Association for Educational Communications and Technology

Contents

ARTICLES

Checklisting
George L. Geis 2

An Alumni-Practitioner Review of Doctoral Level Competencies in Instructional Systems
David D. Redfield and Walter Dick 10

The Project-Oriented Matrix and Instructional Development Project Management
E. William Clymer 14

Group Consensus Evaluation: A Procedure for Gathering Qualitative Data
Constance A. Mellon 18

Instructional Development:
A Consideration of Interpersonal Variables
D.O. Coldeway and R.V. Rasmussen 23

Analysis of Multi-Component Educational and Training Needs
Earl R. Misanchuk 28

Instructional Development in Developing Countries
Farhad Saba 34

DEPARTMENTS

Book Reviews, edited by Allison Rossett
The Technology of Text, ed. David Jonassen.
Reviewed by Robert A. Braden 37

Awards Program for Outstanding Achievements in Instructional Development 39

ERIC Reports on ID, edited by Barbara B. Minor 41
Checklisting

George L. Geis
Faculty of Education
McGill University
Montreal, PQ, Canada
H3A41YZ

A checklist is a series of statements that describe the critical attributes of either some procedure or product. It can serve as aid to the performer carrying out the procedure or producing the product, and it can provide the basis for evaluation of the performance or outcome.

This paper is a discussion of checklists and their variations (job aids, algorithms, heuristics, and decision tables): what they are, how they are generated, and some implications of checklisting for instruction, evaluation, and learning.

Examples. Figure 1 shows a procedural or formative checklist. It states chronologically the steps to be carried out by a technician taking a blood sample. The performer following this checklist would correctly execute the act and an observer could evaluate the performer by reference to it.

Figure 2 represents the critical attributes of a product. This is a correctly addressed mailing envelope. Each statement refers to the outcome of an activity rather than to the performance itself.

Checklists are typically used to evaluate a performance or to guide it (in which case it is often referred to as a job aid.) However, the general procedures for developing and utilizing a checklist apply equally to one which represents criteria for a product (in a sense a quality control device).

The image of an evaluator observing a learned performance and checking off accomplishments and failures suggests a static role for the checklist. Using a checklist to provide feedback to the learner on his or her performance or as a job aid are examples of more dynamic, interactive uses.

Later in this paper we will discuss several points in the instructional sequence where checklisting can be used more dynamically:

- as a way to define and delimit the curriculum, including specification of the key discriminations or concepts to be taught
- as a reference or guide to instruction being developed or on-going (e.g., to the teacher)
- as an instructional technique in which the task of the student is to generate a checklist.

But before exploring its uses, let us examine in more detail some attributes of checklists.

Criteria. Three important criteria apply to any checklist are: relevance, observability, and reliability. A checklist is relevant when all of the items on it are critical; nothing important is omitted and nothing unnecessary is included. The criterion of observability is met when each item on a checklist refers to something an observer, either with or without training, can respond to; items refer to things overt and objective. It follows from this criterion that a good checklist will be reliable; different observers will agree on whether or not (or to what degree) an item on the checklist is present in the performance or product.

A more global application of the criterion of relevance can be applied to the checklist as a whole. The performance being described in the checklist should, in fact, result in the consequences it purports to produce otherwise it is merely a superstitious routine or ritual. (Relevance in this sense is analogous to the concept of validity in test construction.) When the valued product can be attained in many different ways, a process checklist is probably less desirable, and indeed, slavishly following a particular routine may distract the performer from focussing on the results or “purpose,” a point described later.

Algorithms, Heuristics and Decision Charts. When the checklist explicitly and comprehensively describes the only or the preferred procedure for attaining a specified result, it is termed an algorithm. If the steps in a performance algorithm are followed exactly, the desired outcome is inevitable. The step by step proofs in geometry textbooks are algorithms. Another example would be the instructions for changing an automobile tire in a well designed car owner’s manual. Not all rule systems are algorithmic. For example (to use an example from Landa) the rules of chess describe how each piece on the board may be moved but they do not tell us how to play a winning game. Landa (1974) contrasts such permissive rules with the descriptive rule systems of algorithms.

Algorithms might be termed instruction without teaching. But as we will repeatedly caution: Any checklist requires prerequisites which the successful user must bring to it. (The visitor in a foreign land soon learns that no matter how well designed the tire changing algorithm is in the driver’s handbook of his rented car, he must understand the native language if that checklist is to be useful to him.)

A less explicit checklist is the heuristic which provides general guidelines, carrying it out often requires that the user bring to it a sophisticated repertoire. Furthermore, the probability of producing the desired outcome by the use of the heuristic is raised but not guaranteed. A clearly defined, step by step recipe for making a particular dish would be an algorithm. An addition such as this one would be more of a heuristic: “Any tasty fruit might be substituted for the apples in this recipe. However firmer fruits are likely to produce a firmer taste.”
A more sophisticated example of heuristic, offered by Landa, would be the description of a sequence to be used by a detective in attempting to solve a crime.

An example of a complex heuristic would be a description of the activities involved in carrying out a literature search in order to generate an annotated bibliography. Within the general procedure are algorithmic sequences (e.g., the procedures for carrying out a computerized search of the ERIC database); others involve more general guidelines (e.g., determining the key words to be used in the search, abstracting relevant articles.) The attempt to develop an explicit heuristic often reveals some algorithmic components. This can be helpful in planning what and how to teach the relevant content and can demystify the complex expert performance which at first may seem unteachable or even unanalyzable.

The heuristic, unlike the algorithm, is an appropriate method when the outcome cannot by its very nature be predicted. The steps in solving new problems, developing an original short story or creating a piece of pottery can be described heuristically. The outcome of each of these activities might then be examined or judged using an attribute checklist.

A close relative of the checklist is the decision chart. Indeed, upon careful examination and after clarification, checklists often are transformed into decision charts. Figure 3 shows part of a decision chart illustrating its major characteristics. (A decision chart is a flowchart with decision points or nodes. Simpler flowcharts do not include decisions or choices; they are merely descriptions of linear processes or act as summaries or clarification of accompanying text.) A decision chart represents situations in which either of two (or more) conditions could conceivably prevail and a different response is required for each. Thus the user must discriminate the presence or absence of a particular situation and then proceed accordingly to the next node in the chart. Decision charts are often hierarchical or chronological. Typically, the discriminations and the actions which follow are complex and not fully described within the chart itself; consequently, they must be taught if it is to be useful. Branches of decision trees are in a sense algorithms or checklists.

Taxonomies in Biology and Botany are examples of well-developed decision charts. An interesting example of complex decision making is the explication of the steps used by expert readers of visual patterns such as satellite photographs.

Another example of complex procedural decision chart, explicit or implied, is medical diagnosis. Sequential discriminations are required (e.g., Temperature? Rash?). Each discrimination leads to branches (e.g., Low temperature? Periodic cycles of temperature? Steady?) Rather than being the result of travelling through a linear path, the final decision seems to be based upon a slowly emerging pattern which is compared to a standard set of patterns, as if various templates were fitted over it until a best fit is found. Diagnosis also involves circling back to earlier steps, rechecking some indicators, collecting supporting data for others, etc. Diagnostic decisions result from an accumulation of probabilities rather than a summation of straightforward, dichotomous discriminations (e.g., yes/no, on/off.) The probabilistic nature of such decision making adds complexity to its description but is a critical feature which the learner must

---

**Part of a Checklist for a Medical Technician**

**Goal:** Student technician will correctly take a blood sample from a patient's finger.

**Medical Technology Checklist**

1. Assemble equipment
2. Take patient's hand
3. Rub finger vigorously to bring blood to surface
4. Rub alcohol on finger
5. Open instrument pack without touching blade end
6. jab finger
7. Pinch sides of finger to produce blood
8. Touch slide-face to blood
9. Place cover slip on specimen slide; slightly rub together
10. Place specimen on table
11. Rub finger with alcohol
12. Place Bandaid on finger

**Figure 1. An example of a procedural checklist.**

---

**Correctly Addressing and Stamping an Envelope**

1. Always write clearly enough so that the first 5 people you stop can read the address.
2. The name and address of the addressee should be written in the center of the front of the envelope as follows:
   - Name on first line
   - Street address on second line
   - City, state and zip code on third line
3. In the upper left hand corner of the envelope, write your name and address following the format described in #2 above.
4. Moist and place the correct amount of postage stamps in the upper right hand corner of the envelope.
5. If special mailing procedures are used (e.g., air mail, special delivery), the appropriate notation should be added to the front of the envelope in a space away from the stamp, address, or return address. Print the words that denote the special procedure (e.g., Via Air Mail).

**Figure 2. An example of product checklist.**

---

1984. VOL. 7. NO. 1
recognize at the outset.

Troubleshooting equipment is analogous to medical diagnosis. A recent, highly readable book on troubleshooting (Magee 1982) provides examples of and procedures for developing checklists.

Many grammatical rule systems can be depicted as decision charts. However, as with other subject matters, as the rule maps are developed some arbitrary rules may emerge (e.g., "exceptions to the rule.") Not every part of a curriculum may lend itself to the checklisting approach. For sets of rules that are not intrinsically rational or ordered it is pedagogically preferable to recognize the arbitrariness rather than struggle to develop obscure formulas and generalizations with numerous exceptions.

Landa (1974) has suggested some criteria for deciding whether or not to develop and teach algorithms, criteria which apply equally well to heuristics and decision charts. The problem to be solved should be important or significant; the algorithm should not be excessively difficult or complex; the problems to be solved by means of the algorithm should be ones that are frequently encountered. He adds that exceptions to these criteria include instances in which an incorrect solution or procedure of searching for a solution (e.g., trial and error) might be dangerous or otherwise harmful.

In the following discussion we shall use the term checklist to refer generally to algorithms, heuristics, and decision charts since the comments apply to any of these variations.

Weighting. All items on a checklist are important if the criterion of relevance is being met, however they might not be weighted equally, that is, some are more critical than others. An error or omission at some point might be dangerous, costly, preclude attaining the results, or even prevent remedial action later on.

Robert Magee (1973) provides a good example of this point illustrated in Figure 4. Obviously the inclusion of ground coffee is a sine qua non for the attainment of liquid coffee at the end of the sequence. While the system might tolerate some skipping or variability in other steps in the sequence, this item must be included and so it should be weighted more heavily than some others. Whether the checklist is to be used by an observer for summative evaluation purposes or by the student to provide feedback during learning, it is important to note the relative importance of the items on it.

Analogous to weighting is rating. Sometimes there is reason for the observer or user to indicate the degree to which an attribute or step is present. Figure 5 is essentially a checklist used for grading student themes in a History course at Murdoch University. The degree to which each attribute is present in a particular theme may be indicated on the partitioned scale. Such checklists are usually called Rating Forms. Student evaluations (i.e., agreement) among observers is a serious consideration when any checklist is used; obviously the problem is intensified when ratings are introduced. Fairly elaborate techniques may have to be employed to obtain good inter-judge reliability.

Clarity. Checklists are instruments of communication. We might as "Communicate to whom? and Communicate how well?" A checklist utilizing highly technical terms might communicate to the expert observer but not to the novice. Ambiguous terms (which may not meet the criterion of true observability) are likely produce variability among observers as well as users. For example a checklist for evaluating clinical performance of student nurses required that the observer rate the degree of empathy exhibited by trainees toward patients. Lack of reliability among rates (embarrassing questions by trainees about the meaning of the item) led to attempts to clarify it in terms both of observable sets of behaviour and reactions of patients.

---

**Part of an Algorithm for Locating Faults in an Electric Typewriter**

---


Figure 3. An algorithm.
Developing checklists. Various procedures for generating checklists have been suggested (e.g., Landa 1974). Those familiar with task analysis (e.g., Briggs 1968, Mager 1972) will see clear similarities between procedures employed in carrying it out and those below. In fact, a checklist is a task analysis converted into a form that is more useful in teaching, evaluating, and learning. The reader may also be familiar with reports of experts on how they solve problems. These include informal observations (e.g., Polya 1957) as well as the more recent systematic work of cognitive psychologists. Clearly, that literature is also relevant to this discussion. The simplified versions below provided the reader with a better sense of how checklists might come to be rather than with algorithms for constructing them.

Performance Checklists

1. The performance of an expert is observed and recorded. (Even though the author of the checklist may be a master performer, it is preferable to start by observing another performer, thus encouraging the generation of items which meet the criterion of observability.)

In some cases here may be no master performer as, for example, when a new piece of equipment is produced and no operators for it have yet been trained. Experience suggests that total reliance of the development of a training manual or checklists should not be placed upon the developers of the system, such as the designers and engineers. Alternatives include using the performance and comments of successful trainees who have been supplemented, clarified, and performed their own trouble shooting on the original instructions. (For an interesting discussion of developing training manuals to be used with new machines, see Duffy 1982.)

2. After a draft checklist has been created on the basis of observing one master performer, other experts should be observed and notes made on differences among their performances with regard to apparently critical attributes, sequencing, and the like. This may help separate “style” from critical attributes and reveal alternative ways of accomplishing the same end. Differences between style and critical elements become blurred in master performers “my way is equated with “the way.” If alternative paths are equally effective and efficient they should be noted as options. Disagreement among experts may reveal basic problems: what seemed to be a matter of fact may turn out to be a matter of opinion: agreed upon steps may be ambiguous and “clarification” of them may reduce the amount of agreement. Patient and lengthy discussions may be necessary to produce consensus. Sometimes consensus may not be attainable; then, as suggested above, options should be indicated.

3. The checklist is reviewed and revised after observing several master performers. Then it should be tried out on a

---

**Checklist for Making a Pot of Coffee**

<table>
<thead>
<tr>
<th>Step</th>
<th>Scoring</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disconnects coffee pot</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Disassembles coffee pot</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Cleans components and pot</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Inspects components</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Fills pot with water</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Reassembles components</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Fills basket with coffee</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td>Reconnects coffee pot</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Sets dial on coffee pot</td>
<td>10</td>
<td>Yes</td>
</tr>
<tr>
<td>Reports pot is parking properly</td>
<td>10</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**SCORE:** 90%


Figure 4. A procedural checklist, illustrating the need for differential weighting of items.

---

A naive subject, a person drawn from the population of potential learners. Very likely technical terms will have to be defined, discriminations explained, and skills demonstrated. This process will reveal two things: terminology in the procedure that should be simplified or clarified and, importantly, parts of the content that must be taught to any new student. (Alternatively this set of knowledge and skills may be seen as the entry repertoire for effective use of the checklist; instead of representing material to be learned, this content may be used as the basis for a prerequisite test on which one must show proficiency before using the checklist.) Trying out the checklist on novices offers a means of developing a lean and relevant set of teaching objectives.

4. The author of the checklist has determined that, given a specific set of prerequisites, the user can successfully carry out the procedure and achieve the final goal. Further verification and additional insights will result when the author plays the role of user and a master performer observes and comments.

5. Examination of unsuccessful performances is also useful. It points up what items on the checklist are especially critical. It suggests where and what kinds of errors are commonly made, thereby providing the teacher with further guidance in developing the appropriate curriculum and deciding upon the emphasis within it. Error frequency data pinpoints common faulty discriminations or poorly executed skill elements.

An important point being made by this somewhat lengthy discussion of the development procedure is that such a careful process suggests (1) how much universality there is among experts with regard to what is to be taught and, (2) what the critical content of the curriculum should be. Having carried out the process, the instructor has in hand the content of a well developed instrument for evaluation purposes and an explicit statement of key elements of the teaching episodes.

Almost always, this procedure of explanation is time consuming and difficult. When complex decision charts are being produced, the task is even more onerous. However, the outcome is uniquely valid and valuable.

Product Checklists

The same general principles described above apply to the development of a product checklist; the specific steps are somewhat different and deserve comment.

1. To begin with, one engages in a procedure that is, in fact, a version of concept formation: Good and poor exemplars of the product are gathered. For example, to generate a checklist for graders of English compositions, one would gather batches of "A" and "F" papers. Experts should verify the original selection by sorting the whole into two or more piles.

2. Attribute analysis is undertaken either during or after the sorting. The experts discuss what basis each production is placed in the appropriate category. Critical features are revealed as well as disagreements among experts as to both the criticality of the feature and the degree to which it is present in any particular example.

