. In each of the major articles published to date, concern has been expressed about the place of educational technology in the world outside of academia. Gustafson (1978) is concerned that the field of educational technology is not getting enough input from the outside world. Silber (1978) takes a more optimistic approach and sees this isolationism as a problem that can be solved by expanding the target audience of educational technology from higher education to business, industry, medical education, and special education. Boutilier (1979), after analyzing the instructional systems development approach in some detail, concludes that the methods with which educational technology began failed to adapt themselves quickly enough to the changing environment.

It is clear from these articles that the future of educational technology depends, at least to some extent, on increasing the interaction and breaking down the barriers that often exist between academe and business and industry. To increase interaction and break down these barriers will take some effort by both sides. Those of us in business and industry can help by contributing to a greater degree to the literature concerned with educational technology and by participating in the more academically oriented societies such as the Association for Educational Communications and Technology (AECT).

The purpose of this article is to start to break down these barriers and, at the same time, spark more discussion of the future of educational technology. The Impact of Educational Technology on Business and Industry

The impact of educational technology on business and industry, especially in the area of technical and skills training, has been tremendous. A quick review of the changes that have occurred over the past decade makes this quite apparent. Not too many years ago, the content of many courses was determined more by what the instructor had been taught and what the instructor knew about the subject matter than what the students needed to learn to do the job. Today, the content of most technical and skills courses is based on instructional objectives derived from a task analysis. The strategies used to present courses are no longer limited to the old standbys: lecture, on-the-job training, or vestibule. Today, these methods, plus numerous others (including many forms of individualized and learner controlled methods) are used. Evaluation of training programs no longer consists only of a questionnaire at the conclusion of the course to determine the students' attitudes. Industrial trainers are now putting more and more effort into the evaluation of their course. The techniques and methods used to evaluate the effectiveness of courses are many and varied, but they are all aimed at ensuring that the courses are not only well received, but also teach what they purport to teach.

Today's training specialist seldom develops a training program simply because it is requested. After receiving a request to develop a training program, a performance analysis is usually conducted to determine the need for the appropriateness of training as a solution to the perceived problem. Then, if necessary, a training program is developed. If training is not the proper solution, alternatives are usually presented to the requester. This is not to say that unnecessary training programs are not developed because it is politically necessary at times. But at least these concessions are made consciously. Perhaps the greatest impact has come not from educational technology alone but from the combination of educational technology and behavior management. Training departments that combine these two technologies in a systematic manner, such as that espoused by Gilbert (1978), find themselves expanding both their role and their effectiveness within the organization. These departments no longer offer their customers only training courses. They offer assistance in analyzing performance problems and
implementing nontraining solutions such as job aids, feedback systems, changes in job structures, and improved selection processes, to name but a few. While educational technology has brought about many changes within business and industry, there is much to be done. There are five areas that, if attacked vigorously, could lead to major advances in our ability to improve performance.

"Those of us in business and industry must work to expand our numbers and to provide greater opportunity for research and experimentation in applied settings."

**Shortened Development Periods**

First, the time required to develop courses must be shortened without adversely affecting the quality of the finished product. The length of time required for course development may be the biggest stumbling block in getting business and industry fully to accept and use all that educational technology has to offer. Today, many training departments follow a general model of course development like those described by Mager (1974) and Hinrichs (1976), but few implement the model to fullest extent. Training program planners recognize the savings to be realized from shortened presentation times and more efficient on-the-job performance by properly trained employees. Published reports such as Short (1973) and Shoemaker (1976) as well as unpublished, proprietary data attest to the savings. In many cases, companies have obtained savings by doing little more than following a course development process that only superficially approximates an educational technology model.

The process used by most companies consists of some form of needs analysis, followed by a task analysis that seldom goes beyond the determination of the tasks and major elements of each job. Included as part of the needs analysis is usually some form of target population analysis. Using the output of these analyses, objective and prerequisite learning lists are prepared. At this point, adherence to the model deteriorates even further. Materials are developed and teaching methods are selected based often on personal preferences, or worse, on what is fancy or flashy rather than what is effective. Even greater savings could be realized in many cases by closer adherence to a good educational development model.

An in-depth task analysis could result in further reduction of the quantity of material taught, in improved job aids, and in more efficient methods of job performance. Selection and use of appropriate teaching methods and strategies could improve both retention and mastery of the subject matter as well as possibly reduce the learning time.

Why, then, don't training departments expend the time and effort required? There are probably two major reasons. The first is cost. The increased time spent developing courses is almost always reflected in the training department's budget, but the ultimate savings obtained by improving course development (and often that savings cannot be delineated) is seldom reflected totally in the budget of the training department. When this is the case, it may still be possible to obtain needed funds by showing senior management the overall savings to the company. Far too often, the savings cannot be shown because the training is taking place in a dynamic situation where any number of changes or activities may have brought about the savings. In other cases, the savings cannot be shown because, in effect, the training presented an increase in expenditures.

The second, and more important, reason training departments do not expend the time and effort to develop more efficient courses is that the training program is needed immediately, not 6 months later. The technology in many industries is changing rapidly and the rapid change means that the lifetime of a training program is relatively short. The lead time to develop a course is dictated by conditions outside of the training department, such as the time from when information on new products becomes available to the time when a course must be available for use.

**Using Subject Matter Experts as Educational Developers**

The second challenge is the need to develop a better means to use subject matter experts (SMEs) as educational developers. In fields such as telecommunication and computers, not only is the technology changing rapidly, but the subject matter is very complex. The combination of a short time-frame for course development and the complex tasks that must be taught to the students usually precludes using educational technologists as course developers. To get around this, SME's are often trained in course development techniques. The converted SME usually remains far more interested in the original field of expertise than in educational technology. They see task analysis and objective writing as a waste of time. "It might be all right for simple subject matter but not for the things we teach," is the attitude often exhibited. The simple subject matter they developed in educational technology courses cannot be easily related to the complex troubleshooting and other analytical activities that they are asked to teach. They may give lip service to their new course development skills, but the methodology they follow has little resemblance to what they have been taught.

