Association for Educational Communications and Technology

Contents

ARTICLES

The Effectiveness of Using the Instructional Strategy Diagnostic Profile to Prescribe Improvements in Self-Instructional Materials, Barry L. Burkholder 2

Transitioning Learning Strategies Research into Practice:
Focus on the Student in Technical Training,
Barbara L. McCombs 10
Focus on the Technical Training Instructor as a Learning Strategies Expert,
Jacqueline L. Dobrovolny 17

Guided Field Experience: A Must for Instructional Developer Preparation,
Ronald K. Bass and Marvin E. Duncan 23

Contracting for Instructional Development: A Follow-Up,
Suella Walter and Rodney S. Earle 26

DEPARTMENTS

ERIC Reports on ID, Barbara B. Minor 31
Book Reviews, Allison Rosett 33
Evaluating Instructional Technology, by Christopher K. Knapper.
Two reviews by Fritz H. Brecke and Pamela Morais.

Instructions for JID Authors 41.

About this issue...

This issue contains articles dealing with virtually all aspects of the ID field. Burkholder reports on research showing that the Instructional Strategy Diagnostic Profile can be invaluable in revising and improving existing instructional materials.

McCombs and Dobrovolny present two different aspects of an Air Force research effort to determine how to deal with student deficiencies in learning strategies. McCombs discusses the problem of the conative domain, the characteristics of students who lack the will to learn and therefore do poorly on technical training, how to assess these characteristics, and how to evaluate the effectiveness of a program to remediate this problem. Dobrovolny addresses the critical role of instructors in the learning strategies and the importance of involving instructors in all aspects of the development effort. She then suggests an approach for including this instructor involvement.

Bass and Duncan take up a theme from several previous issues of JID—training instructional developers—and suggest a guided field experience approach to provide “practical” as well as “theoretical” knowledge of the ID process.

Walter and Earle follow up their 1979-80 JID article on contracting in ID with the addition of a new “tasks” element to the contract and a discussion of what to contract and how to introduce the client to the contracting process.

In this issue you will also find JID’s regular features—book reviews and a summary of some recent ERIC reports of interest.—K. H. S.
The Effectiveness of Using the Instructional Strategy Diagnostic Profile to Prescribe Improvements In Self-Instructional Materials

Teaching Abstract Concepts

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Abstract. An important question in instructional design is how can existing materials be improved to optimize learning situations for students. Most research on instructional improvement to date has either attended to what needs to be revised and ignored how the revisions should be made or described very specific revisions that were not generalizable into principles. This study describes the success in producing improved learning, confidence, attitude, and test time (without appreciably increasing study time) by improving materials according to prescriptions of the ISDP.

While much is done in instructional technology in the way of designing new instruction, it would be far more efficient to evaluate existing instruction for its effectiveness and remedy its deficiencies. Diamond, Fickman, Kelly, Holloway, Vickers, and Pasquarella (1975) state that we presently give a 19th century education to individuals who will live in the 21st century. The Carnegie Commission (1972) saw informational technology as being able to impact on this dilemma by allowing a wider dissemination of information and by forcing instructors to be more analytical in approach and more conscious about method.

While the Carnegie Commission refers to technology as the use of electronics communication systems, the second definition of instructional technology presented by the Commission on Instructional Technology is just as applicable. That definition states, "It (instructional technology) is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction" (1970, p.7).

Of particular importance in the above definition is "based on research in human learning and communication." Snellbecker (1974) and Glaser (1976) both recognize the importance of learning theory and instructional theory in instructional design and both see learning theory as descriptive of how humans learn and instructional theory as prescriptive of what must be done to the learning environment to affect the student.

"While much is done in instructional technology in the way of designing new instruction, it would be far more efficient to evaluate existing instruction for its effectiveness and remedy its deficiencies."

Clearly, then, the challenge for instructional designers in higher education is to develop methods that are not only used to evaluate instructional materials but also to prescribe changes in those materials—changes based upon what is believed to be true about human learning.

The only method developed to date that addresses itself to instructional analysis and prescription is the Instructional Strategy Diagnostic Profile (ISDP) developed by Merrill, Richards, Schmidt, and Wood (1977). A research review done by Merrill, Olsen, and Coldewey (1976) describes the eight propositions upon which the ISDP is based and demonstrates considerable support for five of them and partial support for one other.