This will result in a first draft of an attribute checklist for the product. The
road is unlikely to be smooth, for the experts will be revealing not only their discriminations but also their values (or, as the disagreeing expert might say, "their biases.") But this is the very stuff of which an exciting, thought-provoking curriculum can be built. What seemed like a simple checklist may turn into a complex and revealing decision chart with important and controversial modal points (e.g., "if at this point you believe that the most important function of literature is that it serves the goals of the State, then.") Careful recording of disagreements among experts is a critical part of this step.

3. Applying the checklist to a new set of exemplars tests out its comprehensiveness and validity. (Alternatively, it might be applied to the old set of exemplars by a new set of judges.) Repeated revisions and tryouts lead to the final version.

4. The use of the checklist by novices will reveal ambiguities, technical terms, higher order discriminations and the like which must be taught to students.

It is worthwhile noting again that the students may be taught long, complex performance chains and sometimes even provided with performance guides without ever acquiring the ability to discriminate the quality of the product they have made. An attribute checklist is the means by which such quality judgments can be learned. In fact, no performance checklist should be used without a corresponding product checklist which allows the performer to evaluate the consequences of his or her performance, a point which will be further elaborated below.

A special case. Occasionally, neither examining performance nor (in the usual meaning) product seems to allow evaluation or determination of "success." Rather one must look at the consequence of the action performed, often the impact upon other people. For example, an actor or actress is valued in terms of the degree to which an audience (perhaps a highly sophisticated audience) is moved. Elements of the performance may be analyzed by critics, but these are at some distance from what really counts. It is by the laughter the comedian produces, not by his routine, that we judge him to be successful. One could call this the "product" and we are inclined to do so, because it lends itself to the same kind of attribute analysis described above. It is sufficient to note that responses to our actions and products by other human beings deserve attention when develop-

![Image of a rating form checklist]

Figure 5. An example of a rating form checklist.
import to indicate under what conditions a particular, whole algorithm may appropriately be used. In the discussion of decision charts we noted that they may consist of trees of algorithms. The nodes of the decision charts often represent discriminations of appropriate conditions for each algorithm. If this meta-level of decision-making is not addressed the learner may master a set of algorithms without understanding when each can be applied. A frequently occurring example is the student in statistics who is competent in carrying out the procedures of chi-square, t-test, ANOVA, etc., but has not the foggiest idea of which test to use under which circumstance.

Consequences. Frequently, a checklist represents a chain with each response item producing the antecedent conditions for the next response. "Press Button A" leads to the red light over Button B going off thereby setting up the conditions for "Press Button B."

In some checklists, then, explication of antecedent conditions results in simultaneously describing most of the consequent conditions in the chain. However, this is not true of all cases, and, in particular the terminal consequence is often neither clearly described nor placed as they can never judge the worth of their performance or the degree to which it is successful. The study of consequences is obviously a critical element in the teaching of a performance. Neglecting it enslaves the student to an outside judge who always must be consulted before value and competency can be determined.

The response. It is obvious that responses called for in the checklist must be in the repertoire of the performer. In some cases that response is narrowly defined—for example when the nature of the machine being manipulated does not tolerate much variability. The performer must demonstrate the particular response required before one can be assured that it is in the performer's repertoire and that he or she understands how much variability is called for. The tennis instructor says, "Grasp racquet firmly," but grasp is a generic term for a wide variety of responses. If the instructor means that a particular grip be used, then it must be described or taught.

The problem of limiting the appropriate response becomes particularly critical in heuristics and decision charts. The writer of a heuristic for sales personnel which states, "Greet the customer..."

Three important criteria applicable to any checklist are: relevance, observability, and reliability.

within a larger context of "purpose." As a result, the performer may not know the "reasons" for carrying out each step, not be able to judge the quality of the outcome of the routine, and not be able to see or state the reason for doing it at all. (cf. the discussion above concerning product checklists.)

At first glance, it seems bizarre to suggest that students should grade their own final examinations. At second glance it seems ever more bizarre that they should not. If at the end of the course the learner (as well as being able to emit the performance itself) cannot discriminate whether his or her performance is satisfactory, we have neglected a critical component of the curriculum. Learners cannot be independent as long

probably assumes a particular repertoire on the part of the user. "Hi. How's it going, folks?" would be an inappropriate greeting by one promoting the services of a funeral parlor. But it is a possible, even likely greeting, given the heuristic statement.

In part, the appropriate class of responses is delimited when antecedent conditions are clearly understood. It is important to realize that further shaping out of the repertoire is enhanced when the consequences are noted and understood as well.

The learner: automaton or thinker? Let us now look at some concerns related directly to the learner. First we will re-examine the common criticism raised earlier: Checklists produce compulsive
The checklist technique places several demands on instructors. They must make explicit the performance routines, key decisions, alternative routes, critical discriminations, criteria for acceptable outcomes and response choices. Furthermore these all must be justified in terms of and related to, theory, principles, facts and real world resources and constraints. The curriculum is the body to be built around the skeleton of the checklist.

Furthermore, the checklist implies a lean approach to teaching with the teaching/learning episodes clearly related to the outcome. Does this mean a march along a barren asphalt road rather than a meandering stroll through the garden? Not necessarily. It merely means that the strollers have in mind some rather well defined purposes. While that constraint may bridle those who have a very different model of education, it should serve those who are attempting to develop in a systematic way certain performances and certain criteria for products of the performers.

Secondly, the recommended response should be seen as one selected from a variety of possible responses. That set of options should be known by the performer and the reasons for the choice of the optimal response understood. (For example, although it would work as well to use a non-silver solder to fix the joint, in time the joint would corrode and break.) The reasons for the selection of a particular response in preference to any other may presume a whole knowledge of theory and facts; they should be taught.

Lastly, the consequence of the performance can be discriminated by the “thinking” performer (e.g. “This is a well done job!”) and the relationship of that particular outcome to the broader picture is clear, and, one hopes, motivating.

Learning and checklists. All of this means that to produce a problem-solver performer—one who really understands the task and who can correctly adjust the performance to challenging circumstances—the instruction must include learning experiences focusing on antecedent conditions, response choice, and consequences.

The checklist need not be a sterile job aid or rating form. It can guide the progress of the learner by explicating what precisely is expected at the end of instruction. It can guide the teacher by reminding him or her of the minimal, critical curriculum to be taught; it can guide the evaluator by describing in detail the performance criteria.

But it is also in the development of the checklist that pedagogical benefits can be reaped.

The involvement of the learner in the creation of the checklist offers an exciting challenge to both learner and teacher.

Students using the checklist as a guide might be encouraged to ask the questions raised above concerning antecedents, response choice, and consequences, “Why am I doing this?” “How will I know if I’ve succeeded?” These are questions at a higher level than “What do I do next?” The way we have been looking at checklists encourages such probing.

Learners as Developers

But other possibilities suggest themselves.

“Grammatically correct” might be one item. It would likely lead to the generation of several algorithms. Another candidate for the checklist—“shows originality”—could open the door to an interesting exploration of invention and originality. In short, as a checklist is developed, the content of the “course” involves developing understanding and proficiency in all the areas to which it refers.

Using the generation of checklists as the motive force of curriculum development and teaching poses many problems, several of which have already been indicated. Another one is the possible threat to us, the teachers. We may not be able to generate a good checklist, or the ones we generate reveal ambiguity between personal values and agreed upon judgments or truths. Like the master performer discussed earlier, we may not have realized the extent to
which the curriculum is our curriculum. This is not to suggest that the teacher's values, special insights, unique viewpoints are unimportant—indeed, they may be a major contribution that only teachers can make to education. The point is simply that the confrontation of my curriculum and the curriculum may prove uncomfortable. On the other hand, it offers special opportunities for exciting high level class interactions—discussions of absolute versus normative standards, of fads and taste versus external verities, etc.

Too often teaching, even good teaching, is focused upon internalizing and using rules. There never seems to be enough time to develop in students techniques of searching for, selecting, generating, and choosing novel procedures and solutions. The particular solutions or rules that are taught to students are the results of such higher order problem-solving by the teacher and other experts; this higher order activity ought to involve the students. The teacher might share with students his or her own heuristic processes rather than the resultant algorithms. Perhaps not every academic really wants to encourage that kind of discussion, but those that do will find that building a course around checklistking will be the ideal catalyst—not only producing discussion but always directing students toward a real practical goal.

The involvement of the learner in the creation of the checklist offers an exciting challenge to both learner and teacher. Carried out to its fullest, it offers new roles for both and a chance for dynamic, higher level interaction even in subject areas that traditionally have been tiresomely taught and learned by rote.

Finally, it may not be too much to suggest that repeated excursions into checklistking may have global effects on students. Most analyses of problem solving as a general ability suggest procedures analogous to those which are involved in the development of a checklist. Students faced with the task of generating a checklist will engage in many problem-solving behaviors (steps such as analyzing the task, considering resources and constraints, ordering a sequence of activities.) It may be, as Landa suggested in the quotation earlier, that repeated guided exercises in developing checklists will result in the internalization and generalization of many problem-solving skills.

Conclusion

Checklists (algorithms, heuristics and decision charts) provide not only a means of evaluation but also an operational definition of teaching objectives, a guide to learning, and an education for curriculum development. Generating checklists can open new insights into the subject matter and teaching strategies. If students are involved, the process can become an exciting and powerful teaching and learning experience.

Checklists are instruments of communication. We might ask Communicate to whom? and Communicate how well?

Footnotes

1. The outstanding contributor to the analysis and application of algorithms and heuristics to education is L. N. Landa. His detailed and extensive work (e.g., 1974, 1976) is highly recommended.

2. The basic properties of algorithms typically cited bear a close resemblance to the previously discussed criteria for checklists. They are specificity (unambiguous, formally understood instructions), generality (applicability to an entire class of problems rather than only one), and resultivity (always produces intended results.) See Landa 1976, p. 108.

3. It is beyond the scope and intent of this paper to explore adjacent areas in the literature. However we should at least note the exciting literature which reports on observations of subjects solving problems. Early studies (e.g., Newell and Simon, 1972; Bruner et al., 1956) have been elaborated by recent research in cognitive psychology.

References


Acknowledgements

Figure 3 was reprinted from the NPSI Improving Human Performance Quarterly Spring 1972, Vol. 1, No. 1, by special permission from the publisher, the National Society for Performance and Instruction, 2126 Sixteenth St., NW, Suite 315, Washington, DC, 20036.

Figure 4 was reprinted by permission of Lear Siegler, Inc./Fearon Publishers, Pitman Learning Division.

1984, VOL. 7, NO. 1
An Alumni-Practitioner Review of Doctoral Level Competencies in Instructional Systems

David D. Redfield
Department of Educational Leadership
and
Walter Dick
Educational Research, Development and Foundation
Florida State University
Tallahassee, Florida 32306

Introduction
The design and development of a graduate program in Instructional Systems is based upon an assessment of need for the program and the experience base of the faculty. These are combined to produce a program which will serve many kinds of clients. Under the best of circumstances, such a program will undergo a variety of types of formative evaluation which will make it more effective. The purpose of this article is to describe one set of procedures used by Florida State University (FSU) to formatively evaluate its doctoral program and to suggest the generalizability of the findings to other doctoral programs.

In 1979, a study was conducted which included all 76 PhD graduates of the FSU Instructional Systems (IS) program. The program had been officially in existence since 1973. The study was conducted in two phases. The first was a mail survey of all graduates asking each to rate the competencies intended as objectives of the IS program on the basis of their frequency of use and importance on the job. A full description of the competencies, their derivation, and role in the degree program is reported by Boutwell (1977).

The second phase of the study involved a conference at FSU which was attended by ten specially designated graduates of the program. These graduates reviewed the results of the survey for their career field (e.g., the results of those graduates working in industry) and then prepared a consensus report for the group.

This report provides background as to the alumni derivation of instructional systems competencies for various career fields, a description of the survey instrument and methodology used in evaluating the program, a summary of the results of the study, and a description of modifications made in the program subsequent to the study.

Derivation of Competencies
The Instructional Systems doctoral program has been designed to meet the needs of students who enter a variety of professional positions following their graduation. The specific career fields in which IS graduates are expected to be employed range from typical university professorial and research positions to positions in industry and government.

In 1973, the IS faculty drew upon their combined experiences in the field and upon logical analysis to derive a set of "competency areas" which are presumably required at entry level for the specified career fields. As shown by Table 1, these competency areas were classified either as core (essential for all career fields) or as specialty (essential for certain career fields but not for others.)

The competencies are provided in Table 3 in somewhat more detail in the form of questions asked of the graduates. While the derivation of these competencies predates the AECT Task Force on Instructional Development Certification efforts to define a set of competencies for possible certification of instructional designers, there is an almost total overlap between the two sets of competencies. (See Bratton, 1981). While various graduate programs place emphasis on different clusters of these competencies (Gilber, 1982), the overall similarities are substantial.

The faculty estimated which competency areas were required by each career field and where emphasis should be placed in the acquisition of particular expertise for each field. In order to define and describe more precisely what is included in each competency area, the IS program faculty established objectives at the knowledge and skill levels. Knowledge level objectives specify information that a student should be able to state; skill level objectives describe application type behaviors that a student should be able to perform. These objectives have been the basis for course content and other educational experiences that make up the FSU doctoral program called Instructional Systems.

Procedures
Questionnaire Development
In order to survey the graduates of the FSU doctoral program in Instructional Systems, a questionnaire was constructed by a faculty committee. The major portion of the questionnaire, as shown in Table 3, was based on an expanded list of competency domains which define the present doctoral program. Respondents were asked to indicate whether or not they, in their current jobs, perform tasks in each of the competency domains. They were also asked to report the frequency of task performance and the proportion of time spent performing specific tasks. Additional sections of the questionnaire were included to determine the respondents' involvement in research on instructional design theory and models and their projections of critical skills needed by them in the next 10 years. Supplemental comments were also encouraged. Before the questionnaire was distributed to all graduates it was reviewed by several faculty members and by 10 alumni, and was revised in accordance with their recommendations.

Population
The questionnaire was sent to all 76 FSU doctoral alumni graduated since the
start of the program (including those who reviewed it). Of the 55 questionnaires sent out to U.S. doctoral alumni, 50 were returned. Nine questionnaires were returned from the 23 international graduates. For purposes of this paper, only the results of the U.S. alumni are reported.

The 50 U.S. alumni respondents were employed in 20 states and several countries of South America. They were distributed among employer classifications as shown in Table 2.

Overall, the mean number of years since graduation of the respondents was 4 years, with a mean of 3.5 years of service in their current job. The distribution of years of service on their current job is shown in Figure 1.

Conference of Graduates

In addition to the information gathered from the questionnaire, the faculty also selected 10 alumni to come to Florida State for an in-depth review of the program. Each graduate represented a major career field in Instructional Systems. Before the conference, participants were mailed information about the purpose of the meeting, a list of the competency domains and specific objectives under each, and a summary of the questionnaire data for the career field they represented. During their meeting, the alumni studied questionnaires and data summaries for their particular career fields and consulted with faculty members. Then they wrote individual reports which related the competency domains presently taught in the program to those needed on the job in specific career areas. Later in the meeting, group discussion among the alumni resulted in a consensus report. This was presented orally to an audience of faculty, students, alumni, and other interested members of the community.

Survey Findings

The response of the 50 U.S. alumni to the questionnaire were tallied as a total group for each of the 22 competency domains described in the FSU Instructional Systems program. Table 3 lists each competency domain indicating how many alumni find a requirement for these competencies in their jobs, the degree to which they are called on to exhibit each competency (use mode on a scale of 1 to 4), and a rank-order rating of the competencies viewed as having greatest importance to these alumni in the next 5-10 years.

For 21 of the 22 competency areas in the questionnaire, a majority of respondents affirmed the requirement for the competencies. Thus, we concluded that these competency domains are actually in use by more than half of the Instructional Systems graduates presently on the job. The competency domains with the highest percentages of respondents answering affirmatively were: human psychology, data handling, needs analysis, describing objectives, and project and program management. A group of competency domains which were almost as frequently named as being part of the respondents' work included: goal definition, learning task analysis, instructional materials development, selecting/developing media, interpersonal communication and consulting, designing training workshops, selecting/developing learner assessment

<table>
<thead>
<tr>
<th>CAREER AREA</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. R &amp; D Organization (Funded Projects)</td>
<td>6</td>
</tr>
<tr>
<td>2. Instructional Development Bureau</td>
<td>8</td>
</tr>
<tr>
<td>3. Teacher Education Center (Public Schools)</td>
<td>4</td>
</tr>
<tr>
<td>4. Medical/Professional School</td>
<td>5</td>
</tr>
<tr>
<td>5. Military/Industrial Training Development</td>
<td>14</td>
</tr>
<tr>
<td>6. Instructional Research Department (University)</td>
<td>8</td>
</tr>
<tr>
<td>7. International Development Organization</td>
<td>1</td>
</tr>
<tr>
<td>8. State Department of Education</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Total number of alumni responding = 50

1984, VOL. 7, NO. 1
instruments, formative evaluation, and general management. The only one of the 22 skill areas which is used by less than half (50%) of the population is research on improvement of instructional design theory and models.