When the SME-turned-educational technologist does try to use the model taught in the educational technology course attended, it quite often does not work. As Boutwell (1979) pointed out, the models that we use are still a long way from being refined sufficiently to permit formulation of course design rules that fit every situation. Yet, it is in these areas that the rigorous application of educational technology could have the greatest payoff. Tremendous sums are spent each year training people to troubleshoot and maintain complex telecommunication and computer systems. Yet few of those trained ever become anything more than just barely adequate at their jobs. Considering the number of people in these jobs and the savings to be obtained, it should be worth finding a means of solving this problem. Two solutions are readily apparent. Find more effective ways to convert SME's into educational technologists, or improve the educational technologist's ability to interface with SME's. Both of these alternatives have been tried with limited success.
Management Training

The third challenge is to infuse the world of supervisory and management training to a greater degree. Even in companies that have a strong commitment to educational technology, the management training groups seem to be exempt from even pretending to develop courses based on a task analysis or designing courses to meet measurable objectives. In few cases, instructionally sound programs are developed for first-line supervisors but almost never for middle- and upper-level management. Yet, here again, we have an area where the cost of training is high, especially if the salaries of the students are included in the cost, as well they should be. But apparent cost should not be a restricting factor. The results that could be obtained from identifying training needs and then bringing about the desired changes in manager behavior are probably greater than those that could be obtained from the same allocation of resources to any other single group of individuals. Well trained, effective managers cannot help but produce more efficient, effective organizations. According to Rader (1979), one of the principal factors affecting productivity in the United States is the quality of management.

Maintenance of Behavior

The fourth challenge is to expand the scope of educational technology to include not only the development, implementation, and evaluation of programs but also the maintenance of the desired behavior. Too often, training programs are developed and implemented at great expense; yet the results obtained are negligible. This often occurs because the work environment does not support proper performance on the job. People are not given feedback, or the feedback that is given is inappropriate. Job aids that should be available are not; tools are in poor condition; the performance workers are trained to give is not the performance actually rewarded.

While line management and training may appear to have two different functions, there is a considerable amount of crossover. Line management is responsible not only for the conditions that exist in the work place but is also responsible for training. Because of the complexity of the training function, there are staff groups to provide line management with training programs. Logical extension of the training function would be to assist line management to develop and maintain a work place that supports the desired behavior or performance. No group is better prepared to assume this function than the educational technologist in the industrial training department.

This challenge certainly is not new. In 1973, Brethower discussed the need for maintenance systems. At that time, she felt those responsible for developing training programs, particularly self-instructional ones, would also have to design maintenance systems. Others have also discussed the topic, but more often than not, under the guise of performance analysis (Mager, 1970) or front-end analysis (Harless, 1970). Gilbert (1978) has taken the whole concept a step further. He suggests that we become performance engineers. In this case, educational technology is just one of many tools in our bag. Still, most colleges, educational technology programs, and training departments ignore all behavior-change methods except training.

Adult Learners

The final challenge must be met before any of the other changes can be brought about. This final challenge is to pay more attention to the adult learner. More research should be done to investigate the characteristics that differentiate the adult learner, especially those in business and industry, from other learners, Brethower (1977) and Knowles (1977) have done quite a bit to enlighten us about adults in general, but little research of business/industry groups has been performed. The research that has been done deals more with those in management or professional positions than with those who are semi-skilled. Once the characteristics of adult learners have been differentiated from those of other learners, curricula should be changed accordingly.

Meeting these challenges will take the combined efforts of academia and business and industry. The former must continue to search out and work with those in business and industry who are interested in the future of educational technology. Those of us in business and industry must work to expand our numbers and to provide greater opportunity for research and experimentation in applied settings. Without this, the theories remain untested hypotheses which we must select, reformulate, and adapt to each new situation.

References


We Live in Two Different Worlds: A Reaction to Patton's Article

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When I reviewed Patton's article, I agreed strongly with several of his suggestions yet I found myself asking why they could not be applied directly to my own situation. The instructional development program at Rochester Institute of Technology is deeply involved with training in business and industry. Most of our students either come from that sector or will be placed there when they graduate. In other words, my work is to prepare educational technologists to do the kind of work Patton describes.

My positive response to the article and my industry contact led me to speculate about the differences between the "third world of instruction" and formal education—especially postsecondary education. This train of thought brought about a realization that there are several assumptions so basic to the two sectors that they cannot be changed (for the time being)—only taken into account. Knowing these assumptions should help advance the dialog between the third world of instruction and formal education. If we are aware of each other's constraints, we can avoid meaningless arguments about some differences and address ourselves to the joint resolution of mutual problems. This was the rationale behind my unusual step of writing a commentary based on an article assigned to me for review.

Now About Those Hidden Assumptions...

First of all, the primary functions of the instructional third world and formal education are different. The primary functions of educational institutions are training and education. The primary function of organizations in the instructional third world is manufacturing, services, or distribution of goods. Training and education in the third world of instruction owe their existence to one of these primary functions and are not primary functions themselves. This is in no way a reflection on the quality of instruction in either sector. The major result of this difference in primary functions is rather that the regulatory system is radically different for training/education in each sector. In the education sector, the instruction is directly regulated by the government. In many instances, it is owned and operated by some level of government—in postsecondary education, usually the state. The consequence is that changing the instruction—adding a new course, starting a new program, changing the basic mode of instruction—is usually subject to governmental review and approval, something with which the third world of instruction (if it's lucky) may not have to contend. Additionally, the external governance is usually reflected in the internal governance of educational institutions. Thus, the rapid changes and flexibility that Patton suggests for the third world of instruction are often impossible in light of the internal and external regulatory system of postsecondary education.

Second, in the third world of instruction, learners are often paid while learning. Learners in the education sector are not only not paid, but in most cases they pay for the training provided.