Problem

The purpose of this study was to determine the effectiveness of the ISDP in analyzing and prescribing changes in self-instructional materials that teach abstract concepts similar to those taught in colleges and universities. It was designed not as a test of the relative effectiveness of each principle, but as a holistic examination of the ISDP process.

Hypotheses

The following null hypotheses were tested.

1. There will be no significant difference in performance on objective tests among students using materials with a high ISDP rating (high consistency and adequacy), a medium ISDP rating (high consistency), and a low ISDP rating (as is).

2. There will be no significant difference in the amount of confidence felt by students taking the three types of instruction.

3. There will be no significant difference in attitude toward any of the three types of instruction.

4. There will be no significant difference in the amount of time it takes students to complete the three types of instructional materials.

5. There will be no significant difference among students taking the three types of instruction in the time taken to complete an examination on that instruction.

Definition of Terms

The following definitions are provided to enable the reader to understand important terms and concepts common to this study.

Abstract Concepts: concepts the referents of which are not directly perceptible such as time and emotion. (Reed and Dick, 1968)

Instructional Strategy Diagnostic Profile: a set of questions and ratings from which
one can make prescriptions to improve instructional materials.

Task-Content Matrix: a method of classifying instructional objectives and test items according to content (what is to be learned) and task (how it is to be learned).

Consistency: the measure of similarity between test items and objectives on the task-content matrix.

Adequacy: a measure of the exit level of behavior required by the objective compared to the needs of a curriculum. It also refers to the quality of the instruction based on the demands created by the test item.

Primary Presentation Form: according to the ISDP Training Manual, all instruction takes place in either of two modes: telling the student something or questioning him/her about it. Each of these modes can be used with either of two instructional elements: generalities or examples. Combining the modes with the elements results in four basic types of instructional presentations, TG: Tell via generality (Generality); Teg: Tell via example (Example); QG: Question via generality (Generality Practice); Qeg: Question via example (Practice).

Limitations

This study focused on the evaluation and improvement of self-instructional materials that are designed to teach abstract conceptual information typical of that which is learned in college and university educational settings.

This study was also limited to the ISDP ratings for test item/objective consistency, test item/presentation consistency and presentation adequacy. There is a rating for justification of task level, but it makes assumptions about the instruction and its relation to the curriculum outside the course being studied. Since the importance of this study is to determine if instruction can be improved so as to aid students in meeting the stated objective, it was decided not to revise the objective, which would thus confound the issue.

Review of Literature and Related Studies

Early Research

Some of the earliest literature in the area of instructional materials improvement is reviewed by Twyford (1969) in the fourth edition of the Encyclopedia of Educational Research. The studies cited (Fletcher, 1953, and Jaspen, 1953) contain several practical drawbacks (i.e., cost) and do not directly attack the problem of prescriptively evaluating "classroom ready" materials and making needed revisions.

During the 1960's there were many reports of improvement to auto instructional language courses. Typical of these is a study by Newmark (1964) which states that materials were revised but states no rationale other than student performance, for making those revisions. Another study typical of this research is that by Morton (1967) which examines course revisions in detail but talks of revisions which are highly situationally specific and contribute little that is generalizable to the literature of instructional revision.

Since 1960 the studies conducted in the area of instructional materials revision would seem to fall into three broad categories: (1) techniques for revising instructional materials; (2) revisions that have been made to instructional materials; and (3) deriving principles of instructional revision.

Techniques for Revision

There are several different types of techniques, described in various degrees of detail, found in the literature. Bjerstedt (1964) describes a system that is intuitively based. Rosen (1968) and Dick (1968) both conclude that test data is an important factor in instructional revision. Lipe (1971) used a purely statistical method for ranking modules by need for revision, which he concluded was too complicated. Abelor (1972) used a technique based on student-teacher confrontation and subjective student feedback, which he concluded was very discouraging for the teachers. Robinson (1972) and Sulzen (1972) both concluded that the knowledge of objectives played an important role in instructional improvement. Proger, Carfioli, and Kalapos (1973) suggest a simulation model for evaluating materials. Kull (1974) credits P. Kenneth Kornoski with the phrase "Learner Verification Information" but states that the method is not specific. Thiggarajan (1976) and Kadawty, Stolovitch, and Thiggarajan (1976) conclude that little is known about how to match the Learner Verification data with the types of revision.