**Consensus Report of Alumni**

In their oral report to the faculty and student, the alumni first emphasized their general high regard for the existing program at FSU. They mentioned particular strengths: the opportunities to participate in internship experiences during which students could try out their newly emerging skills in actual R & D environments; the role models provided by the faculty; and the collegial atmosphere, in which students were treated like professionals. These experiences were reported as relating positively to success on the job.

The panel then discussed the list of core competencies. All of those previously identified in the questionnaire seem to be useful to professionals in the field—no deletions were suggested. Even in cases in which alumni are presently performing mainly management functions rather than the technical work of instructional design and development, they still need expertise in these technical skills to supervise and train others. The research emphasis of the PhD in Instructional Systems was viewed as distinctly beneficial, even by those who are basi-

---

**Table 3**

**Questionnaire Summary**

<table>
<thead>
<tr>
<th>Instructional Systems Design Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Alumni Using Competency</td>
</tr>
</tbody>
</table>

**Psychological Foundations**

1. As part of your job, do you directly use knowledge of human psychology? 88 4 17.5
2. Basic Statistics 86 2 14.5
3. Data Analysis 88 2 6.5
4. As part of your job, do you prepare job descriptions or task descriptions? 66 2 17.5

**Goal Definition**

5. As part of your job, are you required to define and describe instructional goals? 82 2 14.5
6. As part of your job, do you analyze instructional objectives into subordinate skills? 84 2 8
7. As part of your job, do you use or do you teach people to use, objectives which are ambiguously described? 92 3 12.5

**Instructional Materials Development**

8. As part of your job, do you design and develop instructional materials? 90 3 4.5
9. As part of your job, do you develop or specify selection and use of media for instruction? 78 2 19.5
10. As part of your job, do you write or edit copy of instructional materials? 76 2 19.5
11. Instructional Delivery Procedures 80 2 19.5
12. As part of your job, do you design and develop instruction delivery procedures? 74 2 9
13. As part of your job, do you deal with adaptation, marketing or utilization of instructional products? 60 2 12.5
14. As part of your job, do you act as a consultant to other organizations? 84 4 2

**Designing Training Workshops**

15. As part of your job, do you design and develop training workshops? 80 2 3
16. Student Assessment Procedures 84 2 10.5
17. As part of your job, do you select or develop tests for assessing learning outcome? 84 2 10.5
18. Prerequisite Evaluation/Program Revision 84 2 10.5
19. As part of your job, do you conduct formative evaluation studies and use the data for program revision? 82 2 5.5
20. Summative Evaluation 82 2 5.5
21. As part of your job, do you specify the use, and interpret measures of, summative evaluation? 60 2 21
22. Project and Program Management 60 2 21
23. As part of your job, do you deal with the management of grants, contracts, or other funded projects? 60 2 21
24. General Management 60 2 21
25. As part of your job, do you manage the work of subordinates or other aspects of your organization that affect others? 60 2 21
26. Cost/Benefit - Effectiveness Techniques 60 2 21
27. As part of your job, do you manage the work of subordinates or other aspects of your organization that affect others? 60 2 21
28. Research Design 60 2 21
29. As part of your job, do you manage the research and conduct of systematic investigation? 60 2 21
30. Research on Improvement of Instructional Design Theory 60 2 21
31. As part of your job, do you manage the research specifically related to testing of hypotheses involving instructional design theory and models? 60 2 21

---

*The Mode indicates the modal frequency of how often the behavior or task is performed using the following scale of 1-4:

1 = never
2 = less than once per month
3 = at least monthly, but less than twice per week
4 = twice per week or more
cally consumers of research findings.

Three recommendations were made by the panel emphasized certain items in the competency domain list. One recommendation concerns the area of "adap-
ting, marketing, utilization strategies" as identified on the questionnaire. This competency area appears to combine a number of skills which could be identified and separately analyzed. For exam-
ple, the concept of marketing is a complex one which could include the selling of ideas as well as products. The skills in this cluster are thought to be quite important, particularly in in-
dustrial settings.

The second area of concern involves a distinction between formative evaluation, measurement, and testing on the one hand, and the broader area of the program evaluation and policy analysis on the other. The alumni stated that in their jobs they were often called upon to do both types of evaluation.

The third competency area, one which was stressed again and again in the con-
sensus report, was that of generic skills: communication— written, oral, inter-
personal relations; and management, including budgeting and supervising. These skills are critical and frequently used. While many of these can be learned on the job, the alumni felt that preparation in this area during graduate school is most beneficial.

Several competencies in the "specialty" category were mentioned by the alumni. They believed that instruction should be offered in the following competency areas:

1. Working as a change agent in a hostile environment.
2. Special problems of women in the projected work environment.
3. Nonformal education, especially for international employment.
4. Policy implications of instructional design and development issues and educational research issues.
5. Program and project management in a corporate environment.
6. Critiquing and reviewing skills (needed primarily in academic positions).
7. Developing CAI and CMI, as well as broad knowledge about the uses of computers in education and training.

The consensus report recommended that since the employment future for PhD graduates in Instructional Systems is optimistic, active recruiting by the program should be maintained, for example, among both teaching and supervisory personnel in the public schools.

The allied health professions are increasing-
l ingly seeking instructional design skills. Persons with medical training and de-
grees in instructional systems would be very valuable. Remote degree programs would apparently be attractive to indi-
viduals employed in industry who could practice new skills on the job while taking coursework. International organizations and foreign countries continue to be sources for recruitment of students and placement of graduates.

Program Modifications

Following the 1979 alumni meeting, the FSU faculty began the task of curric-
ulum revision, in an effort to incor-
porate the findings of the alumni study into the course and program changes re-
quired by the FSU conversion from a quarter system to a semester system. The faculty voted to retain set of core courses in the doctoral program which reflect the basic instructional design competencies endorsed by the alumni. In addition, a number of changes emerged in response to the alumni recommenda-
tions.

1. All doctoral students are now re-
quired to take, along with other typical Instructional Systems courses, courses in the dissemination and diffusion of ideas and products, formative evaluation of instruction, program evaluation, and basic management skills. New specialty courses have been added, as well as a biweekly seminar which serves as a forum for discussions of current topics in the field.

2. Two major career paths for gradu-
ates were identified: (a) university teaching and research, and (b) industrial training and development. Recommended courses, specialized internship experiences, and dissertation methods have been identified for each area.

Conclusions

This effort to draw on the experience of PhD alumni of the Instructional Systems program had valuable outcomes. To a considerable degree, this review confirmed faculty estimation of required competencies. Through the questionnaire and the alumni meeting, we learned that there were only a few gaps between academic training and the jobs graduates were obtaining. The faculty have attempted to sort through the alumni concerns in order to distin-
guish those which should result in pro-
gram change from those which should be best addressed through on-the-job training. Obviously, this process of pro-
gram review is one that should be repeated at frequent intervals.

There appear to be two substantial implications for other programs in the field. The first relates to the meth-
dology used in this study. It is not at all unusual to survey graduates with a ques-
tionnaire to determine the competencies they use on the job. The followup con-
ference of graduates at Florida State, however, made a valuable contribution to the study. At the conference, partici-
pants reviewed and emphasized the high points of the survey as it applied to their circumstances and those in their career field.

Second, all doctoral programs should consider the expanded responsibilities of the Instructional System doctoral gradu-
ate, as depicted by the study. Skills in the design and development of instruc-
tion are certainly necessary, but according to the alumni, not sufficient for the graduate. The study pointed to a variety of general skills, such as management, and specialty skills, such as computers, which should be included in any doctoral program preparing graduates for industry and universities.

Notes

This project was funded in part by a grant to the first author by Educational Services, Inc., Tallahassee, Florida.

Other faculty participating in this study were: Dr. Richard C. Boutwell, Dr. Robert K. Harison, Dr. Leslie J. Briggs, Dr. Ernest Burkman, Dr. Robert M. Gagne, Dr. Roger Koofman, Dr. Robert M. Morgan, Dr. Robert Reiser, Dr. William R. Snyder, and Dr. Walter Wager.

References

The Project-Oriented Matrix and Instructional Development Project Management

E. William Clymer
Communication Program
National Technical Institute for the Deaf
Rochester Institute of Technology
Rochester, NY 14623

Abstract. Instructional developers create instructional systems by means of a collaborative process: the team approach. Academic organizations typically expect instructional developers to manage an interdisciplinary ID team with little formal authority or supervisory responsibility. The subject-matter specialists and technical specialists that work with instructional developers are assigned to projects by functional managers. Supervision of team members remains with functional managers; yet the developer is responsible for managing the individual's contribution to the project. This ambiguous management system is typical in an organizational design called the project-oriented matrix. A project-oriented matrix is an organizational structure where technical specialists are supervised by functional managers, but are assigned to work on various projects managed by different persons. This paper defines the project-oriented matrix and describes specific management strategies that instructional developers can use to solve common ID management problems.

Organizations have two simultaneous needs that are often at odds with each other: freedom and order. Freedom springs from intuition and leads to innovation. Order stems from intelligence and provides efficiency. (Davis & Lawrence, 1977)

Instructional development (ID) is an approach to solving instructional problems by means of an interdisciplinary team comprised of experts from various instructional and technical support areas within an educational organization. The goal of the ID team is to solve instructional problems within a project framework. The role of the instructional developer is to serve as technical expert on the application of instructional development and as project manager of the interdisciplinary team.

The purpose of this paper is to:
1. describe organizational factors that influence most ID projects and relate them to the features of the project-oriented matrix; and
2. list and explain specific matrix management strategies that instructional developers can use to solve common management problems.

Organizational Place of ID

Instructional development programs should be placed within an academic organization at a point where they can have considerable impact on large numbers of students and faculty (Diamond, 1975). In most situations, directors of ID programs have a position where their immediate supervisor is the highest academic officer of the institution (Durzo, 1978). The rationale for placing instructional development high within the organizational structure is based on the premise that instructional development can assist the entire organization in identifying instructional priorities and help in determining the projects which will reflect prioritized issues (Diamond, 1975). This placement of an instructional development department is logical from both an administrative and political perspective (Durzo, 1978). In addition, the strategic aspects of instructional development are well-served by such an organizational design.

In spite of these considerations, however, there is no guarantee of the acceptance of the department by the institution. If acceptance is to occur, consideration must be given to the functional aspects of the instructional developer's formation of an interdisciplinary team and the step-by-step process of leading the team through the activities of instructional development. Placement of an instructional development department within an organization is important, but the ability of an organization to accept and support the concept of interdepartmental projects and the ability of the instructional developer to manage an interdisciplinary team has a powerful influence on the continued effectiveness of instructional development activities.

Organization Designs

Functional Design

The organizational approach used by most educational institutions generally follows traditional forms of function and authority. People are grouped together according to their common expertise and function. The employees within these groups or departments recognize the authority of the manager or chairperson who has supervisory responsibility and controls resources. The manager has similar background and experience as the employees. The advantages of this traditional approach are obvious in terms of the organization of the skills and expertise of groups of specialists. The persons within the groupings are also provided with clear career paths. This type of approach works well when the institution expects the particular groups of specialists to perform their tasks independently (Gallbraith, 1971). Thus, they are not dependent on other groups within the institution to contribute to their effort. This is usually the case for most of the instructional areas of an academic institution. The chemistry department is responsible for offering the chemistry courses, the history department is responsible for the history program, etc. Figure 1 is a typical organizational chart.

Project Design

An alternative organizational approach to the functional system is the product or project form of organization. It is commonly used by large, technical
Functional Organization

![Diagram of Functional Organization]

The matrix structure is useful, theoretical, and practical system that has application to a wide variety of organizational settings. Instructional developers often encounter projects that exhibit the primary characteristics of a project-oriented matrix, even if the institution does not subscribe to that exact organizational design. By recognizing the ID situation as one that is similar to the matrix design, the developer can be better prepared to deal with the managerial and organizational issues that are inevitable.

ID Project Management Issues

ID and the Project-Oriented Matrix

Figure 4 depicts how most academic institutions see the creation of ID teams. It is obviously quite difficult to understand the place and setting of the ID project by examining this organizational chart. If one were to recast the organizational chart to show ID project formation utilizing a project-oriented matrix, it would appear as a matrix with the functional areas on a horizontal axis and the ID projects on the vertical axis. The matrix subordinates are represented as the points of intersection and represent people who are accountable as two managers, functional and project. Such a matrix is presented in Figure 5.

Project-Oriented Matrix

Matrix organizational designs attempt to combine the best of both of the functional and project organizational designs. The characteristic that is most unique to a project-oriented matrix is the "two boss" or multiple command system (Davis & Lawrence, 1978). This refers to the fact that the team member, for a large part of his/her work, has at least two bosses; the functional manager and the project team leader. This dual or shared responsibility is the conceptual basis for a project-oriented matrix structure.

It is obvious that most institutions have many project and work efforts where there are varying degrees of dual accountability, and are not labeled as matrix projects. However, those persons who manage project teams along with those persons who contribute to project teams would undoubtedly feel more comfortable with the dual accountability they encounter while working on projects if they recognized the organizational structure of their work as having the characteristics of a project-oriented matrix. Figure 3 illustrates the project and functional aspects of a matrix in an industrial environment.

Divided Allegiance

Issue, Greiner and Schein (1981) cite the issue of divided allegiance as a primary concern for the matrix manager. It is a particularly important problem for the instructional developer. The individuals assigned to an ID team are educated professionals who come to the team from a variety of high-skill disciplines. They see themselves as members of their professions first, and contributors to an ID team second. They judge themselves against their peers in other organizations. Their loyalty is to their work, not to a project or organization.

Strategy. The ID project manager needs to recognize that the total ID project is not nearly as interesting or important to the specialist as is the specific

1984, VOL. 7, NO. 1
area of the specialist's work. It is important that the developer capitalize on the team members' loyalties to their professions and provide them with the opportunity to perform the required ID tasks in a manner that will both enhance their professional standing and improve the final ID product.

For example, a television producer/director may have very little interest in the instructional objectives of a proposed ID project, but may be extremely interested in creating a series of television programs that could be aired on a community cable system. If the developer is willing to allow the producer/director to explore the opportunities for public distribution of the television product, the results will undoubtedly be positive. It is important to recognize that it is easy for the developer to overlook the professional needs of the team member in favor of a rigid outcome expectation. Flexibility in terms of allowing team members to maximize their contributions will usually enhance the degree to which team members support a project.

Another, but more difficult, strategy for divided allegiance is to work with functional managers of specialists to be certain that team members' contributions to ID efforts are recognized through formal performance appraisals. Team members are traditionally evaluated by functional managers of like discipline. If an arrangement is made with the supervisors of team members to recognize a person's contribution to a development project in the appraisal process, the specialists would probably consider project assignments in a more positive manner.

A means of allowing the team member to be active within his/her profession must be established and promoted by the ID project manager and the organization. Respect should be given to the professional needs and interests of the team member. Specialists must see that their contributions to an ID project yield both positive rewards to the organization and to each specialist's career goals.

Authority and Responsibility Confusion Issue. Greiner and Schein (1981) discuss a major problem when managing a project using the matrix design: "Who is responsible for what?" ID project leaders rarely have complete control of the individual team members' time. Team members usually work on a number of projects at the same time, with different project managers. Yet they still report to their functional supervisor and have assignments they must complete within their functional area. Within an ID team, a major problem is often encountered when a technical specialist requires a decision regarding a technical aspect of the ID project. Who decides—the functional manager or the project manager?

Strategies. When there is this type of problem on a project, it is often due to a "latent" matrix system (Davis and Laurence, 1978). The latent matrix is frequently encountered in ID project management and causes considerable confusion. People need to be told how the matrix-project management system works before and during the life of the project. People need to know that they are working on a project that utilizes a matrix organizational design. The rationale for the matrix system needs to be
A Project-Oriented Matrix for ID Projects

Functional Areas

- Instructional Development
- Academic Administration
- Academic Dept.
- Academic Dept.
- Support Services

Projects

- ID Project

Figure 5

The developer should carefully explain the roles and responsibilities of each person on the team. Functional managers should be part of the early team building process. "Continuous clarification of individual responsibilities needs to be offered. Obviously, conflict over responsibility never disappears, yet discussion and persuasion, not written job descriptions, can reduce the confusion" (Greiner and Schein, 1981). To resolve a technical question, the project leader should negotiate a solution dependent upon the situation.