This major difference has several implications for instruction. There is, for example, little incentive for postsecondary education to shorten a course. In fact, shortening a course (in terms of time) may have negative consequences. Students, charged by the credit hour, may resent the reduced hours. (From the credit/contact hour, almost everything is calculated—from amount of classroom space needed to financial aid for students. You don't mess much with credit hours.) Licensing and accrediting agencies may question the validity of the abbreviated instruction. (When was the last time you heard the third world of instruction worry about making up "snow days" to satisfy state requirements?) The institution's support service may actually resist modifications which make them change their programs. (While I can design and manage courses with individual pacing and continuous enrollment, my scheduling and records offices currently cannot cope.) In the instructional third world, time literally is money. Training most often represents a cash investment in the employee. Shorten the course and you save not only direct salary but the training logistics and possible per diem and other trainee support. If the trainee's performance is approximately the same after a short training period as after a long one,
the short period raises the organization's return on investment (ROI) dramatically. The same ROI is difficult to establish in formal education because many costs remain fixed (because they are time-based) whether or not the actual course time is shorter.

Third, the different sectors' views of learner permanence are polar opposites. Education is committed to a transient learner—albeit to a longer training period. The learner completes a course of study; the learner departs. There is no thought of the learner as a permanent fixture. The third world of instruction views the learner as a potentially permanent employee who can be retrained repeatedly. The training department will (or may) have a number of opportunities for instruction later in the employee's career on an as-needed basis. Further, if the training is of a general nature or beyond the capability of in-house training, the company may choose to send the employee outside for training—something rarely, if ever, done in formal education. This affects the job-relatedness of training and maintenance of learned behaviors.

Fourth, most instruction in the third world is directly and specifically job-related. Patton's view of performance maintenance notwithstanding, the skills learned are usually used on the job soon after the training, thus helping to maintain the learned behavior. In contrast, educational institutions usually offer instruction related to a family of jobs and the skills learned may—or may not—be used depending on students' jobs after instruction. Because of the different aspirations of the graduates and the differences in jobs available, it is almost impossible to make a course specifically job related. Another implication of this job-relatedness is that formal education is regarded as a long-term preparation—even in the professional and technical skills area. Thus, the educational institution bears the responsibility for training that prepares the student for skills needed immediately as well as skills needed years after leaving the institution. This makes, in general, the approach to instruction in education a long-term proposition and instruction in the third world, short-term. This difference may relate to Patton's observations about upper-level management training being different from some technical skills training. Perhaps management views the skills in upper-management training as so long-term or different as to defy conventional needs analysis (although I doubt it).

Fifth, because of the constraints of fixed course times and teaching a general family of skills, the education sector often assumes the responsibility for pushing (or leading) a student as far as possible within the time available and the learner's ability. While assuming this responsibility may be regarded by some as totally unwarranted, it is nevertheless the mindset of most educators and can be a barrier to the introduction of competency-based or criterion-referenced instruction. The education sector regards course content as a series of levels of competency which may be mastered in a fixed time period. Those mastering more competencies get A's and those below the minimum mastery get F's—with a range of grades in between. The mindset of instructional third world is the opposite. Content is regarded as a fixed set of competencies with time as the flexible variable. This is especially true in skills training. The difference in approaches becomes evident when the developer seeks end-of-course objectives from the different subject matter experts.

The foregoing is by no means an exhaustive list of differences. There are more. Those pointed out are major differences—differences that often go unacknowledged and lead to misunderstandings (and sometimes acrimonious debate) between the two sectors.

There are also a number of similarities (which should be evident to most) that allow instructional developers working in either sector to assist one another and to move the art and science of instructional development forward. Patton's article is one such needed step in moving things forward.

This book is essentially a catalog listing conclusions (principles) which the authors feel have relevance for the designers of instructional materials. The conclusions are taken from research in the behavioral sciences. The 193 numbered condition-result statements are arranged in four chapters: perception (56 principles), memory (41), concept learning (27), and attitude change (69). Each of the principles is grouped with related principles, isolated on the page with boldface type, and elaborated with some commentary. There are also some sections which introduce various groups of principles and which define terms common to such a group. There seems to be little systematic sequence except within short sections. The authors suggest that principles can be studied or used in any order.

The book is an instructionally oriented Bershon and Steinor (1964). As a summary of what is known that is relevant to Instructional Design, it is very useful. While it may not be an exhaustive list of relevant principles it is nevertheless quite comprehensive in scope. I recommend it as an excellent reference book for all serious instructional design personnel.

After the fact, it is easy to be a critic and I would not wish the following comments to be seen as negative. Rather, they represent some wishes for characteristics I hoped would be in such a book but found lacking.

Fleming is the author of the first three chapters and Levine is the author of the chapter on attitude change. Fleming writes to an audience of instructional designers in the sense of those persons who develop instructional materials to be used by individual students in classroom or other educational settings. Chapters 1 and 2 are especially well done in this regard because most of the research cited was not done in an instructional context. On the other hand, chapter 4 is written to an audience of mass media designers, quite a different group. Most of the research cited in chapter 4 was done in the context of mass media so this direction is not surprising. However, in the reviewer’s opinion, Levine’s translation of the principles for designers of instructional materials is not as well done as Fleming’s in chapters 1 and 2. On the other hand, I felt that Levine’s writing style was more readable.

The authors state that, “Instructional Message Design” refers to the process of manipulating, . . . , a pattern of signs and symbols that may provide the conditions for learning.” However, in some of the principles it is not clear that the variables are under the control of the designer. For example, concrete object concepts are easier to learn than abstract concepts; ease of concept attainment generally increases as the number of critical and noncritical properties decreases.

The most disappointing aspect of the book, for this reviewer, is its minimal taxonomic organization. For the most part the principles are listed one after another rather than being nested in any sort of taxonomy. Clearly some of the principles are pervasive and some are qualifications. There is some attempt at nesting in the text in that a few principles have corollaries numbered with “a”, “b”, “c”, etc., but there is no overall organizational scheme which would facilitate remembering and using the principles. Upon going back to the book after I had finished reading it, I found it difficult to locate a specific principle I remembered reading.

The chapter headings I found somewhat puzzling. They don’t seem to follow any of the category systems in the literature. Perception seems to be part of the sensation, perception, thinking, memory type scheme organized around mental processes. However, the memory and concept chapters seem to be from the memory, concept learning, principle learning, problem scheme. The attitude learning chapter seems to be from the affective, cognitive, psychomotor scheme.