A review of the above references described, in various degrees of detail, what changes they made in the instruction but fail to cite the specific reasons for making those changes. Desler and McNell (1960) report on making six specific changes to an auto-tutorial science program but fail to explain why. Gropper, Lumadane, and Shipman (1961) list revisions made to two television programs and list the features of the revision technique, but, again, don't cite a rationale for making the revisions. McEntee and Rivers (1971) describe changes made to the U.S. Naval Academy leadership course. The revisions were limited to adding and omitting test items, and, again, no rationale was given for the changes.

There are some reports of instructional revision where a rationale has been given, but it is in the sketchiest of terms. Willitams et al. (1963) cite suggestions by students as the basis for revising a series of self-administered workshops in insurance audio visual education. Rahimow (1971) contends that by looking for certain response patterns in module tests, improvements can be made to either test items or content. Burger (1974) lists error rate and student interviews as the basis for making improvements to a math program.

Some studies of instructional improvement state rationales which must be questioned on the basis of reliability. VanderMeer and Montgomery (1964) state that changes they made in educational films were "based on the data collected from tests and on the basis of experience, intuition, and imagination." In a similar study on the improvement of instructional films, VanderMeer, Morrison, and Smith (1965) based their

"The most important feature of the process was the determining of why certain instructional sequences were ineffective and what could be done to improve them."
changes on test results, results of previous film studies (presumably studies similar to those of Fletcher and Jaspen), and the results of a series of staff conferences. The Learning Research and Development Center (1973) improved self-instructional materials in curriculum development using as a basis unit rating sheets, which were inconclusive (many weren't returned), post-tests, and mailed students could use to ask questions.

To summarize this descriptive research, one could consider the following:

1. The revisions that were made are described in terms ranging from broad sweeping generalization to mention of content areas needing revision, to specific revisions made to individual pictures and captions in films.

2. The description of the basis for the revisions that were made, if listed at all, is often sketchy and of questionable reliability.

3. Again, as in the first section of this review, the emphasis is on what is to be revised and not how it is to be revised.

Principles of Revision

Several investigators have noted the problem of no reliable basis for revision and have attempted to derive principles for instructional improvement. Silverman, Coulsen, Melaunro, and Newark (1964) inferred from tutorial sessions three principles of revision: gap, irrelevancy, and mastery.

Moore (1968) lists four principles, the content of which is similar to Silverman's of empirical revision. Baker and Alkin (1973) state that, since in most research the revision is done by the experimenter, the improvement could quite possibly be related to experimenter bias or time on task as opposed to techniques. They go on to suggest that a viable alternative to reporting empirical research is the writing of detailed technical reports when successful (in terms of program effects and staff satisfaction) formative evaluation activities have been completed.

Related Studies

While this would seem a possible alternative, this author believes a far more productive solution would be to predicate revisions on empirically tested, theoretically based methods for structuring the stimulus materials. Work of this nature was done by Gropper and Glasgow (1966), and Gropper (1967). These two studies provide evidence that stimulus materials revised on theoretically based principles can be used to increase student learning.

The thrust of Gropper's study was to determine if student response was needed when the stimulus materials were presented properly. On the basis of his results, Gropper concludes that structuring the materials properly makes a significant difference, but in order for performance to approach what would be expected from programmed instruction, a response mechanism must be built in. The only prescriptive evaluation tools developed for revising instruction by et al. The problem here lies in the way these principles were tested. Both studies used acceptable instructional materials and impaired them by introducing gaps and/or irrelevant items and/or eliminating branching. This "backdoor" approach to validating principles of revision is questionable. It would seem more worthwhile to find an unsatisfactory program and improve it by implementing the unproven principles.

Baker (1970) concluded that empirical revision rules generalized across developers and across subject areas paid off modestly. These results should be questioned due to flaws in experimental procedure and design.

In another discussion of the problems prescribing changes for stimulus and response presentations is the Instructional Strategy Diagnostic Profile. In addition to the research review already mentioned, further support for its principles has been offered by four additional studies.