Speciality Emphasis

Issue. Each project requires the unique talents of team members to create a finished product. Contributors tend to see the project in terms of their own specialties. Team members may have a tendency to place too much emphasis on their particular specialties at the expense of other components of the project.

Additionally, technical specialists may feel a need to use trendy or fashionable technology without careful consideration of the realities of the project and budget. An associated problem has to do with the team members' lack of respect for a project manager who is not "state-of-the-art in the specialists' area.

Strategies. The project manager must be "literate" in the major technical areas that normally contribute to the ID effort. The ability of the project manager to determine what is an appropriate level of effort or expense from a technical specialist is critical if the project will be completed on time and at budget with the team members feeling that they have produced work that is state-of-the-art for their profession.

The instructional developer needs to determine what is the best compromise in order to keep the team members happy and to reach the instructional goals of the project. The key to keeping the project on course is to apply "continuous planning" with the entire team (Greiner and Schein, 1981). Monitoring, in a positive way, the plans and work of the various team members keeps all persons aware of the project goals and provides feedback to the individual as to what is an appropriate level of effort and expense.

"Groupitis"

Issue. Davis and Lawrence (1978) define "groupitis" as the mistaken belief that matrix management is the same as group decision making. The process of ID probably appears as an exercise in group dynamics to many first-time content specialists and technical personnel. The meeting is the environment where ID takes place. Meetings for the entire team are scheduled frequently for such purposes as team building, planning, and actually creating the instructional design. Due to the nature of lengthy and complex meetings, there can be a tendency on the part of team members, especially those seeking additional power or control, to create a form of "democracy" within the project. People, striving to have their point-of-view accepted, often will campaign for their ideas within the group, seeking additional support. If given the opportunity, they will press for group consensus in order to force a decision on the project manager. Obviously, group process is the great strength of instructional development. How can the developer control the team so that the project moves along according to the collective direction of the team, without relinquishing control?

Strategies. The instructional developer can do several things to create a distinction between group decision making and project management. The best way to ensure that team members understand the decision making process is to explain the process at the start of the project. The explanation should be delivered by the functional managers prior to the team building stage. The decision-making process should be reinforced throughout the project by both the project managers and functional supervisors. When explaining decision making relationships, the managers should emphasize that the responsibility for getting decisions made and maintaining momentum rests with the project leader. However, each specialist should be given the autonomy to determine the most effective/efficient activities for their area of specialization.

It is critical that project leaders make the best use of meeting time. A tone for meetings should be set at the start of the project and maintained. Agendas are a very effective way of controlling the time spent in meetings. Invite only those persons who need to be there. Encourage discussion during meetings. Promote an open exchange of ideas. A group leader should summarize and attempt to bring issues to closure. It is critical that the project leader does not default or relinquish the leadership position at the summary stage of discussion.

Conclusion

The existence of matrix characteristics in ID project management is inevitable. The two-boss situation surfaces very quickly during the team building stage of a project. The developer and the functional manager are the two bosses who share the technical specialist. The functional manager, due to resource and supervisory power, is usually the stronger partner. That is, the functional manager is given the power by the
Group Consensus Evaluation: A Procedure for Gathering Qualitative Data

Constance A. Mellon
University of Tennessee
at Chattanooga

Abstract. Group Consensus Evaluation, a course evaluation procedure based on qualitative data-gathering techniques, can provide an effective alternative to traditional course evaluation forms. Using this procedure, students come to agreement, in small groups, then in the class as a whole, on the things they would like to keep the same in a course, the things they would like to see changed, and how that change might occur. This procedure provides the instructor with a single class view rather than a series of conflicting views while providing a forum for students to separate their individual problems with a course from those that are shared with their fellow students.

The young woman with a doctorate in educational technology was the only instructional developer at a small liberal arts college in the midwest. As such, it was her function not only to facilitate the design of courses, but to evaluate them as well. She had been trained at one of the major university development centers whose professional staff included two evaluators and she had studied carefully the evaluation processes they used. Therefore, for each course she designed, she gathered the typical kind of information using a written form composed of a Likert-type scale and a space for comments. It seemed, however, that the results were always the same. About half of the students thought the instruction was clear, interesting, important, and taught at just the right pace. The other half found it to be slightly confusing, somewhat uninteresting, generally unimportant, and taught a little too fast (or a little too slow). The open-ended comments were, perhaps, even less helpful. Some students thought that too much material had been covered in the course while others found the material repetitive. Some students declared that the class was too structured while others complained of no structure at all. Some students wanted more lecture while others argued for increased student participation.

Written evaluation data of this kind are relatively easy to analyze; however, interpreting the results to faculty may create a problem. Let us suppose that the new instructional design for a sociology class included a role play exercise. The professor, anxious to find out how students reacted to this new educational experience, asks that evaluation data be collected. Presenting the data to the professor might create a scene similar to the following.

"Dr. Johnson," the developer might begin, "of the 32 students enrolled in your class last semester, 15 mentioned the role play exercise as the thing they liked best about the class."

"Excellent," the professor might reply. "But what about the other 17 students?"

"Well," the developer might explain, "eight of them really thought the role play was a waste of time, three said they would never enroll in another course where they were forced into a role play situation, and the other six didn't mention that component of the course at all."

"All right then," might be the response, "you're the instructional developer. What should I do about that role play component next semester?"

This dialogue is typical of the difficulties instructional developers encounter in the higher education setting. On the one hand, they are trained to believe strongly in the necessity for formative evaluation as an integral component of development. On the other hand, the data they are able to collect are often contradictory, confusing, and insufficient to provide any clear direction to the efforts to improve instruction.

References

Are there other choices? At the College of Saint Benedict in St. Joseph, Minnesota, an alternative procedure was developed. The procedure, Group Consensus Evaluation, was based on the work of D. Joseph Clark and colleagues at the Biology Learning Resources Center, University of Washington (Clark & Bekey, 1979; Redmond & Clark, 1982). Begun as a small effort in conjunction with several newly developed general education courses, it was met with enthusiasm by the faculty and soon expanded into a college-wide program.

Group Consensus Evaluation is a procedure for obtaining information using interview and small group techniques.

What Is Group Consensus Evaluation?

Group Consensus Evaluation is a procedure for obtaining from students much the same sort of information that is solicited in the standard evaluation form. However, the information is obtained in the classroom using interview and small group techniques. The procedure follows a fairly simple and straightforward pattern of activities.

The evaluation is conducted at the end of a regularly scheduled class, taking between twenty to forty minutes to complete. After introducing the evaluator and explaining that he/she will gather information for course improvement, the classroom teacher leaves. The evaluator tells the students that the procedure they will use is designed to facilitate class agreement on the strengths and weaknesses of the course and how the course might be improved. He/She assures the students that only a summary of their discussion will be presented to the instructor and that the things said and who said them will be kept confidential.

The students are then asked to divide into small groups of no more than five or six. This physical division, often in classrooms obviously not designed for small group interaction, is actually one of the more difficult parts of the procedure. Nevertheless, at the College of Saint Benedict, effective evaluations were run for classes which ranged in size from five to ninety students.

Each small group is asked to appoint a recorder to report their findings back to the group as a whole. The evaluator then asks each group to take about five minutes to come to agreement on the things they liked best about the class, the things they liked least, and some specific suggestions for improving what they liked best.

At the end of the time period allotted for small group discussion, the evaluator asks for group reports. Spokespersons are asked to report their group’s findings on each of the three questions: strengths, weaknesses, and suggestions for improvement. The groups who are not reporting are asked to listen carefully to see if they agree or disagree with the group that is reporting. When groups disagree on some issue, it is thoroughly discussed. Sometimes, when the issue has been clarified, the groups will then agree on a shared point of view. If agreement is impossible, the evaluator might try a hand count to see what percentage of the group holds each point of view. This procedure continues until each group has reported.

The evaluator has two main functions during this process. First, he/she must listen carefully and record the findings of each group. Second, where general group discussion is needed, he/she should facilitate clarification and communication by asking necessary questions and providing succinct summaries. He/She also acts as timekeeper for the process, being certain that all groups have a chance to report fully on each of the questions within the time allotted for the evaluation.

It can be seen that both written evaluation and Group Consensus Evaluation solicit the same sort of information about a course. In practice, however, while the factual elements obtained may be similar, the outcome of each method is quite different. This is primarily due to the fact that the theoretical base of Group Consensus Evaluation is different from that of the written evaluation.
techniques are consistently associated with this area: participant observation and unstructured interviewing. Group Consensus Evaluation is based upon the latter technique, unstructured interviewing.

The Unstructured Group Interview

The unstructured interview has been described in a variety of books dealing with qualitative methods (Banake, 1971; Richardson, Duhrenwend & Klein, 1963; Spradley, 1979). Basically, it is a conversation between two people where one can ask questions and the other respond in a comfortable and non-threatening way. The purpose of the unstructured interview is to understand another’s point of view. The questions should be aimed at making the person being interviewed comfortable so that he/she will be willing to communicate. Thus, questions should not challenge, confront, or argue with the point of view being expressed. The aim is to understand another’s perspective, not to change it.

In the unstructured interview, the person being interviewed should do most of the talking. The interviewer should encourage the respondent to continue talking by nods, smiles, and such verbal encouragement as “yes” and “go on.” The interviewer should not interrupt the respondent or cut off the flow of conversation. If questions occur as the respondent talks, the interviewer should remember them or jot them down to ask later.

One useful approach to understanding qualitative methodology is from the perspective of symbolic interactionism. This perspective, based upon the philosophy of George Herbert Mead (1934) and Herbert Blumer (1969), differs from conventional psychological and sociological frameworks in that the human being is viewed as an acting rather than a responding organism. The assumption is that people act on the basis of the meaning things have for them and that in order to understand the actions of people, it is necessary to interpret objects as they do. “Objects,” from this perspective, include not only the person doing the acting, but other people and their actions, the environment, and the physical objects within the environment.

Although qualitative research methods are limited only by the imagination of the researcher, two basic methodologies with the addition of one further element. Interviews are conducted in a group setting. The evaluator conducts the Group Consensus Evaluation should be familiar and comfortable with group procedures. During the early part of the process, groups must be allowed to function freely in order to arrive at agreement on the points in question. However, the evaluator needs to be aware of groups who require some prodding on time or task and the point at which to end the small group discussion. When the small groups report to the group as a whole, the evaluator should summarize the points as they are noted, then constantly check to be sure that his/her perceptions agree with those of the students who are reporting and the students who are listening. Clarifying questions should be asked as necessary and large group discussion of the points being made should be encouraged.

Applying the procedures of unstructured interviewing to this group situation, the evaluator should remain neutral, neither agreeing nor disagreeing with the opinions being expressed. His/her responsibilities during this data-gathering stage are facilitation and inquiry. Through the use of these procedures, information on the students’ perceptions of the class and the basis for these perceptions can be collected.

Clarifying Data Through Group Consensus Evaluation

One of the particular values of this

Students expressed their preference for Group Consensus Evaluation as opposed to the written evaluation method.

Merton, Fiske and Kendall (1956) described a modification of the unstructured interview which they called the focused interview. While still aiming at subjective experience, the respondents are asked about a particular concrete situation in which they were all involved. The intent is to clarify the situation by recording descriptions from a variety of participants.

Group Consensus Evaluation incorporates both the unstructured interview and the focused interview into its evaluation procedure is the opportunity to clarify perceptions as they are noted. For instance, during a Group Consensus Evaluation with an upper division chemistry class, there was an obvious split of opinion on the value of the lectures the instructor had given. One small group reported that they liked the lectures best because they stressed principles rather than repeating specific material to be memorized. Other students strongly disagreed, claiming that they found much of the lecture material incom-
prehensible. By questioning and discussion, it became clear that the problem was with the entering knowledge of the students rather than the lecture style of the instructor. Those students who liked the lectures had taken their basic chemistry classes from the same instructor. Those who disliked the lectures had taken the introduction from other instructors. The students concluded that there was a real need for consistency in the chemistry sequence and that departmental revision would be necessary to accomplish this. For a short term solution, they suggested that study guides and skill sheets used by the instructor in his basic chemistry class be made available to the students who had taken classes from the two other chemistry instructors and that a weekly review session be held for those who needed it.

In another instance, an introductory math class was being evaluated. The students reported two opposing perceptions of the instructor: one group found her to be encouraging, accepting, and helpful; the other group reported inflexibility and discomfort in raising questions. As these two points of view were discussed, one student noted the fact that the positive perceptions were from the men in the class and the negative ones from the women. Several women then were able to state their feelings that the instructor showed preferential treatment to male students. Once this view had been expressed, many of the men in the class supported it and were able to describe incidents to illustrate it.

Unlike the written evaluation method, the theoretical base for Group Consensus Evaluation is qualitative in nature.

These two examples were selected to demonstrate the type of data which can be gathered using the unstructured interview procedures of Group Consensus Evaluation. As can be seen, discrepancies in the data can be followed up immediately, and in many instances, the reasons for the discrepancies become clear. This allows for a fuller understanding of the problems with a specific course and how they might be handled, thus providing a broader base of supporting information when the course was welcomed by faculty under these circumstances where it might have been ignored or resented under other circumstances.

The Advantages of Group Consensus Evaluation

In addition to the points discussed above, there are several other advantages of Group Consensus Evaluation which should be considered. First, due to the nature of the procedure, it can be used to improve the class being evaluated as well as to improve the course in the future. Evaluations conducted at mid-semester provide enough succinct information to allow for immediate adjustments to the class being conducted. Thus students no longer have to be asked to contribute data for course improvements they will never see. Improvements are immediate and are tailored to the individual needs of the class.

Second, both students and faculty like this method of evaluation. Students expressed their preference for Group Consensus Evaluation as opposed to the written evaluation method. They explained that, while they were asked to fill out innumerable written evaluation forms, they never saw any results. With this procedure, they felt that someone was finally listening to their ideas and acting upon them.

Faculty were also enthusiastic about Group Consensus Evaluation. The data were clearly defined and presented a single class view rather than a compilation of many opposing views. Suggestions for improvement were reasonable, possible, and could frequently be quickly implemented in the class being taught. In addition, the fact that the faculty member had requested the evaluation and then acted upon it improved the communication between the instructor and the students.

At the College of Saint Benedict, faculty requests for Group Consensus Evaluation increased from five during the first semester to thirty in the following semester. Faculty who had requested evaluation for one class they were teaching often followed the first evaluation with requests for their other classes to be evaluated. In addition, many of the faculty requested written summaries of the feedback sessions to include in their documentation for promotion and tenure.

Third, Group Consensus Evaluation allows a clear distinction to be made between the problems of individual students and problems with the course. By allowing time for class discussion of each issue, students can see which problems experienced in the class are shared by the group and which problems are the student's own. While the evaluator using this procedure never challenges the opinions students present, other students discussing how their views differ from the one being expressed may do so. For instance, a small group of students in a religion class under evaluation had no positive comments on the course at
all. They complained that the work was too hard, the assignments too long, and the tests unfair. There was immediate disagreement by the majority of the students who defended the instructor and her teaching methods. Several students pointed out quite strongly to the dissenting group that the assignments and work load were more than fair compared to other college courses and that the problem was that this group of students was just not willing to work.

Group Consensus Evaluation is a cost-effective way to gather data.

The dissenting students finally admitted that their stand had been somewhat biased and that the workload and testing procedure was indeed fair in the college setting.

Finally, Group Consensus Evaluation is a cost-effective way to gather data. It requires less than an hour of class time, yet yields results which are, in essence, already analyzed. And the analysis is conducted by experts on the meaning of the data: the students whose opinions the data represent. The data reported are clear, present a single view, and can be acted upon without a great deal of debate about meaning. In addition, Group Consensus Evaluation prepares the way for any instructional improvement services available to the faculty at that particular institution.

In Summary

Group Consensus Evaluation, a course evaluation procedure based on qualitative data-gathering techniques, can provide an effective alternative to the written evaluation. By involving the students in a discussion aimed at class consensus, it provides a forum for separating the problems of individual students from the problems with the course and for clarifying ambiguous pieces of data. A single class view is presented for the instructor's consideration rather than a series of conflicting views. Moreover, through the one-on-one feedback sessions, a natural setting for involving faculty members in instructional development activities is provided. The Group Consensus evaluation procedure is useful in any setting where course evaluation is used to guide instructional development activities.