I was even more puzzled by the principles that were included and that were not included in some of the chapters. The memory chapter includes classical
conditioning and reinforcement theory paradigms, which are probably broader than memory. This chapter also includes sections on discrimination learning and motor learning. Motor learning was seriously neglected being relegated to a single principle. (How does that make all you skill-training designers feel?) The literature in this area would seem to justify a separate chapter of principles for designing motor skill instruction. The concept chapter also had problem-solving and creativity tackled on with only three principles included. The literature in this area would also seem to justify a separate chapter. Designing instruction for procedures and for principles was completely ignored. While not extensive, there is sufficient research in this area to justify another chapter.

The authors also state that, "We do not treat the step-by-step process of "

The book would have been exceedingly more valuable if they had: not to review the shopworn steps in the ID process, but rather to translate individual principles or sets of principles into procedures that could be followed by designers in developing instruction. There is ample evidence that educators, including instructional designers, are not very good at seeing the implications for practice in a given principle. What is needed is for someone to translate principles into procedures and design guides which work. Fleming and Levie have taken a good first step by pulling the principles together and it is certainly too much to ask for them to also translate these principles for practice. But still, I wish they had.

In summary, Instructional Message Design is an important reference work. One can always wish for more and indicate what else could have been done. But while we were indulging in such idle wishing Mac and Howard were busy doing it. My congratulations on a job well done.

Review by M. David Merrill, Department of Curriculum and Instruction, University of Southern California, Los Angeles, CA 90007.

References


The author provides the following frame of reference when using the word workshop:

"I am using the word workshop to encompass all those learning activities that occur in group settings. A workshop then, is any group meeting that has adult learning as a primary purpose. If no learning purpose exists, it is some other kind of meeting: a bridge party, lynch mob, or perhaps a political convention." (p. 4)

The author then proceeds in three sections ("Planning the Workshop," "Conducting the Workshop," and "Evaluating the Workshop") to flesh out the skeleton provided by this frame of reference.

The book is a prescriptive, how-to-do-it manual designed for use by anyone involved in adult learning, ranging from large agency administrators to line staff. It takes the reader step by step from assessing needs, specifying learning objectives, selecting resources, designing learning activities, budgeting, making arrangements, rehearsing, packing, setting up, setting the learning climate, agreeing on objectives, directing learning activities, closing shop through evaluating, using examples and worksheets to simulate the range of tasks and functions involved.

Davis makes a clear statement that today it has become almost axiomatic that continuing education is essential, in meeting the needs of modern adults and of the organizations with which they work. Staff development and continuing education are used synonymously in that staff developers do continuing education, which includes not only traditional concepts of formally structured learning but also informal learning in group settings.

In chapter 1, "Assessing Needs," the author encourages the practitioner to emphasize his own needs in the group situation; this is counter to group development objectives which consider group needs paramount! Davis discusses very superficially McGregor's X-Y theory of motivation, the management grid, behavioral assumptions, and the three leadership styles—of authoritarian, democratic, and laissez-faire—all of which have an important bearing on adult learning. Leadership style which facilitates learning according to the situation is of special importance. The author continues to demonstrate his literary inerence by presenting his own adult learning theory and its shortcomings: "(1) it is not scientific, (2) concise, (3) nor internally consistent." He continues this style in his discussion on testing commitment as part of the competency model method simplified, where he suggests, "have participants pledge allegiance."

In chapter 2, Davis seems to get intellectually serious in discussing general and specific learning objectives, but he breaks this train of thought by sharing "The Sad Story of Farmer Brown."

In chapter 3, "Selecting Resources," the author omits some discussion on the importance of grouping learners according to learning objectives, but the methods section is very comprehensive.

The book contains specific and useful observations related to each step in the continuing education process. Marketing recommendations take into consideration not only various consumer needs but also the production resources and capacities of the workshop. There were no examples given for media releases and the direct mail marketing strategy. Practical considerations are suggested for setting market price, and for promotion. The section on budgeting differentiates between line, performance, and program budgets and the relative usefulness and advantages of each, giving the reader specific examples and tips on budget design. Davis focuses on people within the workshop, both from the perspective of the practitioners and learners. Characteristics of the adult learner and a range of learning approaches are brought to the attention of the reader. The relative merits of differential leadership style intervention are discussed.

In spite of all criticisms, Planning, Conducting, and Evaluating Workshops could well serve as a basic handbook for school principals, personnel directors, staff-developers, in-service trainers, training directors, program coordinators, supervisors, union leaders, human resource developers, human service administrators and practitioners, faculty members, and experienced graduate students who are involved or planning to
be engaged in those critically important processes. One finishes this book with a sense of having the necessary tools with which to work.—Reviewed by William Boline, university professor and Coordinator of Group Process, Governors State University, Park Forest South, IL 60466.


Ever go through a year of rigorous instructional development on a course, come up with a marvelous product, then whip together a workshop to "show the faculty how it works," only to lose everyone during the first hour of the workshop? Ever been given 4 hours to orient the faculty of your institution's instructional improvement program in a workshop setting—and thrown up your hands in despair? Ever been told to "explain the new special education law" to teachers in an after-school workshop when you know that the teachers don't want to know about the new law and don't want to attend the workshop? Ever been told to give a 2-day workshop on operating a piece of equipment more safely to the 20 employees who use the equipment—knowing that you're faced with a motivational, rather than an instructional, problem?

Yes, the workshop is thought of more and more as the omnipresent, inservice training panacea—or at least instructional delivery system. If you want to turn this trend to your advantage, accomplish some real learning, and avoid some of the problems described above, then this is the book for you.

Many Pluses, One Drawback

Davis' book combines a systematic approach to the design of workshops (Kemp, Briggs, and the IDI people would be proud) with a group-oriented approach (the laboratory approach used by National Training Labs) to present a clear, practical, understandable method for planning, then conducting, and finally evaluating workshops.

The book is written clearly and is readable. It is written informally, talking with the reader, not at him or her. It eliminates jargon almost completely, so that you don't need a PhD in design to read it. And it is written in a style that makes you want to turn to the next page (rather than fall asleep) because you enjoy and learn at the same time.

The book is practical. Davis doesn't spend 30 pages discussing the why's (and why-not's) of writing behavioral objectives for workshops; he just tells you how to do it in three pages.