The work which established the first principles of the ISDP was done by Wood (1970). He found that the difficulty of a problem and an index of the presence of primary presentation forms (rule, example, and practice) could be used as predictors of student achievement.

In a study conducted by Merrill, Wood, Baker, Ellis, and Wulfeck (1977) supporting evidence was found for four of the original ISDP Principles, plus evidence that presentation forms in an instructional sequence must be consistent with test items.

Other studies have been supportive of the ISDP. Richards (1976) found that nutrition instruction with a high ISDP consistency rating produced significantly more learning than instruction with the same content with a low consistency rating. Sharp (1978) found evidence to support four of the original ISDP principles. Choi, Merrill, Callahan, Hawkins, and Norton (1979) found evidence to partially support the hypothesis that students in organic chemistry who studied a text with a higher ISDP rating would perform better on a test than students who studied a text with a lower ISDP rating.

This preceding work has shown the ISDP to be used effectively to design and to revise classroom materials and self-instructional materials teaching concrete concepts. The purpose of the present study was to determine the effectiveness of the ISDP in analyzing faulty self-instructional materials and prescribing revisions to presentation so as to improve the teaching of abstract concepts.

Method

Subject Matter and Materials

The materials used for the study were extracted from Orientation to Instructional Media (Weliwer, 1972), a course syllabus and self-instructional text for the basic instructional media course at The Pennsylvania State University. A study of the comprehensive exams revealed that students' performance was appreciably lower on a module on learning theory than any other. Since there appeared a discrepancy between expected performance and actual performance, and since the module content was highly abstract, it was considered ideal for this study. The materials were edited to facilitate experimental administration.

Subjects

Subjects were volunteers solicited from survey courses, introductory courses, and general education courses from three of the colleges of The Pennsylvania State University. Subjects received four dollars for participating and two additional dollars for scoring in the top half of their respective cells.

Development of Materials

The objectives, test items, and instructional materials were evaluated and rated for consistency and adequacy
The isolation issue is resolved by assuring that the generality statement (in this instance, the concept), examples of the concept, practice items, and feedback are separated from supporting test material and identified as such. The help issue is resolved by assuring that there are mnemonics and/or simplified representations of the generality, example, and feedback displays and that there are no helps in the practice item. All of these issues must be resolved for an instructional sequence to have an adequacy rating of 1.00. Resolution of these issues consisted mostly of separating the facts and concepts to be learned from the text and identifying them, separating the examples of concepts from the text and identifying them, adding mnemonics to assist in the learning of concepts, and including mnemonics in the feedback.

Special mention must be made of the type of mnemonic used in this study. The facts requiring mnemonics consisted of elements of learning theory that had to be associated with the name of the theorist who created them. It was felt that by creating a "box" out of the initial of the theorist's name and incorporating the name into the "box," a visual cue would be added that would aid the remembering of the relationship of the theoretical element to the theorist. Further, placing the element of theory into the box served the purpose of separating and identifying the concepts which were to be learned.

“The purpose of this study was to determine the effectiveness of the ISDP in analyzing and prescribing changes in self-instructional materials that teach abstract concepts similar to those taught in colleges and universities.”

Experimental Procedures

Subjects were assembled in a classroom and randomly assigned to three different groups. Each subject was given a packet containing one set of self-instructional materials, one optical scan answer sheet, one time card, and one blank sheet of paper. Subjects were instructed on the procedure of the experiment, questions were entertained, and the subjects were directed to three different classrooms.

As each student began and completed interacting with the study materials, he or she recorded the time from a large digital clock at the front of the room. As students finished, they raised their hands and a monitor would take their study materials and give them their exams. Again, as they began and completed their exams they marked their time cards accordingly.

Instrumentation

Students' abilities to perform were measured by a thirty-five item multiple choice objective test made from items developed for the original and the revised forms of instruction. The test was checked for content validity by the instructional media course instructors and was found to be a valid instrument for assessing the learning of course content. The KR-20 reliability coefficient of the test is .78. The confidence score was measured by students' reactions to thirty-five, five point confidence scales, one for each answer. The attitude of the students toward the instruction was measured by a fifteen item, five point Likert Scale (Oppenheim, 1966). The instruments measuring performance, confidence, and attitude were combined into one eighty-five item examination. The amounts of time required to complete the instruction and to complete the test were taken from records each subject made of the time he or she started and completed those tasks. The subject could observe the time from a large digital clock clearly visible at the front of the room.