References

Submitting to JID

Manuscripts submitted to JID should conform to APA format. Any artwork should be professionally produced and camera-ready. Authors are cautioned to take special care that the references agree with citations in the text, and that the reference list conforms to APA format. You will have to submit written permission to use any material (tables or figures) from another source. Type everything double-spaced, including references and footnotes. Include a cover letter confirming that your manuscript is original, has not been published previously, and is not currently under consideration for publication elsewhere.

Manuscripts are reviewed by the editor, an editorial board member, and two consulting editors, a process which takes about two months.

Send four copies of your manuscript to:

Norman Higgins, Editor
Journal of Instructional Development
Dept. of Educational Technology
FLS/College of Education
Arizona State University
Tempe, AZ 85287

JOURNAL OF INSTRUCTIONAL DEVELOPMENT
Instructional Development: A Consideration of the Interpersonal Variables

D. O. Coldeway
Head of Instructional Development
Instructional Development Department
Athabasca University
Edmonton, Canada, TSL 2W4

and

R. V. Rasmussen
Associate Professor
Department of Organizational Analysis
The University of Alberta
Edmonton, Canada, T6G 2G1

For further information, contact R. V. Rasmussen. The order of the authors' names does not signify that an unequal contribution was made by either author.

Abstract. It is only recently that much attention has been paid to the interpersonal aspects of the instructional development process. While many writers have stated that interpersonal competency is a must for instructional development specialists, few have spent much time explaining why. This paper utilizes behavioral and social-psychological frameworks to explain why the instructional development process can be a difficult and demotivating experience for a subject matter expert. Anecdotal evidence taken from interviews with three subject matter experts who were recently involved in instructional development projects is used to illustrate the difficulties that can occur. Also explored are the implications for research and for training instructional developers.

Since instructional development often consists of a collaboration between one or more instructional development specialists (IDs) and one or more subject matter experts (SMEs), it seems obvious that a significant amount of attention should be focused on the interpersonal aspects of the instructional development process. Recently there have been several articles published in the area (Bratton, 1979; Coscarelli & Stone-water, 1979; Durzo, 1979; Leitzman, Walter, Earle & Myers, 1979; Rosenberg, 1978; Rutt, 1979). According to Bratton, who has reviewed the literature on this subject (1979) much of the writing falls in the categories of personal opinions and how-to-do-it approaches. Our review of the literature indicates that much has been done in terms of developing models and theories and in extending work in other areas (e.g., organization development, consultation skills) to the area of instructional development consultation. Research on consultation processes is needed and is one of the next logical steps in the development of the field; however, there is room for further study derived from the personal experiences of IDs and SMEs engaged in the instructional development process. Moreover, while most writers have pointed out the need for IDs to develop interpersonal competence, few have provided details about why they feel so strongly about the matter.

The purpose of this paper is to explore the instructional development process from the perspective of the SME. Our goal is to explain how the instructional development process can threaten and demotivate an SME and to discuss how interpersonal skills can be used to overcome these problems.

The Hazards of Instructional Development

Most instructional developers would probably agree that instructional development is needed, that it is interesting, and that it can be fun and fulfilling. However, the average SME might experience the process as what has been called a social trap (Platt, 1973). A social trap occurs when socially desirable behaviors that would have a high long term payoff are punished in the short run. In such a case, the desirable behavior may be abandoned before the long run benefits occur. The same sort of social trap may exist in the instructional development process. That is, while instructional development may be seen as a socially and educationally desirable goal, the short run experiences of SMEs may be such that they are tempted to abandon the process before a project is complete. For one thing, SMEs begin the instructional development process with a feeling that they have a fairly good grasp of their field and of how to teach it. As they progress through the instructional development process they enter into a period of disorganization and confusion. Among other things, they find that they can't explain the course concepts as well as they thought they could, that their teaching sequences no longer make sense, and that their exams are mostly at the memory level when they thought they were teaching people to think creatively.

It is only later, after a substantial and lengthy developmental effort, that SMEs are likely to feel that they are more in control of their course than they were initially. The comments made by one of three SMEs that we interviewed who were recently involved in development projects illustrate this point:

"I can't say that I feel that I am anywhere as strong in my field as I should be, but I do feel that I know two areas as well as anyone else...that I have...well...practical insights. So, it was quite disconcerting to me when we began to discuss some of my pet ideas. When he (the ID) began asking for examples, I provided some of the ones I've used in lectures and notes. But, somehow through the conversation and his questioning, I began to see that they didn't pan out and that some of the ideas weren't quite right. After a period of this, I began to wonder whether I knew anything at all."

During the development process, the ID can't help but send esteem-reducing messages to the SME. As an expert in the instructional field, the ID's task is to find problems with the instruction and correct them. The better the ID is, the more
problems are uncovered, and the more the analysis is esteem-reducing for the SME. As our interviewee put it.

"How did I feel? Frankly, I felt terrible. You see, I'm not your standard academic, but I did think that I made up for doing less research by being a better teacher and by focusing on practical applications. It felt awful to have what I considered my strengths washed away. I thought of quitting teaching several times during this period."

Another potentially negative aspect of the process has to do with the need for the SME to explain the content of the course to be developed to the ID. This places the SME in a vulnerable position rarely encountered elsewhere (except perhaps in the case of the academic SME adequate."

A final factor that makes instructional development difficult for SMEs is the shift of control from the SME to the ID. Most SMEs' are accustomed to being in a position of unquestioned authority with respect to the selection of content and the delivery systems for their courses. The ID's ideas with respect to these matters challenge the SME's authority and force a sharing of power. One may wish to argue that this could not amount to much of a problem since the SME has agreed to engage in instructional development. However, the degree of power-sharing is likely to be far greater than an SME initially imagines it to be.

"She (the ID) had her own ideas about everything. I thought that I had a pretty good order of presentation, "renowned masterful teacher" to "incompetent bore." Although the task analysis obviously demonstrated a need for improvement, he dropped his involvement with the project shortly after this first series of interviews.

A second SME we interviewed was designing a course for an open learning institution with the help of an ID from that institution. After several meetings he was quite upset and claimed to be near to quitting, although he didn't do so. His reasons as he stated them were the following:

"Each meeting with him (the ID) is like a debate. I'll mention an idea or a concept and he'll either question its integrity or he'll add several ideas of his own. In several meetings, I thought I'd never get a word in edgewise. I sometimes wonder who he thinks the expert is."

Experience in other related fields (e.g., organization development, counseling, and community development) suggests that there are several things an ID can do to minimize the negative aspects of the instructional development process and to ensure that a project reaches completion. Three areas that have been shown to be important will be discussed: the contracting process, methods of building supportive climates, and active listening techniques.

The Contracting Process

The contracting process has been stressed in other consultation fields (Caplan, 1970; Spencer, 1969) and recently in the field of instructional development (Leitzman et al., 1979). Ideally, a contract is a negotiated agreement about what will happen during the consultation process. However, this ideal is rarely reached or even consciously considered in most human transactions. Instead, much of what goes on is in the domain of what has been called an implicit psychological contract. In any meeting between two or more persons, there will be a set of expectations held by both parties about how each should behave. In some cases the expectations coincide, while in other they do not. Such contracts operate on a subconscious level, that is, neither party explicitly mentions behavioral expectations, yet each behaves as if under contract, expecting the other person to know the boundaries of the contract and not to transgress beyond them (Carney & McMahon, 1974; Egan, 1978). If a person senses a violation of these un-negotiated expectations, he or she will feel uncomfortable and may even avoid.
future interactions with the other party. An example of an implicit psychological contract occurs at a social gathering where it's generally okay to ask, "What do you do for a living?" but not, "How much money do you make?"

In the case of instructional development, this notion is very important because the SME is likely to have unrealistic expectations about the purposes and processes of instructional development, and unless these expectations are made explicit and are negotiated openly, the development effort may falter. For example, most IDs have probably experienced having to carefully explain that instructional development is not centered on learning to use media effectively. Other unrealistic expectations that the SME may hold include the following:

- That it will be easy to describe the objectives of the course.
- That the course concepts are easily explained to others.
- That the instructional development process will be fairly straightforward because the ID knows exactly what to do.
- That the ID is a sort of super-organizer who will do much of the writing of exams, workbooks, etc.

Of course, most IDs anticipate some of these problems and try to account for them. For example, they usually explain that instructional development is not simply building media into a course. However, rarely will an ID lay out an explanation of the process and outcomes of instructional development to the degree that there is a full understanding on the part of the SME. That it is important to do so is stressed by Argyris (1970), a consultant in the field of organizational development. According to Argyris, it is only when clients can make a fully informed choice that their commitment to a developmental process will remain high.

For these reasons, IDs should be aware of the nature and importance of a psychological contract. In addition, they should know which aspects of an instructional development project need to be explicitly clarified and how to do so. While it is not the purpose of this paper to identify all the important elements of a contract or to describe at length how to communicate the contract to the SME, attention to the following elements should be considered:

- The length of the process.
- The frequency of meetings.
- The amount of stress the interaction may cause, and the reasons for stress.
- The nature of the process (i.e., how the ID and SME will interact).
- The goals of the process (e.g., what instructional development is, what instructional objectives are, why are they important).
- The short run costs and the long run benefits of the process.

Communicating the above types of information to an SME can be accomplished in a variety of ways and using a variety of delivery techniques. There are excellent programmed workbooks explaining the purposes and techniques of instructional development (e.g., Dick and Carey, 1978). As food for thought, some counselors have developed videotapes of sessions that they show to new clients and others have developed precise, written contracts (Egan, 1975).

In the instructional development context, Leitzman et al. (1975), provide several useful examples of contracts they have utilized with their clients. In initial discussions with new SME-clients, the authors have found it useful to spend about a half-hour describing one of their most recent development projects.

Of course, the ID should be careful not to overwhelm the SME with unnecessary detail. The point is that the relationship may be in jeopardy unless the SME's expectations are close to reality. Research is needed to determine precisely which expectations are likely to mismatch reality and what is the most efficient method of bringing those expectations into line. One hypothesis of interest is that the relationship between the degree of detail in the contract and its effectiveness is curvilinear (Egan, 1975). Contracts either too high or too low in definition may result in low effectiveness.

Building a Supportive Climate

Gibb (1961) analyzed a large number of tape recordings in a variety of interpersonal situations and found that certain characteristics of the communications led either to the formation of defensive or supportive climates. A defensive climate is one in which a person perceives threat, becomes unable to concentrate, and distorts what he hears. Conversely, in supportive climates, people are better able to concentrate upon the content and cognitive meanings of messages. Because the nature of the interaction that takes place during instructional development is, in part, a transmission of complex information from SME to ID, clearly it would be important to develop a supportive climate.

There are two concepts mentioned by Gibb that are applicable to an instructional development interview, namely, control and evaluation. Controlling speech is speech in which someone is trying to do something to someone else—for example, to change an attitude, to influence behavior, or to restrict the field of activity. According to Gibb, speech that is used to control evokes resistance. This poses a difficulty for an ID because, as stated previously, part of the ID's job is to fit the SME's ideas into an instructional development framework.

This control dilemma can be resolved by the way in which the ID directs the conversation. Most IDs that the authors have observed use a series of (controlling) leading questions to elicit the information they need for the instructional development. This is analogous to the strategy that physicians use when approached by a patient. They typically ask patients a series of diagnostic questions and prescribe a solution. Patients often have little idea of where the questioning process is leading or they may even have the wrong idea. The physicians are often oblivious to the fact that the patient's hands are sweating because he fears that the physician questions indicate that something is dramatically wrong.

This type of approach may work in the doctor-patient relationship because of the nature of the psychological contract with respect to the practice of medicine. Many patients treat the physician as a parent figure and place
themselves in a submissive posture. However, the ID-SME relationship does not have this long historical pattern of dominance-submission, and because the ID and SME are often near equal status, it is not likely to. Still, many IDs proceed as if they are physicians producing a diagnosis for a patient.

There are two ways that ID's can reduce the degree of control they have over the process. First, they can do an effective job of contracting before the consultation starts in which case the SME will be more likely to understand and accept the ID's questioning. Second, during interviews, when the ID feels a need to draw information from the SME, questions can be preceded by a statement of purpose allowing the SME to share in the decision to pursue the subject further. As an example, the ID could say:

"I'd like to ask you about what you actually want the students to be able do when they complete the course. This will help us to write the course objectives. Is that okay?"

A second type of communication that leads to defensiveness is evaluative speech or "expressions which by tone of voice or verbal content seem to be judgmental" (Gibb, 1961). Avoiding evaluation completely is, of course, impossible since it is the ID's task to improve the instruction which necessitates evaluation. However, there are different ways that an ID can raise an identical issue:

1. "I'm confused about why you've included this item on your final exam. It's not clear to me how it relates to the objectives we've developed."
2. "I think you should scrap this item. It doesn't fit the objectives."
3. "Your exam items aren't consistent with the objectives."
4. "Why did you include this item on the final exams?"

The first statement would be better than the others for several reasons:

- It is problem-oriented rather than solution-focused as is statement #2.
- It is tentative rather than certain as are statements #2 and #3.
- It places the responsibility for the ID's lack of understanding on both parties rather than solely on the SME as do statements #2 and #3.
- It more completely describes the ID's thoughts about the issue, and thus orients the SME rather than merely probing as does statement #4.
- It refers to a specific item rather than generalizes about the exams as does statement #3.

The methods of giving feedback in supportive ways cannot be completely demonstrated in this paper. However, there are numerous treatments about how to do so in the communications literature (Egan, 1975; Hansen, 1975; Kurtz & Jones, 1973; Morris & Sashkin, 1976; Porter, 1974). It is important to keep in mind that effectiveness in giving feedback is not an easily mastered skill. Thus training, and not just reading, may be a necessary adjunct of a training program for ID specialists.

In supportive climates, people are better able to concentrate upon the content and cognitive meanings of messages.

IDs should also be aware that they may transfer negative evaluations inadvertently. For example, one SME that we interviewed reported the following:

"I walked into the ID's office one day to say hello and I noticed a cartoon posted on her door. It was very negative about behavior modification (the SME's field). I didn't feel too bad at the time, but later I heard that she and the editor had told some other people that they think the course concepts are unrealistic. I would never trust them again after that."

A related issue has to do with the ID's use of positive evaluation. Many IDs focus their feedback on what's wrong with a course. While this is necessary, they could also focus on what's right. The ID's positive feedback may constitute the sole source of positive reinforcement during the initial period of the development process. In short, through selective positive reinforcement, the ID may be able to balance the short-run punishers that constitute the "social trap" of instructional development. An example of how powerful and ID can be in reinforcing an SME is demonstrated by the following statement made by one of the SMEs interview:

"He (the ID) was very interested in the content. It was great for me because most of my students never get into it the way that he did. On some days he would describe how he had applied the ideas in his own work. At other times, he would be very enthusiastic about what he was learning from me."

To summarize, the above discussion points out the sources of evaluation and the importance of the way evaluations are done in the instructional development process. While it may not be possible to avoid being evaluative, an ID can vary the way evaluation is delivered and certain variations are more likely to build a supportive climate than others. The cases also suggest that if the ID does not value the subject matter, he may be unable to develop a positive climate.

Active Listening

A third important area concerns the difficulty of transmitting accurate information from the SME to the ID. Haney (1979) has coined the term "bypassing" to refer to the many ways that messages can be misinterpreted when two or more people are conversing. According to Haney, bypassing occurs frequently because people tend to accept surface meanings as the true meaning of a message and thus fail to probe for deeper or alternative meanings.

Given that the task analysis involves the transmission of very complex ideas on the part of an expert (the SME) and often involves the use of jargon, the likelihood that bypassing will occur during the process seems greater than in normal conversations.

Bypassing may have contributed to the ineffective practices described on the previous pages. In one case, the IDs may have judged the content to be unrealistic because they did not fully grasp it. In another, the ID may have debated the content as arduously as he did because he didn't understand it. While both problems could have been caused by an inadequate transmission of information from the SME to the IDs, they may also be caused by the failure of the IDs to attempt to clarify what they were hearing or by the tendency to believe that they understood when they didn't. At least this is the feeling of one of our SMEs:

"He (the ID) would debate just about
everything. Sometimes, he would have a good point, but most often I was convinced that he didn't understand what I was talking about. A lot of the debate was about irrelevant or trivial aspects of the course ideas.”