The book can be used in any setting. The process described and the language used to describe it make this one of the few books that can be understood by trainers, health educators, teachers, professors, and developers alike, and one of the few ID-like processes that just about everyone will agree makes sense for helping adults learn in a workshop setting.

The book uses lots of examples. Unlike some of the abstract and obtuse ID texts and articles we are used to reading (even those that explain the importance of using examples in teaching—without using any themselves), Davis presents lots of examples of each step in the process of developing workshops. Whenever he tells you how to do something, he shows you examples of what it should look like when you've done it.

The book has a set of accompanying worksheets. The result of each step in the process is summarized on a simple, easy-to-use worksheet. When you have completed all 16 worksheets you have written down in a convenient format everything (yes, everything) you need to plan, conduct, and evaluate the workshop. The worksheets are shown and discussed in the book and the accompanying Workshop Stuff Packet contains blank, full-size copies of the worksheets, so you can duplicate them and fill them out for each new workshop you plan.

The book stresses needs assessment. It is refreshing to see more than lip service paid to the important step in the ID process of finding out what the problem really is before you jump in and try to solve it. Davis spends 40 pages (more than 10 percent of the book) explaining how to find out what the needs really are and cautions "if no learning need can be found, there should be no workshop." (p. 35) While the process he advocates is not as rigorous as Kaufman's needs assessment model, it is sufficient for the purpose.

The book stresses evaluation of the workshop. Instead of suggesting the usual five-item "I thought this workshop was ______ useful" type instrument used in most workshop evaluations, Davis stresses the need to get two types of evaluation data from participants: feedback from participants on each of 17 different aspects of the workshop and evaluation data from each of the participants on each of the objectives of the workshop. This twofold evaluation provides the workshop designer with objective and subjective information about the success of the workshop and with usable information for workshop revisions. While this is not a rigorous formative or summative evaluation, it is a much more rigorous evaluation than most workshops are usually subjected to.

The book deals with the nitty-gritty details. As every workshopper knows, the best designed workshop can fall apart if the room is the wrong size, the chairs are arranged incorrectly, the budget is not adequate, or the coffee doesn't arrive. Davis does not ignore these nitty-gritty, but crucial, details. He deals extensively with budgeting, making arrangements, rehearsing, packing, and setting up for the workshop. The worksheets for these areas are comprehensive and provide a useful checklist of things to do—and things not to forget.

The book does have one problem. The area in which I found the book to be weak, at least from the point of view of an instructional developer or a media person, is that of "Selecting Learning Resources" and "Designing Learning Activities." Davis spends a lot of time explaining various group activities involving people (from demonstrations to gaming, from discussions to role playing). Many of these are techniques with which developers are not familiar and their inclusion in the book is a strength.

The weakness, however, lies in the almost exclusive reliance on "people" instructional activities. Davis' attitude is best summed up when he says "You can probably get a good price for that projector." (p. 122) He clearly does not like any instructional materials (let alone mediated instruction). He lightly brushes off films, audiotapes, and overhead transparencies because they make people upright, put them to sleep, or require projectors. While instructional development certainly has gone beyond the always-use-media stage, I think it is going too far in the other direction, and this trend is in opposition to what research has determined about the effectiveness of media for different types of
learning objectives and learners. It is too harsh a judgment to say “never use media.” I believe this is a serious omission from the book and seriously weakens the resources and activities sections.

**Adult Learning Principles Demonstrated**

Perhaps the reason the book does as good a job as it does (with the exception of the content omission discussed above) is that it practices what it preaches. Davis is an adult educator and begins the book by presenting his theory of how adults learn. The 22 principles about adult learning and workshops are extremely useful to anyone working with adults—either as a novice (to find out what this new creature is like) or as an experienced practitioner (to codify what experience has probably already taught).

Davis then applies these principles to his own book. The clarity of writing, the use of examples, the provision of worksheets, the practical orientation, and the tone of the book all follow his stated principles of adult learning. It is instructive to compare this book with ID texts that teach certain principles—but certainly do not follow them—and see the difference.

The reader can learn in two ways from this book, then: first, from the content—how to plan, conduct, and evaluate a workshop; second, from the presentation of the content—follow the principles you are teaching and you will end up with a better book.

I highly recommend this book to all instructional developers, especially those who conduct workshops or who will in the future. In addition, the book and set of worksheets are complete enough to make up a good (and easily developed) course for an instructional development curriculum at the college level. It is almost, in fact, a self-instructional course—with the reservation that additional input must be provided during the sections on resource selection and learning activities.

And now, before I wax too ecstatic, and while the information is fresh in my mind, there’s this workshop I’d better go plan...—Reviewed by Kenneth H. Silber, university professor of educational technology, Governors State University, Park Forest South, IL 60466.

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Barbara B. Minor, ERIC Reports on ID
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ERIC Clearinghouse on Information Resources
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This document contains additional detailed information about the Air Force Instructional System Development (ISD) model as well as the paper presented at the AECT convention. Of particular interest to instructional systems designers is a short overview of the Air Force ISD model; an extended example which demonstrates the Air Training Command Technical Training documentation required for entire "career fields" (in which one task is carried from job task inventory through all steps of ISD to end with an evaluation report); and descriptions of an ISD managers' course, ISD technician course, and mediated materials development course. Examples of documentation, course evaluation, and a brief discussion of future trends are also included.—Microfiche 83c, paper copy $7.82 plus 66c postage, as document ED 174 198.


The first phase of this project, designed to develop training programs for Marine and Navy F-4 pilots and Radar Intercept Officers based on Instructional Systems Development (ISD), evaluated the utility of the emerging 6.2 ISD model by identifying its strengths and weaknesses and by developing specified end products to be used in subsequent ISD phases. Project activities were conducted onsite at the Marine Corps Air Station in Yuma, Arizona, with government-furnished subject matter experts contributing to major tasks under the direction of ISD personnel. This report includes summaries of the major tasks completed during this phase: objectives hierarchy development, media selection, syllabus development, and training support requirements analysis. —Microfiche 83c, paper copy $10.82 plus 84¢ postage, as document ED 164 012.