Statistical Design

The design of the study was a one-way analysis of variance measuring the differences among the three levels of instructional quality. This design was used for each of the dependent variables—performance, study time, test time, affect, and confidence. Multiple comparisons of the means were made using the Tukey–WSD technique and a familywise Alpha level of .05.

Results

The means and standard deviations for all five scores from the three different instructional groups are shown in Table 1. It may be noted that there are differences in all scores except study time favoring the materials revised for im-
proved consistency and adequacy. There was an eleven percent improvement in performance, a twelve percent improvement in confidence, a twelve percent improvement in attitude, and a fifteen percent decrease in test time from the original version to the most improved version.

An examination in Table 2 reveals that these differences are significant, and a series of Tukey-WSD follow up tests show that the significant differences are between the original version and the version with improved consistency and adequacy.

There were no significant differences in materials are better able to meet stated performance objectives. Since the number of concepts and facts to be learned was the same in all three forms of instruction and since the major differences in performance were observed between subjects studying the original materials and subjects studying the materials with optimum consistency and adequacy ratings, it can be concluded that the structuring of instructional materials according to ISDP principles has a direct positive effect on the amount of content that is learned.

Confidence
Students who study ISDP revised

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Statistic</th>
<th>Original</th>
<th>Improved Consistency</th>
<th>Improved Consistency and Adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>X</td>
<td>22.55</td>
<td>24.50</td>
<td>26.40</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>4.71</td>
<td>5.35</td>
<td>4.35</td>
</tr>
<tr>
<td>Confidence</td>
<td>X</td>
<td>3.61</td>
<td>3.81</td>
<td>4.09</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>.66</td>
<td>.52</td>
<td>.50</td>
</tr>
<tr>
<td>Attitude</td>
<td>X</td>
<td>3.25</td>
<td>3.56</td>
<td>3.83</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>.55</td>
<td>.54</td>
<td>.46</td>
</tr>
<tr>
<td>Study Time in Minutes</td>
<td>X</td>
<td>36.42</td>
<td>40.30</td>
<td>40.60</td>
</tr>
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<td></td>
<td>S.D.</td>
<td>10.69</td>
<td>13.06</td>
<td>11.25</td>
</tr>
<tr>
<td>Test Time in Minutes</td>
<td>X</td>
<td>28.29</td>
<td>24.97</td>
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</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>4.76</td>
<td>5.68</td>
<td>6.03</td>
</tr>
</tbody>
</table>

the amount of study time, even though the improved version had more than twice the number of pages of instruction than the original. Based on these findings, hypotheses 1, 2, 3, 4, and 5 are rejected, and hypothesis 4 is accepted.

Conclusions and Recommendations

The purpose of this study was to determine the effectiveness of the Instructional Strategy Diagnostic Profile in analyzing and prescribing changes in self-instructional materials that teach abstract concepts similar to those taught in colleges and universities. Based on the results of this experiment, the following conclusions are made.

Performance
Students who study ISDP revised materials have more confidence in what they have learned. This would appear to be a direct result of the student knowing exactly what he is supposed to learn. Following ISDP processes dictates that the important generalities that a student is required to master be set apart and identified. While other methods can be used to inform a student of what is considered important—such as writing the behavioral objectives at the beginning of a module—separating and identifying each point provides an immediate visual cue which doesn't rely on the student's memory. Further, this separation provides an easily accessible reference for the student to check what he has learned with what he was supposed to learn. By being aware of what is required of him and by being able to ascertain that he is achieving his goals, he can be more confident that he has mastered the correct material adequately.

Attitude
Students who study ISDP revised materials have a better attitude toward their instructional materials. Logically, there would appear to be a strong association between confidence and attitude. If a student feels that he is learning properly and the time he spends interacting with study materials is not wasted, he is bound to have a positive attitude toward those materials. What may be even more important is that if he has a good attitude toward his study materials, he will probably spend more time interacting with them and be likely to reap even greater rewards.