Haney (1979) recommends the following strategies for avoiding difficulties of this nature:

- Develop a tentativeness about one's understanding of a message (e.g., do not assume that you understand the SME's message).
- Ask for clarification or elaboration.
- Occasionally rephrase the other's ideas in your own words and check for verification.
- Ask for specific examples.

Active listening also serves as an immediate reinforcer to the SME and is consistent with counseling approaches that emphasize positive regard and empathy as key elements in the relationship with the client (Rasmussen, 1978). Along these lines, Savage (1975) designed and evaluated an experimental training system to improve the empathic capabilities of IDs when interviewing their SME clients. He concluded that the training system was useful for increasing the empathic identification of IDs toward clients and recommended that such training be incorporated into the curriculum for preparing new IDs. This type of training may have been helpful in the situation described earlier in which the SME became so upset that he was physically ill. Had the ID noticed that the SME was upset, he could have focused for a time on the SME's emotional reactions and perhaps helped to work them through.

Summary and Recommendations

We have explained in some detail why the instructional development process is a "social trap" for the SME. We have also offered some thoughts about what can be done to make the process more reinforcing and less punishing in the short run. One obvious solution to these problems is to develop training in interpersonal competence as has been done by Savage (1975). While Savage's efforts are interesting and commendable, it seems certain that such training must go beyond training in empathic identification. Suggestions should be made about what constitutes the skills that are needed by IDs and about the hierarchical arrangements for teaching those skills. This paper was based on interviews with only three SMEs. There is a need for extensive surveys of SMEs connected to both successful and unsuccessful projects and working with interpersonally skilled and unskilled IDs. It would be useful to have more work along the lines of that done by Price (1976) towards producing descriptive audits of the skills of successful and unsuccessful IDs. Having established the skills of successful practitioners, it would be worthwhile to determine how best to teach these skills to ID students and to determine whether such instruction produces the desired effect in the field.

References


1984, VOL. 7, NO. 1
Analysis of Multi-Component Educational and Training Needs

Earl R. Misanchuk

Division of Extension and Community Relations
The University of Saskatchewan
Saskatoon, Saskatchewan S7N 0W0

Contexts

Context #1:
You are an instructional developer who has just been hired by a large teaching hospital as Director of Staff Training. You and your staff of three—all of whom have been in their positions for one to four years and all of whom have taught in assorted contexts, but none of whom has any particular instructional development skills—are expected to develop and implement "whatever training programs are necessary." Your budget is extremely small, and it becomes obvious, after a few weeks of intensive discussion with your staff, that the range and intensity of training problems is very wide. You know that you don't have a hope of attending to all training needs, given your resources, but worse, you lack a starting point because you don't know which needs are most critical.

Context #2:
Your institution has been awarded a contract by the government to develop a training program for managers of government-funded "social housing (group homes, senior citizens' centers, live-in health care facilities, etc.)." Simply put, although a few of the several hundred managers now in place have MBA's in administration, most have little or no formal training in the area—indeed, many have not even completed high school. They are expected to manage facilities housing anywhere from three to 800 people at varying levels of functionality, from completely self-sufficient to totally bed-ridden. One of the requirements of the contract is that you conduct a needs analysis to determine which training needs are most critical, then develop instruction to fill these needs.

Context #3:
A professional organization of computer specialists, whose membership is largely from the retail business, insurance, and banking sectors, but also includes manufacturing, wholesaling, and education, wishes to initiate a professional development education program for "all computer people in the province," but isn't sure where to begin. Each person on the executive produces a different list of topics that, according to his or her personal experiences, warrant professional development education. There is a vague feeling that despite the vast amount of learning about different hardware and software that constantly takes place in a computing environment, it is not so much computing that defines the real need as how to manage people, how to administer, how to deal with people. You have an opportunity to moonlight a lucrative contract with the organization, but first you have to show them that you are capable of addressing the most widespread professional development needs (even though you are not an expert in computing); to do so, of course, you must know what the needs are.

All three contexts show evidence of the necessity of conducting thorough needs assessments prior to undertaking other instructional development activities. And all three contexts are quite typical of the real world (e.g., see Spitzer, 1981).

The Need for an Analytic Tool

One approach to the assessment of educational or training needs involves a task analysis of the general job role, which leads to the specification of a series of skills or tasks that individuals in that job role might be expected to be capable of performing (Misanchuk, Note 1). For each task or skill, the potential learner is measured on one or more of three criteria, called need components: the competence or ability of the individual to perform the task or skill, the relevance of the task or skill for the individual's particular job role, and the individual's desire to undertake training in the task or skill (Misanchuk, Note 1; Misanchuk & Scissors, Note 2).

While different institutions and organizations may use different combinations of those three need components to operationalize educational or training needs (see Misanchuk, Note 1), it is likely that at least two of the components will be included in any definition. This implies that two or three (typically numerical) responses for each individual, for each task or skill, must be considered simultaneously—a mind-boggling job if there are dozens of skills or tasks, and dozens or even hundreds or thousands of potential learners (e.g., Misanchuk & Scissors, Note 2; Scissors & Misanchuk, Note 3).

The adoption of a multi-component model of educational and training needs leads to the collection of two, and possibly three pieces of data per potential learner for each skill eligible for training. In any but the most trivial situation, this leads to a vast array of data whose complexity belies analysis by conventional methods.

The analysis of such needs data would be made considerably easier if it were possible to compute a single score for each potential learner, representing the two or three dimensions of each skill/task. Such scores could then be averaged across people to provide an index of need for each skill/task.

A number of approaches suggest themselves but turn out to be lacking. Let us assume for purposes of illustration that the data for two need components, relevance and competence, have been collected by having potential learners use five-point Likert-type scales to respond to the questions "How important is this task for your job role?" and...
classified ordinal data developed by Hildebrand, Laing, and Rosenthal (1977a, b) offers the potential for developing an analogue which could be applied to the needs analysis situation. In contrast to the typical methods of analysis of nominal and ordinal data (e.g., the raw error rate; the odds, or cross-product, ratio; phi-square; chi-square; and various correlation coefficients [see Reynolds, 1977]), which are descriptive, a posteriori approaches to analysis, the approach suggested by Hildebrand, et al., is predictive. In other words, it predicts the probability that certain combinations of a joint distribution will occur, then tests to see how closely the prediction matches the observations.

The logic of this prediction approach is eminently adaptable to the analysis of educational needs: One need only postulate that a high educational need exists when the respondents collectively exhibit (for the two-component case) a high job relevance with a concomitant low competence in the skill, and conversely, that a low educational need exists when there is a low job relevance with concomitant high competence. The postulate can be extended to include three or more components of need, if desired (see Misanchuk, Note 2).

The procedure yields a single statistic which succinctly describes the need as defined on both dimensions simultaneously, permitting the immediate and intuitively obvious comparison of various skill needs by comparing single numbers, each representing one skill need. It also permits statistical tests for determining the significance of differences, although the subject will not be further pursued in this paper (for details, see Hildebrand, et al. [1977a, b] and Reynolds [1977]). For the three-component definition of need, the adaptation of the procedure is not quite as straightforward; however, a number of possibilities are being actively investigated to permit the multivariate application.

In any but the most trivial situation, this leads to a vast array of data whose complexity belies analysis by conventional methods.
relevance coupled with maximal respondent competence.

Now, in reality, we would be unlikely to define only cell (1.5) as errorless. As already suggested, cells (1.4), (2.5), and (2.4) represent responses that lend a fair bit of crediblity to the prediction of high need, albeit less than the situation where everyone responds in cell (1.5). We might therefore designate cells (1.5), (1.4), (2.5), and (2.4) as errorless cells, and all the others as error cells. Indeed, this is exactly analogous to what is done in the dichotomized-additive approach mentioned earlier. The problem with this strategy, as Misanchuk (1980) pointed out, is that it becomes impossible to differentiate between the situation where everyone is in cell (1.5) and the one where everyone is in one or more of cells (1.4), (2.5), and (2.4).

Ideally, we would like to recognize an increasing amount of error associated with cells that are progressively more remote from (1.5). The PRE approach allows us to do just that, by assigning error weights to cells representing "partial" errors; cell (1.5) is given an error weight of 0, cells (1.4) and (2.5) could be given error weights of, say,.1, and cell (2.4) could be given an error weight of .2, etc. Although different values could be assigned to the various error weights, it seems reasonable to have the "worst" error cell (5.1), represented by an error weight of 1.0 (i.e., it is a "whole" error), and the other cells pro-rated reasonably as they become more proximate to the completely errorless cell (1.5). Any number of weighting schemes could be devised, but parsimony and simplicity being the essence of good theory, there seems no reason to apply anything more complicated than a linear progression; I suggest that the distribution of error weights shown in Figure 2 is a reasonable one to use while we learn more about the analytic method.

To understand the logic of the actual analysis, it is best to temporarily ignore the "partial" errors represented by the error-weighted cells and deal with the more straightforward case where responses are unequivocal. The hypothetical frequency distribution in Figure 3 will be used to trace the logic of PRE analysis; note that for this example, cells (1.4), (1.5), (2.4), and (2.5) are considered errorless.

For any pattern of response cells, it is possible to compute the number of expected respondents for each cell, based on the marginal totals for the distribution, in a manner very similar to that used in computing the familiar chi-square. The proportion of respondents expected for cell (2.2) in the distribution in Figure 3, for example, is

\[
\frac{(9/45 \times 6/45)}{1/45 + 2/45 + 1/45 + 0 + 0 + 1/45} = 0.22.
\]

For 45 respondents, this proportion corresponds to 0.22 X 45 = 1.2 respondents that can be expected to fall into cell (2.2).

For cell (3.4) the expected number of respondents is

\[
\frac{(9/45 \times 12/45) \times 45}{1/45 + 2/45 + 1/45 + 0 + 0 + 1/45} = 2.4.
\]

Using only the marginals, then, it is possible to compute the expected response rate for each cell, which we can then use (as chi-square, again) to compare to the observed response rate. In prediction terms, this expected response rate can be viewed as corresponding to the expected error rate due to chance. In practice, however, we are interested only in the cells where errors of prediction can actually be committed, so we say that the expected error for an errorless cell is 0. The expected error rate for the entire distribution is simply the sum of the expected errors for all error cells. For Figure 3, therefore, the expected error rate is

\[
\]

Now, in fact, the observed error rate is different from the expected one; it is represented by the sum of the proportions of observations actually falling into error cells; once again, errorless cells are excluded from the computation since entries in them do not constitute errors. For Figure 3, the observed error rate is

\[
\]

The proportionate reduction in error is defined by Hildebrand, et al. (1977a) as the relative reduction in error achieved by the predictions in comparison to the error of a reference position. To fulfill this definition, the number of errors that could be expected, based on knowledge of marginal distributions only (the reference position), is compared to the actual, observed distribution of errors.

```
<table>
<thead>
<tr>
<th>Not Important</th>
<th>Relevance</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poorly</td>
<td>(1.1)</td>
<td>(2.1)</td>
</tr>
<tr>
<td></td>
<td>(1.2)</td>
<td>(2.2)</td>
</tr>
<tr>
<td></td>
<td>(1.3)</td>
<td>(2.3)</td>
</tr>
<tr>
<td></td>
<td>(1.4)</td>
<td>(2.4)</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(2.5)</td>
</tr>
<tr>
<td>Very Well</td>
<td>(5.1)</td>
<td>(5.2)</td>
</tr>
<tr>
<td></td>
<td>(5.3)</td>
<td>(5.4)</td>
</tr>
<tr>
<td></td>
<td>(5.5)</td>
<td>(5.6)</td>
</tr>
</tbody>
</table>
```

Figure 1. Cell labels in a tabular display of bivariate data. Cells are identified according to convention by numerically identifying the row first and the column second, separated by a comma, and enclosed in parentheses.

```
<table>
<thead>
<tr>
<th>Not Important</th>
<th>Relevance</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poorly</td>
<td>0.7071</td>
<td>0.5363</td>
</tr>
<tr>
<td></td>
<td>0.5000</td>
<td>0.1768</td>
</tr>
<tr>
<td>Very Well</td>
<td>0.7289</td>
<td>0.5990</td>
</tr>
<tr>
<td></td>
<td>0.5990</td>
<td>0.5536</td>
</tr>
<tr>
<td></td>
<td>0.7006</td>
<td>0.6374</td>
</tr>
<tr>
<td></td>
<td>0.6374</td>
<td>0.5536</td>
</tr>
<tr>
<td></td>
<td>0.8839</td>
<td>0.7006</td>
</tr>
<tr>
<td></td>
<td>0.7189</td>
<td>0.7071</td>
</tr>
</tbody>
</table>
```

Figure 2. Suggested error weights. For simplicity, a more-or-less linear progression (based on a unit diagonal length) is suggested, although other patterns could be proposed for specific purposes. For all practical purposes, weights could be rounded to two significant figures.

The statistic \( V \), is used by Hildebrand, et al. (1977a, b) to represent the proportionate reduction in error.

\[
V = \frac{\text{Expected errors} - \text{Observed errors}}{\text{Expected errors}}
\]

For Figure 3,

\[
V = \frac{0.739 - 0.689}{0.739} = 0.068
\]
In more formal terms,

\[
\sum_{i=1}^{R} \sum_{j=1}^{C} W_{ij} \sum_{i=1}^{R} \sum_{j=1}^{C} W_{ij} P_{ij} \quad \nabla = 1 - \frac{A_{ij} P_{ij}}{

where \( W_{ij} \) is the error weight for cell \((i,j)\) (\( W_{ij} = 1 \) for every "whole" error cell; 0

\(< W_{ij} < 1 \) for every "partial" error cell), \( P_{ij} \)

is the probability of a randomly sampled observation falling into cell \((i,j)\), and \( P_{i} \)

and \( P_{j} \) are the expected marginal probabilities for the rows and columns, respectively. Examination of the equation immediately above shows how the "partial" errors mentioned earlier can be accommodated by the statistic: substituting the error weights suggested in Figure 2 for the W's in the equation gives the desired result.

In the needs analysis situation, as distinct from the prediction situation, it makes more sense to assume some prior knowledge of the expected distribution than to allow the observed marginal probabilities to determine the expected distribution. If the marginal probabilities are known, the denominator of (1) becomes defined independently of the observed data: individual cell probabilities, of course, are simply the product of the row and column probabilities corresponding to that cell.

To distinguish the original statistic proposed by Hildebrand, et al. (1977a, b) from the one conceptualized here (with its prediction of high need concomitant with an error weight distribution similar to that in Figure 2 and its known expected distribution) we shall attach the subscript \( N \) to the original statistic. In other words, \( V_{N} \), the proportionate reduction in error index of educational need, is (computationally) equivalent to equation (1) (with the proviso that \( P_{i} \) and \( P_{j} \) are previously specified by the researcher).

Interpretation of the Statistic

The adaptation of the PRE approach to needs analysis involves predicting a high educational need for each skill, then using the computed value of \( V_{N} \) to determine the validity of the prediction. A high value of \( V_{N} \) indicates high validity of the prediction, hence high educational need for the associated skill. Comparative values of \( V_{N} \), therefore, can be colloquially interpreted as comparative degrees of need.

Perhaps the most useful feature of \( V_{N} \) is that it is a single number which can summarize information about the distribution of two or more variables. Del can assume a range of values from minus infinity to 1. Negative values, which denote a prediction failure in the prediction application, can, in the needs analysis situation, be immediately and intuitively regarded as indicating no need. Positive values near zero indicate a small need, and values approaching 1 indicate increasing need. The individual value of \( V_{N} \) associated with a skill, per se, however, is of less interest than when it is taken in comparison to the values of \( V_{N} \) associated with other skills: a ranking of needs based on the ranking of values of \( V_{N} \) is thus possible.

In that regard, an interesting area for further research is the question of prior knowledge of the expected marginal distributions. A number of reasonable distributions can be postulated: flat, normal, and monotonically increasing distributions represent only three of them. While the absolute values of \( V_{N} \) will obviously change as the values of \( P_{i} \) and \( P_{j} \) are changed, it would be interesting to find out whether or not judgments about needs would change as a function of the expected marginal distributions. For example, \( V_{N} \) for Figure 3, if an expected probability distribution of .2, .2, .2, .2, and .2 is assumed for the job roles, it might be reasonable to postulate a monotonically increasing set of proportions as one moves away from the upper left corner of the needs assessment data matrix. An expected probability distribution which fulfills that description, 0, .1, .2, .3, .4, yields a value of \( V_{N} = .220 \).