Implementing College Regular Vocational Programs into a Bilingual Mode—Two Instructional Design Models in Operation, Arturo A. Koitsky. Paper presented at the annual meeting of the Association for Educational Communications and Technology, New Orleans, March 1979, 44 pp.

Prepared as a handout for a poster session at the 1979 AECT convention, this set of materials includes descriptions of the Bilingual Access Programs at Elgin Community College, a general systems approach for bilingual access programs and Vocational English as a Second Language (VESL) materials, a bilingual access instructional delivery system, an instructional design model for developing bilingual access support materials, and an instructional design model for developing ESL/VESEL components (two sequential models). Also included are a sample of instructional analysis sheets, a sample list of Spanish/bilingual instructional aids, a sequence of milestones within the bilingual access instructional design process, a list of programs to be implemented in a bilingual mode, a sample of bilingual learning aids, and a sample VESL lesson. —Microfiche 83c, as document ED 171 316; paper copy not available from EDRS.


This study applied a path model developed from factors associated with instructional development success in the United States to a similar instructional development environment in Australia. These factors included institutional commitment, faculty rewards, instructional design staff expertise, campus audiovisual production services, program evaluation, and faculty interest in innovation. A three-part questionnaire was administered to project directors; Part I identified the general nature of the project and the person responding; Part II consisted of a 50-item measure of perceived success factors in instructional development; and Part III provided for self-ratings of project success. The most important findings have been the completely different factor structures: Where respondents in the United States saw the issues as provision of support services, organizational support with good administrative systems, faculty incentives, and financial resources, the Australian respondents saw as major issues the provision of support and administrative services, status of project internally and externally, positive and clear innovative climate, and expertise and skills of the faculty to carry out the project. —Microfiche 83c, paper copy $1.62 plus 48¢ postage, as document ED 172 793.

This study was designed to determine the relationship between personal and environmental variables and the amount of reported instructional development done by media professionals at the K-12 level in the state of Alabama, as well as the effect of those variables on the reported performance of instructional development activities within each domain delineated by the AECT. The study also attempted to identify those factors which might lead to increased amounts of instructional development by K-12 media professionals. Findings revealed a positive relationship of competencies, attitude, budget, empathy, and nonsupervisory time with reported performance of instructional development activities; however, it was found that volunteer assistance—students or parents—did not contribute to the amount of instructional development undertaken. Recommendations include competency testing for media professional preparatory program graduates, research into empathy training, and an increase in nonsupervisory time for media professionals. A list of references is provided. —Microfiche $3.32, paper copy $3.32 plus 48¢ postage, as document ED 172 796.


Intended to provide a frame of reference for a symposium on automated aids to instructional design and development (ID), this paper demonstrates the need for improved procedures and automated aiding systems by outlining problems encountered in ID—e.g., complexity of curriculum planning and instruction development, quality maintenance in the ID process and products, and cost effectiveness. Various classes of functions the aids might serve (such as database management, instructional design decision-making, material production, and personnel training) are described and related to the programs discussed by the other symposium participants. Some conjectures about the potential of developments in intelligent computing for assisting ID conclude the paper. A list of references is provided. —Microfiche $3.32, paper copy $3.32 plus 48¢ postage, as document ED 172 766.


The elaboration theory of instruction is an alternative to organizing instruction in terms of a hierarchical task analysis. The hierarchical organization results in an instructional sequence that begins with highly fragmented, small pieces of the subject matter content, an approach which many educators have found to be demotivating. The elaboration theory calls for beginning the instruction with a special kind of overview—one that epitomizes the instructional content rather than summarizing it. Then it calls for elaborating on that overview, by adding detail or complexity in "layers" across the entire breadth of the content, one layer at a time, until the desired level of detail or complexity is reached. A brief list of references is provided. —Microfiche $3.32, paper copy $3.32 plus 48¢ postage, as document ED 172 788.

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The book provides descriptions of graduate programs at 61 institutions, with detailed information.

Graduate Degree Programs In Instructional Technology 1978-79 is available from AECT Publication Sales, Dept 8A, 1126 16th St., N.W., Washington, D.C. 20036. AECT Member Price: $3.50; Nonmember Price: $4.50. Orders under $15 must be prepaid. A $1 charge plus postage will be added to billed orders.
Brief Description of Program

The System for Individually Guiding Mastery Attainment (SIGMA) was designed to develop, field-test, and evaluate a 32-credit-hour, two-semester, competency-based, preservice elementary teacher education program. The program was to be individualized through modules (learning packages), personalized, team taught, and organized by flowcharted competencies rather than courses. The development and field-testing period was 1971 through 1975.

Context and Students Served

San Diego State University is a large urban university where most students do not live on campus. The Department of Elementary Education is the largest of seven departments in the College of Education and employs approximately 40 full-time faculty. While there is a growing number of minority students in elementary education, the great majority are white, middle class females. Student teaching experiences are arranged so that each candidate is placed at least once in a racially or ethnically different environment.

Program Description

The content objectives of the SIGMA program are the same as those approved by the California State Commission for Teacher Preparation and Licensing for all other elementary credential sequences at San Diego State University. However, the organization and delivery of instruction is radically different. The content emphasis is not identified as course work but flowcharted into a skills development sequence intended for the most part to impart generic teaching skills transferable to all settings. The selection and sequencing of these skills require that the content be highly integrated, not only horizontally, but vertically between skill strands to establish prerequisites and interrelationships. (See Figures 1 and 2.)

Objectives generated from the identification of skill areas are of four types: knowledge, performance, consequences, and affective. A concerted effort is maintained to demand actual performance in realistic teaching situations. Because decisions about program development are made as a faculty team, duplications or omissions of content such as might be found in a typical series of courses are eliminated.

Modules are used to individualize the program so that students move through the skill development strands at their own pace. Each module incorporates six characteristics:

1. Behaviorally stated objectives including terminal behavior, assessment conditions, and criterion level.
2. Behaviorally stated prerequisites for each module.
3. A preassessment based on the objectives.
4. A variety of learning alternatives teaching to each objective.
5. A postassessment based on the objectives.
6. A provision for remediation if exit criterion is not met on any objective (Nagel & Richman, 1972).