Study Time
Students do not take an appreciably greater amount of time to study ISDP revised materials. Even though the number of pages of written material was increased from thirteen to thirty pages and the number of practice items the subject had to answer was increased from six to twenty-two, the mean study time increased less than 12 percent. The probable explanation for this is that the revised material is organized in such a way that the student can immediately pick out the important points of the lesson. It would seem that this factor allows the student to process more information in a given instructional sequence in a shorter period of time.

Test Time
Students who study ISDP revised materials complete examinations in less time. If students know the answers to test items and if they are confident that their answers are correct, they will spend less time in searching the test item for clues, equivocating over choices, guessing, or other non-productive behavior.

In summary, it may be concluded that the ISDP principles form an effective diagnostic and revision tool that can be effectively used to improve instruction.

Another conclusion that can be drawn from the data is that improving self-instructional materials on the basis of consistency between objectives, test items, and instruction is not sufficient to assure improved learning, confidence, attitude, or test time. This should be contrasted with the findings of Richards (1976) where Improvements of consistency, only, yielded significant improvements in student performance. The crucial difference is that the Richards study examined changes in lecture and handout

JOURNAL OF INSTRUCTIONAL DEVELOPMENT
materials, while this study examined changes in self-instructional materials. It is critically important for self-instructional materials to be structured in accordance with ISDP adequacy criteria. It would appear that it would be a waste of resources to commit time and/or money to revising self-instructional materials on the basis of consistency criteria alone.

Implications for Practice

With the costs of higher education being constantly scrutinized and frequently cut, and with the problem of declining enrollments facing college and university administrators, the growing trends are toward creating new markets for educational programs. The retarding of students who previously failed academically is one such market. It could be argued that one critical factor involved in academic failure is the failure of the instructional materials used by the school to meet the needs of those students. That failure could be cognitive or affective in nature. That is to say, the material could fail to explain clearly, or it could fail to motivate students into wanting to learn.

It would seem that if a course instructor or a curriculum committee observed that student performance was at a lower level than expected, they could consider the ISDP as a viable possibility for improving their instructional system. This could have a very positive effect on student retention and thus help to ease the financial strains of institutions of higher learning.

Very few instructional programs produce optimum results—that is, every student achieving the objective of the course. In view of this common situation, almost every course could benefit from revision efforts of some kind. As a purely practical matter, however, the effort required in revising instruction dictates that only those aspects (segments, modules, features) of instruction causing the most difficulty should be selected as potential revision projects.

Another relationship should be drawn between colleges and universities, in contrast to trade schools, technical schools, military schools and business training centers. Instructional technology seems to have a stronger foothold in the latter group, as any look through the classified ads of The Chronicle of Higher Education would indicate. However, it would appear by comparing this study to Merrill, Wood, et al. (1977), that the ISDP is even more effective at improving instruction of abstract material taught more often in four-year institutions than the more concrete kinds of information taught more frequently at other types of training facilities.

While the author would not suggest tampering with instructional systems or materials that are found to have an adequate degree of effectiveness, for those courses or instructional sequences which are not producing desired results, the eighteen percent when viewed over one module doesn't amount to much, but viewed over a long course could amount to several days which could result in a substantial savings. When this is added with the fact that study time is not significantly affected, especially considering the improved performance, it would seem to be a financially wise investment to revise faulty materials.

| Table 2. |
| A Summary of the Means, Degrees of Freedom, and F-Ratios on Effects of Instructional Quality on Five Dependent Variables |

<table>
<thead>
<tr>
<th>Form of Instruction</th>
<th>Mean</th>
<th>df</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
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<td>Performance</td>
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<tr>
<td>Original</td>
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<td>Confidence</td>
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<td>3.61</td>
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<td>5.29</td>
<td>.007</td>
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<tr>
<td>Improved Consistency and Adequacy</td>
<td>23.90</td>
<td>2.88</td>
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*in minutes

ISDP would seem to be a valuable improvement tool which could be used effectively in colleges and universities.

Although the thrust of this study was the examination of revision to materials, the content of which is taught typically in colleges and universities, there is one implication for any institution where training is done by independent study and the financial cost of training time is a factor. A saving of test time of over according to ISDP principles.