To provide a flavor of what values of \( V_{N} \) can be expected from various distributions, and to indicate the kind of changes that can be expected from varying the expected distribution, Table 1 presents some comparisons based on the data in the matrices in Figure 4.

Matrix [1], as is visually apparent, illustrates a high need, and has a correspondingly high value of \( V_{N} \).

As might be expected, the values of \( V_{N} \) decrease as we go from Matrix [1] to Matrix [6]. Matrix [5], which illustrates virtually no need, and Matrix [6], which illustrates no need at all (according to visual inspection), have negative values of \( V_{N} \).

While there are differences in values of \( V_{N} \) as a function of expected distribution used, the monotonicity of the values across the six matrices is retained, and it is probable that any of the expected distributions could be assumed without destroying the ability of the statistic to be used at least to rank order educational needs. It would be advantageous, however, to have a standardiz-

The procedure yields a single statistic which succinctly describes the need as defined on both dimensions simultaneously.

1984, VOL. 7, NO. 1
common in needs analysis; in a recent study (Scissons & Misanchuk, Note 3), values of \( \psi_N \) did not exceed about .25. Realistically, the typical maximum values of \( \psi_N \) ought not to be expected to be much higher than that, for the same reasons as those listed in the argument for the .0, .1, .2, .3, .4 marginals: the tasks used as a basis for the needs assessment procedure were, by and large, quite relevant to the job roles, and the process of natural selection that obtains in hiring and firing tends to place more-or-less competent individuals into job roles.

![Figure 4(a). Matrix [1].](image)

![Figure 4(b). Matrix [2].](image)

![Figure 4(c). Matrix [3].](image)

![Figure 4(d). Matrix [4].](image)

![Figure 4(e). Matrix [5].](image)

![Figure 4(f). Matrix [6].](image)

The possibility of assigning different error weights to cells poses interesting possibilities for research. It also provides for flexibility in varying the emphasis on the need of one or more of the need components, thereby overcoming a major limitation of both the approach used by Misanchuk and Scissons (1978) and the dichotomized-additive approach (LeSage, 1980). If there were a priori reason to believe that, say, competence and relevance were of equal importance in determining need but that desire was only half as influential as the other two components, the \( \psi_N \) approach could accommodate it. Furthermore, it may be possible to sharpen the sensitivity of discrimination at the high end by using a weighting scheme other than the linear one suggested in Figure 2.

As noted earlier, the multivariate extension of the statistic is currently being investigated. For the bivariate case, it does not matter (in the prediction situation) which of the two is considered the dependent and which the independent variable. This property makes the statistic directly applicable to the needs analysis situation, for the bivariate case. However, the property does not hold for the multivariate case; hence the lack of straightforward adaptation mentioned earlier.

Computer programs have been developed for the procedure, making it easy to use; the computation of the statistic is well within the scope of a pocket calculator, however, and becomes laborious by that method when the number of distributions to be examined is large.

**Conclusion**
The adaptation of a proportionate reduction in error approach to the analysis of needs assessment data is relatively straightforward. In addition to permitting a greater sensitivity to differences in frequency distributions than other analytic approaches while providing a single statistic \( \psi_N \) for the comparison of bivariate distributions, there is a potential for extension of the statistic...
Table 1

Effects on $V_N$ and the Standard Error of $V_N$ of Using Different Known Marginal Distributions

<table>
<thead>
<tr>
<th>DISTRIBUTION</th>
<th>FLAT</th>
<th>NORMAL</th>
<th>MONO</th>
<th>FLAT</th>
<th>NORMAL</th>
<th>MONO</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATRIX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[1]</td>
<td>.9552</td>
<td>.9488</td>
<td>.9543</td>
<td>.0187</td>
<td>.0200</td>
<td>.0179</td>
</tr>
<tr>
<td>[3]</td>
<td>.6785</td>
<td>.6550</td>
<td>.6926</td>
<td>.0408</td>
<td>.0436</td>
<td>.0390</td>
</tr>
<tr>
<td>[5]</td>
<td>.3964</td>
<td>.3869</td>
<td>.2397</td>
<td>.0716</td>
<td>.0766</td>
<td>.0685</td>
</tr>
<tr>
<td>[6]</td>
<td>.5178</td>
<td>.5237</td>
<td>.4513</td>
<td>.0374</td>
<td>.0400</td>
<td>.0357</td>
</tr>
</tbody>
</table>

The FLAT distribution had marginal proportions of .2, .2, .2, .2. The NORMAL distribution had marginal proportions of .250, .226, .451, .258, .030. The MONOmeric distribution had marginal proportions of 0, 1, 2, 3, 4.

See Figure 4.

Footnotes
1. This paper was originally presented at the Annual Meeting of the Association for Educational Communications and Technology, Dallas, Texas, May 3-7, 1982, under the title The Analysis of Multicomponent Training Needs Data. Portions of this paper were presented earlier at the Evaluation Network/Evaluation Research Society Joint Annual meeting, Austin, Texas, October 1-3, 1981, under the title A Proportionate Reduction in Error Approach to the Analysis of Needs Identification Data.
2. The author gratefully acknowledges the comments and suggestions made on earlier versions of this paper by R. A. Yackulic, R. A. Schwier, E. H. Scissors, A. T. Wong, and W. R. Foshay.
3. For lack of a better term, the terms 'task' and 'skill' will be used in this paper to mean approximately the same thing: a job-related activity that can be learned. Obviously, the words are used with considerably less precision in meaning than in most other applications in instructional development. Neither term is intended to imply only psychomotor activities. Tasks or skills—as the terms are used here—include everything from specific psychomotor activities to complex groups of activities that may involve cognitive and/or psychomotor (and perhaps even affective) com-
Instructional Development in Developing Countries

Farhad Saba
Center for Instructional Media and Technology, Telecommunications Division
The University of Connecticut
Storrs, Connecticut 06268

Abstract. Instructional Development (ID), as a concept, a policy, and a technology takes place under rather distinct circumstances in developing countries. These include, but are not limited to, traditional, political, and economic conditions. Such circumstances often influence and may sometimes dictate how instructional development is implemented in the countries. An understanding of these conditions is useful for analyzing existing instructional development efforts in developing countries and for planning new ones.

Introduction

Instructional development does not occur in a vacuum anywhere. But in developing countries where formal institutions and the economy are less diversified, instructional development as a concept, a policy, and a technology tends to be more directly affected by prevailing conditions. These conditions and their possible influences on instructional development processes are discussed in this article. An understanding of these conditions is useful for analyzing existing instructional development efforts in developing countries and for planning new ones.

The conditions included in this discussion are prevailing traditions, prevailing politics, and prevailing economies. These conditions combine to provide a context for the selection and implementation of instructional development as an approach to solving a country's educational problems. They may affect the form and substance of ID in the way it is practiced, and influence the speed with which projects reach their goals, stagnate, or disappear.

The definition of instructional development prepared by the Association of Educational Communication and Technology (Silber et al., 1979) is used for this discussion.

A systematic approach to design, production, evaluation, and utilization of complete systems of instruction, including all appropriate components and a management pattern for using them, instructional development is larger than instructional product development, which is concerned with only isolated products, and is larger than instructional design, which is only one phase of instructional development.

It is with this broad conceptualization of the field of instructional development in mind, that the prevailing conditions in developing countries are analyzed and their effects on the ID process are discussed. The conditions described here were originally observed in Eastern, and Middle Eastern countries and may differ in other developing countries.

 Prevailing Traditions

Many developing countries are located in the ancient world, where Judaism, Christianity, Islam, Buddhism, Hinduism, and Zoroastrianism first recruited their early followers. Ancient civilizations consisted of a specific conduct of life in relation to the immediate environment and to the cosmos. This conduct of life embodied social and cultural forms that were evident in the education of youth, in the political and economic institutions, in the practice of art and science, and in the philosophy of life. The combination of these enduring elements constitutes a country's traditions (Nasr, 1981).

Many of the traditional civilizations of the ancient world went through a process of decline that began in the seventeenth century. After the passage of four hundred years of cultural stagnation, at least two types of traditions can be observed—an original tradition and a decadent one. Original traditions have the following attributes:

- They are based on a sense of the sacred.
- They are based on ethical and aesthetic values.
- They have a holistic view of knowledge (subjective and objective).
- They recognize two approaches to the attainment of knowledge (intuitive and analytical).
- They perceive the knower and knowledge as indivisible.
- They partially manifest themselves in science, art, and technology.
- They are democratic and non-dogmatic.

These attributes contribute to the cultural development of society. The attributes of decadent tradition that have emerged during the decline of ancient civilizations are: superstition, prejudice, formalism, ignorance, demagoguery, religiosity, and dogmatism. These attributes hinder the cultural development of the society.

In many developing countries these two extreme forms of traditions and all the differential shades between them are evident. At times and in certain circumstances, original traditions may be in a process of ascendance (e.g., India, Algeria). As developing countries become more aware of their own heritage, as distinct from a colonial heritage or the heritage of modern civilizations, they look to their own original tradition to close the four-hundred-year cultural development gap (Hermasi, 1980). In a different setting, the decadent tradition may exert formal influence through bureaucratic procedures or informal influence through customs and habits. The presence of decadent traditions may be so pervasive as to totally obscure the potential of the other traditions, leading the uninitiated observer to equate all traditions with superstition, prejudice, formalism, ignorance, demagoguery, religiosity, and dogmatism. Formal attempts to reduce
decadent traditions or to promote original traditions are functionally a political act.

Prevailing Politics
The process of instructional development is also influenced by prevailing political conditions. As a country's actual or perceived independence permits, it is useful to categorize political conditions as internal or external.

Internal Political Conditions. The process of national formation in Europe was a function of gradual government institutionalization and a separation of those government institutions from the internal contending forces and an accommodation of the external forces. The desired outcome of the process of national formation is internal stability and external international balance. Attainment and maintenance of this stability and balance is not entirely a political matter. Economic conditions in the developing countries are critical factors in the process of national development and in turn for instructional development.

Prevailing Economics
Attainment of economic prosperity has been the elusive goal of developing countries for the past three decades. The people of developing countries, who constitute seventy-five percent of the world's population, live under stagnant economic conditions that allow them average per capita incomes of $200 per year (The World Bank, 1982). The optimism engendered by the end of foreign occupation and the attainment of relative independence in the 1950's and the 1960's is dissipating in the 1980's. The economic disparity between poor and rich is increasing both among and within countries; it is greater in relative terms in the 1980's than in the 1950's. The existing conditions within the developing countries which perpetuate this inequality include the following:

- Lack of capital investment or the inability to absorb and use funds when capital for investment is available.
- Lack of trained and educated personnel.
- Lack of production and management efficiency and know-how.
- Uneven distribution of wealth and income.
- Lack of ability to fully utilize agricultural resources and establish industrial units.
- Lack of diversity in export earnings and reliance on one or two exportable commodities for earning.

In the past thirty years, many attempts have been made to alleviate the economic problems of developing countries. These efforts have generally failed to bring economic prosperity. Some progress in food production and reducing infant mortality and illiteracy have been made. But this progress occurred slowly, on a small scale, with little consideration for secondary consequences. In some areas in which economic development has been rapid, hidden consequences have retarded or eradicated desirable effects.

The meaning ascribed to the word "development" has changed in the past.
thirty years as efforts have intensified to improve the quality of life in developing countries. Until the 1970's, development generally implied economic development (Lohmann, 1979). Other aspects of a country's life were either totally neglected or were conceived as a subordinate function for economic development. Improving the economic conditions of the developing countries has been the supreme goal of many experts, policy makers, and administrators. Political, educational, cultural, ethical, and aesthetic developments either have been ignored or have been erroneously assumed to follow once economic prosperity materialized.

Within the field of economic development, the meaning assigned to "development" has further been conceptually reduced to certain economic indicators. In the 1950's and 1960's, growth in the gross national product (GNP) was taken as the most important criterion for economic improvement. As it became apparent that this extreme simplification of the economic reality, dictated by a certain model of economic evaluation, was not adequate to explain what is and what ought to be, development economists added other indicators to their measurement instruments. Per capita income, income distribution, urban-rural disparity, income diversity, and social equity were added. An index for gauging the physical quality of life was also developed (Morris, 1979). Nevertheless, the general approach of the field of development economics has remained a reductionist one based on quantifiable growth indicators in the physically observable economic process.

Implications

The prevailing traditions, politics, and economics as delineated affect the manner in which instructional development occurs in developing countries. For instance, a country with decadent traditions is highly unlikely to select instructional development as a strategy for dealing with educational and general economic development problems. The more a developing country is able to move towards a way of thinking attuned to the principles of its original traditions, the more likely that country will use instructional development. In fact, the concept of original tradition with its emphasis on the indivisibility of knowledge and knower requires a systematic human-oriented solution for problem-solving—such as instructional development. Original traditions relate the achievements of the past to the conditions of the present and the needs of tomorrow. They are not intrinsically antithetical to the idea of progress. Decadent traditions, however, cannot accommodate development and progress. The distinction is an important one for those who are planning, implementing, or evaluating instructional development projects in developing countries.

Political ideologies and traditions translated into educational policies may alter the structure of instructional development and transform it to a semi-systematic effort. Instructional development is a democratic idea. Almost all ID models prescribe needs analysis as the first step of the process. Needs analysis and definition of priorities become more possible and functionally achievable when the country enjoys internal stability with a healthy degree of dissent in the political process. As the degree of dissent grows and moves the political process towards violence, consensus on real and perceived needs becomes very difficult. An internally stable country with a balanced foreign policy following the principles of original tradition is more conducive to keeping the structure of instructional development intact as a democratic idea based on needs analysis and a systematic approach to progress.

Under certain prevailing politics and traditions, development of instructional systems for some content areas becomes difficult, if not impossible. Unstable political systems tend to limit the depth and breadth of political education in content areas related to theory and history of political, economic, and social ideas. Physical sciences also become limited in their methods of inquiry. Independent laboratory investigation may be limited to dogmatic, a priori knowledge. Limitations can be imposed not only on the content of an instructional development project, but also on those who can participate in the project—such as women, certain social classes, and religious "minorities," etc.

Favorable political and economic support are necessary ingredients for the success of a development project, even in developed countries. In the developing countries, with contending political factions and scarce economic resources, political and financial support become even more important. Political support becomes an even more sensitive issue, since the overwhelming majority of the people of developing countries perceive "process technologies" as alien concepts. The probable success of an instructional development project is higher if the ID process itself helps the indigenous parti-

References

Allison Rossetti,
Book Review Editor
Professor of Education Technology
San Diego State University
San Diego, California 92182-0311


This book by David Jonassen and colleagues is an important collection of informative essays about text. As the title implies, the contents cover a wide range of related subjects which provide everything from the highly theoretical to the functionally useful and practical. Amazingly, everything seems to fit. The organization of the book is well conceived, and the choice of authors was inspired.

Because no short review is going to do true justice to the comprehensive contents of this book, and because this is a book that will be around and under discussion for several years to come (it will be a standard reference), this reviewer finds himself intimidated by the thought of dredging up the lengthy title every time he wishes to refer to the work. The Technology of Text: Principles for Structuring, Designing, and Displaying Text is a dandy title, and it is appropriately descriptive of the contents of the book. Tech-of-Text, however, is shorter, handier, and lends itself to an even short and pronounceable acronym: ToT. The short title and acronym will be used throughout the remainder of this review.

Having established the essential generality that this is a review of ToT which is a good and important book, let's get to the details. Tech-of-Text is a BIG volume as books go these days—500 pages from title page to the end of the index. That is a lot of text (organized written discourse), and most of it is wall-to-wall with concepts, research findings, and examples. This tome is divided into four sections which contain a total of 22 chapters written by 19 different authors. The sheer size of this book explains the hefty price tag of $32.95. The consistent high quality of the prose from chapter to chapter is one of the features which makes ToT worth that price tag.

Section 1

The first section is devoted to "implicit structures in text." Beginning on the very first page there is a veritable outpouring of theories in this introductory section. Jonassen himself authors chapter one, and he does not hesitate to anchor his assumptions to schema theory. In contemporary educational psychology circles that is a fairly safe base. The subject is covered quickly but thoroughly, and Jonassen establishes the necessary distinction. For example, after a brief definition and explanation of schemata—enough to help the reader understand what he is talking about—he ties it all to his own package of ideas, "Knowledge is represented in memory as schemata; it is represented in text as propositions...and propositions combine to form the content structure of prose."