This instructional delivery system uses 28 modules in the fall semester and 15 in the spring semester and enables the student to attain objectives in a variety of skill areas. The student, through conferences and small group meetings, is assisted by instructors to successfully complete the module requirements. Each student is assigned to an on-site classroom in which the performance required by each module is evaluated in a realistic educational setting. A concurrent seminar is conducted throughout each semester to provide continuity and large group interaction and to allow for further instructor input as needed.

The method and organizational system when compared to the normal programs requires a number of modifications in the roles of all participants. The students are required to assume much more responsibility for their own learning; the university instructor is relieved of much of the task of information delivery and becomes a manager, counselor, and facilitator, the cooperating classroom teacher becomes pivotal in providing opportunities for classroom experiences which help students cross the bridge from theory to practice. The highly personalized approach to instruction and the creation of a noncompetitive learning environment result in the development of cooperative group behaviors. The positive group feeling creates an esprit de corps that keeps motivation high during the entire year (Berg, Murphy, & Nagel, 1976).

Organizational structures chosen to deliver the model involve a campus-based learning center and field-based laboratory. Campus facilities were provided in the form of an individualized study center (ISC) to support the model with print, audio, and video media (Harrison & Nagel, Note 1). The SIGMA faculty team normally consists of five university faculty who work with a group of about 30 to 35 student teachers all year and are responsible for all
FIGURE 1. Flowchart for skill development and student teaching—first semester (15 weeks).

FIGURE 2. Flowchart for skill development and student teaching—second semester (15 weeks).
skill development requirements and on-site supervision.

Criterion-referenced assessments based on behaviorally stated objectives are used to evaluate student teachers. The criteria stress attainment of mastery, and modules provide for remediation in order to reach that level. Should a student not attain mastery he or she is provided with the opportunity to remediate the specific weakness which the instructor diagnoses. In most instances, all that the student needs to achieve mastery is more time to study or practice. If remediation is still needed at the end of a semester, the student is given a grade of "incomplete."

Evaluation of full-time student teaching is highly correlated with the modular part of the program. During the first semester's field experience, each student is evaluated on his ability to integrate the previously developed competencies into his or her performance while working with a group of children. During the second semester, full-time field experience, each student and cooperating teacher identify the objectives that the student will try to accomplish with the children in the assigned classroom. The student develops and negotiates a contract with the cooperating teacher and university supervisor which specifies certain desired consequences from working with the children. The final evaluation is based on the student's demonstrated effectiveness in fulfilling this accountability contract.

To make SIGMA a regenerative program, responsive to students and changing perspectives, both formative and summative data are collected periodically.

Evidence of Effectiveness

In the 1974/1975 school year Donald F. Enos collected data on the SIGMA program and a control group, and in 1975/1976 he did a follow-up study of employed graduates of both programs, analyzed data, and documented the results (Enos, 1976). He was assisted with data collection from time to time by graduate students from San Diego State. However, none of those involved in conducting the research was at any time involved with the development or implementation of the SIGMA program. Additionally, no member of the SIGMA faculty team or any other faculty or students were involved with the specification of hypotheses, data collection, analysis, or reporting results and conclusions.

The SIGMA program (N = 33) was conducted by three faculty and two student teaching supervisors; the control group program (N = 40) was run by 12 faculty and six supervisors. The treatment for the control group was the regular instructional program in elementary education consisting of a foundations course and several methods courses in a variety of subject areas. The number of credit hours in each program was equal. Control group students were taught primarily through lecture and discussion, and evaluations were of a norm-referenced variety.

It was not possible, because of administrative constraints, to assign randomly student teachers to the two programs, but it is believed that the groups were comparable because students were not selected especially for either program. All were enrolled on the basis of the regular registration procedure used by the Department of Elementary Education. Additionally, no significant differences were found when comparisons of pre-enrollment interview ratings, GPA's, or numbers of men and women were made for the two programs. It should also be noted that students were observed to be more reluctant to enter the SIGMA program because it was an unknown and, in fact, the SIGMA block was the last to fill at registration out of a total of eight blocks available. As a result, it is believed that the two groups of students were as equivalent as they would have been had it been possible to make random assignments.

Claims of Effectiveness

Evidence of effectiveness will be presented in four areas. When compared with a control group, the SIGMA program:

1. Demonstrates a significantly greater level of student knowledge on an examination of the competencies approved for elementary education at San Diego State University by the California Commission for Teacher Preparation and Licensing.

2. Demonstrates significantly better student teacher verbal interaction with children as measured by the Reciprocal Category System, both during the certification programs and in a follow-up study of employed graduates. The differences noted were as follows:
   a) The ability to provide for and personally use more positive reinforce-
   b) The ability to provide a more accepting classroom atmosphere and to facilitate the development of more positive feelings within the children.
   c) The ability to provide increased opportunities for children to present unsolicited facts, information, and opinions during the instructional process.
   d) The ability to facilitate the children's interactions within the classroom.

3. Demonstrates significantly more use of individualized instruction by student teachers when working with children as measured by the Descriptive Observational Record for Individualized Instruction and the Individualized Instruction Inventory, both during the certification programs and in a follow-up study of employed graduates.

The SIGMA program provided an increased number of training techniques for the student teachers in individualizing instruction within the classroom. The SIGMA program student teachers provided more flexibility and direct, task-oriented situations for children; a wider variety of available materials throughout the classroom; and greater pupil participation in planning, self-direction, leadership in groups, and individual activities. The SIGMA program student teachers also provided greater challenges in children's assignments, as well as relationship of the assignments to diagnosed learning needs, and tutorials of individuals with learning problems.

4. Demonstrates significantly higher ratings of student teacher performances by the children taught as measured by the Student Evaluation of Teacher Instrument, II, both during the certification programs and in a follow-up study of employed graduates.

Costs for Adoption and Maintenance

In 1976 costs are shown in Table 1 (Enos, 1976).