The intended thrust of section one is to explore ideas related to the internal organization of instructional text. Essentially, the topics covered are those identified by Jonassen in his preface as relevant to the implicit structuring of text: discourse analysis, component display theory, elaboration theory, pattern notes, and brain functions. These topics are the basis for chapters two through five. Except for the chapter on pattern notes, this section is mostly theoretical.

Reading Ann Pace's treatise on "Analyzing and Describing the Structure of Text" (ch. 2), the reader is at once captured by the book's faults and virtues. Discourse analysis—like most of the topics in ToT—is not new, but a glance through the references is enough to confirm the impression that explaining the subject in the current context was a unique challenge. Pace responded with a compromise between the what-if, the what-is, the what-to, and the how-to. The dosage seemed just right to this reviewer. She stated the theory simply and organized a goodly number of subtopics so that the historical content and sequential evolution of the subject were easily understood. She then cited enough research findings to buy my confidence and summarized with a set of implications which allowed me to jot down quickly half a dozen rules of thumb for use in my own ID practice. Not bad for a 10 page chapter. Yet, I went on to Alan Fields' chapter wondering whether too much had been covered too fast. As with most chapters in this book, I was left hungry for more and uncertain whether that was the author's intent.

The chapter on "Getting Started: Pattern Notes and Perspectives" is the sort of thing which will be either of inestimable value or worthless, depending upon the reader. Individuals who do not organize their thoughts well and who can follow Fields' advice could easily find this chapter (which describes an alternative method to linear notes for outlining the structure of a set of related ideas) to be worth more than the price of the book. People who already have an idea-organizing repertoire are likely to find this to be a rather tedious chapter.

Two of the best papers in the collection complete this section. The most important theoretical chapter in ToT is "Writing and Evaluating Textbooks: Contributions from Instructional Theory" by Sari and Reigeluth. Although the chapter is 37 pages long, more is done in three pages (59-61) than in all the rest—for in that span the authors do a truly GOOD job of explaining both Merrill's Component Display Theory with its eight propositions and Reigeluth's Elaboration Theory with its seven strategy components. By-and-large Jonassen and his contributors have accepted these two
theories which are seen to be an influence throughout the entire book. Hand's chapter on brain functions during learning belongs in ToT, but does not fit neatly anywhere in the overall organizational scheme. Thus it ended up in the section on implicit structures in text. This chapter is particularly appealing to me, because it is the most successful attempt that I have seen to link concisely what is known and theorized about the physiology of learning to the practice of designing instructional materials.

Section Two

The stated purpose of the second section of the book is to deal with explicit techniques for structuring text. These are "techniques for externalizing organizational structure." Or, if you prefer, "for signaling...the content structure of the prose passage in very explicit ways." Jonassen and Kirschner begin this section by introducing a three-dimensional model which conceptually does very little to tie the subsequent chapters together. They missed a bet here. Some combination of organizer-theory and mathemagenics would have provided better focus. While the authors barely allude to Rothkopf's (Mathemagenic) Two-Process Model of Learning, that theoretical position is strongly felt in ToT. The whole book and particularly the section concerned with explicit signaling, visual cueing, layout, typography, and other such ancillary aspects of content meets the assumption that mathemagenic behaviors should be accommodated in the instructional design. Moreover, the greatest strength of the collection of techniques described in the lengthy (12 chapters, 255 pages) second section is that these papers collectively provide a set of related choices for the text designer to use during the design process—choices which all affect the introduction of mathemagenically useful material into the finished text. Some readers may prefer to view these chapters as identifying the variables of text design rather than establishing a set of choices. Whatever your perspective, however, we're talking about options available to the author/designer that affect the way in which the verbal discourse (content) can be displayed.

The chapter titles themselves tell you what to look for here. Waller's chapter is "Text as Diagram: Using Typography to Improve Access and Understanding." For individuals who are unfamiliar with printing in general and typography in particular, this will prove to be very informative fare. Duchasil, best known for his work on the role of illustrations in text, has written "Textual Display Techniques," a chapter that deals mostly with the manner in which textual material (words) are displayed on the printed page. As might be expected, his concern for the "look" of the page comes through rather strongly. James Hartley's chapter is entitled "Designing Instructional Text." He has written an excellent book by the same title, and the chapter covers some of the same material—although in less detail. Particular emphasis is given to layout and spacing. Even Hartley's collection of notes, demonstrating the utility of his advice to authors. A nice touch!

As with most chapters in this book, I was left hungry for more and uncertain whether that was the author's intent.

Tech-of-Text has information about illustrations divided into three chapters: "Design Principles for Diagrams and Charts," by Winn and Holland; "Affecting Instructional Textbooks Through Pictures," by Brody; and "A User-Oriented Approach to the Design of Tables and Flowcharts," by Wright. Taken together, these chapters make a nice package. There are an ample number of principles cited, examples given, and suggestions made. There are also an appropriate number of illustrations to be true to the content. Very little redundancy exists, which was a surprise under the circumstances. This reviewer has no criticism of the material presented in this block of papers. However, the omission of even so much as a reference to charting conventions and techniques must be marked as a serious flaw. The fundamental graphic language for presenting statistical data (charts and graphs) has been somewhat codified for over 30 years. There are basic principles which apply, and certainly there is a frequent need by instructional designers to select an appropriate graphic from and weave it into the fabric of larger text.

"Structured Writing and Text Design" and "Printing: The Next Stage: Discourse Punctuation" by Horn and Showstack, respectively, are powerful examples of the processes they recommend. You really must see the pages of these two chapters to fully appreciate how much expository writing can be enhanced by using printing techniques to emphasize the structure of the ideas being presented.

Chapter 12 requires special comment. Written by Jonassen himself, "Advance Organizers in Text" is another of the chapters that seems almost to have been arbitrarily placed. When incorporated into a text an advance organizer (or post organizer for that matter) is as much a part of the discourse as any other piece of the writing. Therefore, it would have been perfectly logical to have included this chapter in Section One, where its high theoretical load would have seemed more at home. For example, in addition to the notions about organizers themselves, the reader is exposed to a model that posits two dimensions of learning, and with an explication of subsumption theory. The examples and the how-to half of the chapter are good but appear to be targeted at course-bound student readers rather than at a more general audience.

Section Three

Four brief chapters open the door to the new field of electronic text. Coke's chapter on "Computer Aids for Writing Text" is a fascinating review of what computers can do to help writers. Merrill, in "Displaying Text on Microcomputers," introduces the topics of screen format, paging, user friendliness, interaction (between student and computer) and evaluation. Both chapters are highly readable interesting, and, sadly, too general. Linda Reynolds' "Display Problems for Teletext," in contrast, may suffer from being too specific. As one reads the system-specifics information about Teletext (the British system), it is difficult to forget that the current trend is for international standardization upon some variation of Telidon (the Canadian system). Nevertheless, the chapter probably has staying power, because Reynolds also covers more lasting topics like
Awards Program for Outstanding Achievements in Instructional Development

This year, the Division for Instructional Development (DID) is again planning to offer awards to recognize outstanding achievements in the instructional development field. These awards will be presented at the 1985 AECT convention in Anaheim. This year’s awards categories are:

1. Outstanding Practice in Instructional Development
2. Outstanding Book in Instructional Development
3. Outstanding Journal Article in Instructional Development
4. Outstanding Graduate Student Research in Instructional Development
5. Presidential Award for Outstanding Service to the Division for Instructional Development

Information about each of these awards is presented below.

Outstanding Practice Award
This award will be given to those individuals or groups that have applied instructional development procedures in an exemplary manner. Application of the procedures may have resulted in a new or revised instructional product or system, or some other output.

You may nominate any group or individual (including yourself) for the Outstanding Practice Award. The work for which a group or individual is nominated, however, must have been completed after December 31, 1981.

Nominations should be in the form of a 3 to 5 page (8 1/2” X 11)” paper, typewritten, double-spaced summary of the work done by the individual or group being nominated. Summaries should include a brief description of:

a. The instructional problem that was addressed
b. The instructional development procedures that were employed in order to solve the problem
c. The magnitude of the development effort in terms of time and cost

d. The instructional events (activities) that constitute the instructional product or system

e. How the product or system was designed to as to insure proper implementation

f. The means by which the product or system was disseminated
g. Evidence of reduction or elimination of the problem, including performance data, attitude data, and/or cost effectiveness data

In addition to the information listed above, be sure to include, on a cover page:

1. The name(s), address(es), and telephone number(s) of the nominee(s)
2. Your name, address, and phone number

Nominations must be postmarked by September 30, 1984. Mail 6 copies to:

DID Outstanding Practice Award
c/o Robert A. Reiser
305D Stone Building
Florida State University
Tallahassee, Florida 32306

Outstanding Book Award
For the first time, the DID Awards Committee will be accepting nominations for an Outstanding Book Award. Books nominated must have been published after 1981 and should be relevant to the field of instructional development. The judges are particularly interested in books that are well written, with a clear purpose, and which in some way provide a significant contribution to the ID field. Anyone may make a nomination. Members, readers, authors, or publishers who are aware of a book that they believe warrants an award are encouraged to nominate it. The nomination procedure is outlined below:

a. Nominations will be by signed letter. No anonymous nominations will be accepted.
b. Complete bibliographic information should be included: author, name of book, where published
and by whom, date of publication, and ISBN number if known.

c. A short statement of perhaps 1 to 2 paragraphs providing your rationale for nominating the book.

d. Authors and publishers should indicate whether review copies will be furnished upon request of the judges.

e. You may provide as enclosures: copies of reviews, promotional literature, or other informational materials which help to describe the nature and quality of the book.

f.Nominate early to allow judges adequate time to obtain and carefully consider the book. The judges cannot assure consideration of nominations postmarked after September 30, 1984.

g. Send one copy of your nominating letter and five copies of all enclosures to:

DID Outstanding Book Award

c/o R. A. Braden

Instructional Development Division

LKC

Virginia Tech

Blacksburg, VA 24061

Telephone inquiries (e.g., has a book been nominated already?) may be made to Roberis Braden, (703) 961-5879.

Outstanding Journal Article Award

The DID Awards Committee will be accepting nominations for an Outstanding Journal Article Award. Articles nominated must have been published after 1981 in a regularly published journal, and should be relevant to the broad field of instructional development. The judges are particularly interested in articles that are well written, with a clear purpose, and which provide a significant contribution to the ID field. Members of DID, readers, authors, or publishers are encouraged to make nominations. The nomination procedure is outlined below:

a. Nominations will be by signed letter. No anonymous nominations will be accepted. Self-nominations are welcomed.

b. A complete bibliographic citation should be included in the letter.

c. The letter should also contain a short statement (1 to 2 paragraphs) providing a rationale for the nomination.

d. Supporting documentation (e.g., reviews, reprint requests) which would support the nomination should be included.

e. The letter should identify the article type (e.g., research/theory, case study, process/product description, application).

f. It is the nominator's responsibility (not the author's or the Awards committee's) to assure that permission to promote, duplicate, and distribute the article has been granted by the publisher. The Division of Instructional Development assumes no liability in this regard.

g. Deadline for nominations: September 30, 1984. Early nominations will be appreciated.

h. Send one copy of the nominating letter, and five (5) copies of the article to:

DID Outstanding Journal Article Award

c/o Marc J. Rosenberg

AT&T Data Systems Education Center

P.O. Box 3510

Room 40-9C172

New Brunswick, New Jersey 08903

i. For further information, call Dr. Rosenberg at (201) 699-4827.

j. Sorry, documentation submitted cannot be returned.

Outstanding Graduate Student Research Award

The graduate student research award will be given to a graduate student who has made a significant contribution to the body of knowledge upon which instructional development is based. The work must have been completed while enrolled as a graduate student and after December 31, 1981.

You may nominate any individual (including yourself) for the graduate student research award. Nominations should be in the form of a 3 to 5 page (8 1/2 x 11 paper), typewritten, double-spaced summary of the work done by the individual being nominated (4 copies of summary required). Summaries of more than five pages will not be considered. The 3 to 5 page summary should include a brief description of:

1. the problem—design and methodology

2. data analysis procedures (if applicable)

3. summary and conclusions

4. the effect the new knowledge is likely to have on the instructional development profession.

In addition to 4 copies of the 3 to 5 page summary, you should attach a cover page which includes:

1. the award category in which the nomination is being made (graduate student research)

2. the name, address, and telephone number of the nominee

3. your name, address, and telephone number (if different from nominee)

4. date research was completed.

The deadline for submission of all nominations is September 30, 1984. After the nomination deadline is past, the subcommittee on graduate student research awards will select a group of finalists. At that point, the finalists may be required to submit additional information. The winner will then be selected by the subcommittee.

Send nominations, by September 30, 1984, to:

Gary Anglin

Taylor Education #136B

University of Kentucky

Lexington, Kentucky 40506-0001

Presidential Award

The winner of the Presidential Award for Outstanding Service to the Division is selected by the current president of DID. Nominations for this award are not necessary, but the current president is interested in receiving suggestions as to who may be deserving of this award. Send suggestions by September 30, 1984 to:

Barbara Hakes

Education Hall, Rm 319

University of Wyoming

Laramie, Wyoming 82070

Richardson argues that a principal limitation of frame-based computer assisted instruction (CAI) results not from the characteristics of the computer medium, but from prior instructional design practices, specifically the logical abstraction of behavioral objectives. Learning hierarchy-based instruction implemented in the interactive computer-based medium results in sets of both global and local branching difficulties. Such difficulties include the potential for the subtree mastery assumption to be falsified for the occurrence of response errors which could stem from psychological or cognitive considerations rather than logical ones. Large-scale translation of extant curricula based on logical hierarchies into the CAI format thus offers no fundamental advance in the practice of instruction; however, the interactive quality of the new medium does promote change toward a reformulation of instruction in terms of the more appropriate alternative of psychological task analysis. Eight references are listed.—Microfiche 97 cents, paper copy $2.15 plus shipping, as document ED 225 338.


In most existing computer assisted instruction (CAI)—which typically consists of the presentation and reading of text, answering questions, and the presentation or review of materials depending on the student's answers—the nature of the instruction would not actually require a computer, according to Montague. He finds two problems with this approach: computer capabilities for interactive task simulation are underused, and the tacit requirement to present instruction and tests in text form makes learning more difficult for many tasks. These problems may be the reason that little, if any, difference in the effectiveness is found between computerized and non-computerized versions of instruction. He feels that recent emphasis in research on mental representation in learning and on work task simulations for instruction provides a basis for what may be a significant advance in techniques for CAI design. The coupling of these ideas with advances in computer science and technology that make it easier to develop interactive task representation would make possible substantial gains in effectiveness. Montague reviews the problems together with selected research and theory, presents several examples of recent work in CAI implementation that attempt to overcome the problems, and presents suggestions derived from this work for the systematic development of design technology for interactive CAI.—Microfiche 97 cents, paper copy $3.90 plus shipping, as document ED 224 476.


Weeks argues that the optimal allocation of Air Force talent requires, among other considerations, the measurement of both enlistee aptitudes and job aptitude requirements. Although objective procedures are available to measure aptitudes accurately, he feels that the procedure currently used to establish relative aptitude requirements is both un-systematic and subject to influence by extraneous factors. He describes a systematic procedure for inferring relative aptitude requirements based on occupational information collected at the task level. The measure issuing from this procedure developed by the Air Force Human Resources Laboratory is referred to as learning difficulty, and represents the time it takes to learn to perform an occupation satisfactorily. The steps in the development of this procedure are (1) collecting supervisors' rating of task difficulty, (2) obtaining benchmark task difficulty ratings from independent experts, and (3) analyzing the ratings for reliability and validity. Using this procedure, measures of occupational learning difficulty have been produced for more than 200 occupations of Air Force specialities. The author feels that the use of these more refined measures of task assignment via aptitude measures may result in a more efficient use of Air Force personnel and ultimately cut down on attrition caused by job boredom.—Microfiche 97 cents, paper copy $2.15 plus shipping, as document ED 219 625.

The above documents may be ordered from the ERIC Document Reproduction Service (EDRS), PO Box 190, Arlington, VA 22210. Please order by ED number, indicate the format desired (microfiche or paper copy), and include payment for the price listed plus shipping. Inquiries about ERIC may be addressed to the ERIC Clearinghouse on Information Resources, School of Education, Syracuse University, Syracuse, NY 13210.