Conclusions

The Enos study has presented very strong support for the effectiveness of the SIGMA program and establishes it clearly as a viable alternative to regular programs of elementary teacher preparation. The study has demonstrated that student teachers completing the SIGMA program obtained the following benefits
### Table 1 — Costs of SIGMA

<table>
<thead>
<tr>
<th>Item</th>
<th>Installation</th>
<th>Subsequent Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personnel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Training consultants</td>
<td>$1,225</td>
<td>0</td>
</tr>
<tr>
<td>2. Faculty team</td>
<td>9,618</td>
<td>Same as regular program</td>
</tr>
<tr>
<td>3. ISC supervisor</td>
<td>4,625</td>
<td>$9,250</td>
</tr>
<tr>
<td><strong>Individualized Study Center</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Facility development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Furniture</td>
<td>3,500</td>
<td>0</td>
</tr>
<tr>
<td>b. AV equipment</td>
<td>4,250</td>
<td>250</td>
</tr>
<tr>
<td>c. Remodeling</td>
<td>4,000</td>
<td>0</td>
</tr>
<tr>
<td>2. Software for modules</td>
<td>3,062</td>
<td>150</td>
</tr>
<tr>
<td><strong>Consumables — 35 sets of modules for students</strong></td>
<td>412</td>
<td>Paid by student fee</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>$30,692</td>
<td>$9,650</td>
</tr>
</tbody>
</table>

Compared with student teachers completing the regular program:

1. Significantly greater knowledge about teaching and learning.
2. Significantly better verbal interaction with children.
3. Significantly greater use of individualized instruction, and
4. Significantly higher ratings of their performance from children they taught.

The outcomes of this study seem to be consistent with those being achieved with mastery learning in a variety of other subject matter areas (Block & Burns, 1976). Additionally, SIGMA appears to be generalizable and disseminable. It is believed that the dissemination to adopters should include careful counseling and training, systematic assembly of modular components, preparation of an individualized Study Center, and follow-up visits from consultants. All of these requirements appear to be realistically feasible for dissemination and implementation at other sites in IHE's, LEA's, or even some county or state offices should such desire to credential preservice elementary teachers. Because most of the competencies are generic in nature, no conflict is anticipated with state laws; however, states may have additional requirements beyond SIGMA which could be handled in a traditional manner.

It is believed that SIGMA is a disseminable program which has been successful in raising the quality of new teachers entering the profession, while at the same time providing a model for teachers to emulate in working with children.—Reviewed by Thomas S. Nagel, College of Education, San Diego State University, San Diego, CA 92122.

### Reference Note


### References


Criteria for the Selection of JID Articles

Types of articles appropriate for publication

1. Theories, models, conceptual frameworks of instructional development;
2. Techniques for designing and evaluating instructional systems;
3. Reports on evaluations of instructional development projects;
4. Case studies of instructional development projects;
5. Summaries and abstracts of instructional development projects;
6. Instructional materials designed to improve the skills of instructional developers.

In addition, JID will publish:
7. Critical reviews of important literature related to instructional development;
8. Critical reviews of generally available instructional systems;
9. Letters to the editor.

Articles submitted for publication in JID are refereed by an Editorial Board using specified criteria. There are two sets of criteria. The first set applies uniformly to all types of articles.

General Criteria for All Manuscripts

A. Purpose and scope. Does the manuscript fall within the purpose and scope of JID?
B. Contribution. Does the manuscript make a new contribution to the field of instructional development by presenting a new point of view or presenting a new look at a traditional point of view?
C. Literature-based. Does the manuscript indicate that the author is aware of, and incorporates, what others have already reported in the literature about the topic being addressed and related topics?
D. Generalizability. Does the manuscript present theory, procedures, or results in the form of conclusions which can be generalized and used by other instructional developers: 1. Logical extension. Are the general conclusions logical extensions of the work reported?
2. Utility. Will the general conclusions be useful to other developers as guidelines for their work in other settings?
3. Clarity. Are the general conclusions stated in a clear enough manner for other developers to envision how they might apply the conclusions in other settings?
E. Readability. Is the writing style of the manuscript readable, clear, and understandable to the reader?
F. Concreteness. Does the manuscript merit the length it takes to say what it has to say?

Specific Criteria

The following set of criteria (Verifiable, Disciplined, and Conceptual Structure) will be applied to all manuscripts, but different questions will be used to judge manuscripts that fall into different categories. Manuscripts will be placed in one of three categories:

1. Theory/Procedure/Approach—dealing with the why, the what, or the how of instructional development.
2. Case Studies—dealing with a specific application of the what or the how of instructional development in a specific setting.
3. Inquiry—data-based studies dealing with evaluation and/or validation of instructional development techniques or products.

The specific criteria, by category, are as follows:

1. Theory/Procedure/Approach

G. Verifiable. Is the theory, procedure, or approach presented in sufficient detail so that an informed reader could test the theory or replicate and apply the procedure and approach?
H. Disciplined. Does the description of the theory, procedure, approach, contain: (a) the assumptions on which it is based; (b) terms that are clearly defined with examples; (c) procedures that are clearly and completely explained so they can be followed by an informed reader?
I. Conceptual Structure. Does the description of the theory, procedure, or approach indicate how it is different from, or an extension/elaboration of, current theory, procedure, approach, and are these theories, procedures, approaches identified, described, and/or referenced?

2. Case Study

G. Verifiable. Is the project described with sufficient detail so that an informed reader could replicate the technique or products used?
H. Disciplined. Does the description of the project include the audience, instructional setting, subject matter content, instructional development approach used, delivery system, instructional management and implementation procedures, validation procedures and results, limitations and constraints of the specific case?
I. Conceptual Structure. Is the project an example of a particular procedure or approach? If so, is the procedure or approach clearly described or referenced, and is the way the case is related to the procedure or approach clearly specified?

3. Inquiry

G. Verifiable. Are the instruments, activities, materials, and steps used in the inquiry described with sufficient detail so that an informed reader can understand, examine, and to some extent replicate the plan used in the inquiry?
H. Disciplined. Does the description of the inquiry include its assumptions and boundaries: hypotheses: methodology: results: conclusions? Are these elements logically consistent?
I. Conceptual Structure. Does the inquiry go beyond the day-to-day tasks of instructional development to address a fundamental question related to instructional development is the theory, procedure, or approach being questioned described or referenced? Is the way in which the inquiry is related to the theory, procedure, approach clearly specified?