Implications for Further Research

It has been shown in this study that ISDP revised instructional materials are more effective in an experimental setting. However, the true value of self-paced, self-instructional materials lies in their use in a mastery model over a period of days or weeks. The results of this study have some interesting implications for that type
of learning situation which would warrant further investigation. For example, if students can learn more material in about the same amount of time, as this study shows, it should take students less time to reach mastery of the content area. It would also seem logical to assume that if students had a higher attitude toward their course materials and more confidence in their learning, they would probably spend more time interacting with those materials. This in turn could bring about even greater differences in performance over the length of a course. To carry this one step further, the increase in performance could produce a still greater difference in attitude. These are logical conclusions that may appear obvious, but should be tested empirically.

Another consideration worth investigating is the use of ISDP revised materials with students at different levels of development and different levels of ability. This could have wide implications for use in elementary and secondary schools. However, before one could recommend the use of these types of learning materials for other types of students, it must be determined if students functioning at a lower developmental state or students with sub-collegiate aptitude levels could benefit from them.

Previous research (Twyford, 1969; Rosen, 1968; Dick, 1968; Aboder, 1972; and others) indicates that almost any effort at revision is of some value. Additional research could contrast one or more of these largely undefined techniques with that of the ISDP. It could also serve to further verify the utility of a theoretical approach and to determine if, in fact, the ISDP is more effective than any other presently documented or utilized technique for producing increases in desirable student outcomes through instructional revision. In effect, the experiment would be testing: (1) the effects of the original instruction, (2) an intuitively revised version of the instruction, and (3) a theoretically based or ISDP revision of the instruction.

It would also seem warranted to conduct a study similar to Merrill, Wood, et al. (1977) in which various principles are tested apart to determine their individual contributions to the learning environment. It should be remembered that the study was concerned with the teachings of concrete concepts and that several predicted outcomes were not realized because, according to the author, the criterion tasks were not of such difficulty as to require some of the assistance provided by the ISDP prescribed improvements. Reed and Dick (1968) concluded that abstract concepts are more difficult to learn than concrete concepts. Therefore, some of the outcomes predicted for the Merrill, Wood, et al. (1977) study may be found true for abstract content.

Keeping in mind the Carnegie Commission’s goals for the year 2000, it would seem appropriate that a study be made to determine if entire courses of instruction can be improved via ISDP

“Students who study ISDP revised materials are better able to meet stated performance objectives,... have more confidence in what they have learned,... have a better attitude toward their instructional materials,... do not require an appreciably greater amount of study time,... and complete examinations in less time.”

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Transitioning Learning Strategies Research Into Practice:  
Focus on the Student in Technical Training

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Abstract. Applying learning strategies in the context of computer-based military technical training requires the solution of a number of research problems. In an ongoing, four-year effort to define student learning strategies/skill training needs, instructional procedures, and training products, four major research problems have been addressed. First, how does one go about identifying the types of learning strategies and skill maintenance strategies likely to have the most payoff? Second, what methodologies are appropriate for identifying segments of the student population most in need of specific types of skill training? Third, what are appropriate evaluation criteria and research designs to apply in a military CMI instructional environment where practical benefits are judged in terms of increased student efficiency? Finally, what assumptions can be made about the generalizability of research findings from a military learning strategies/skill training program which emphasizes general cognitive, affective, and cognitive skills related to effective and efficient learning? Approaches to these problems as derived from research conducted in the context of the Air Force Advanced Instructional System—a large-scale individualized and computer based technical training environment—are described.

The application of cognitive and affective learning strategies in the military has been an area of concern since the late 1970s (O'Neil & Spielberger, 1979). A large part of this concern is based on the fact that the termination of the draft in 1972 has presented the military services with a variety of unique problems. A prevalent and continuing problem, predicted by Vitola and Valentine (1971a, 1971b), is that manpower resources from the higher aptitude levels are more limited and the percentage of high school graduates lower than found during the draft. Not only is it recognized that many recruits possess inadequate basic reading skills (Duffy, 1977; Fletcher, 1977; HumRRO, 1977; Mockovak, 1974; Smith, Note 1; Stolte & Smith, Note 2), but there have been efforts to address other types of cognitive and affective skill deficiencies associated with motivational problems in military students of lower ability and educational level (Boskoski, Bialek, Pitkin; & Gordon, 1975; Joyce, Note 3; McCombs & Dobrovolski, Note 4; McCombs, Dobrovolski, & Judd, 1979; O'Neil & Spielberger, 1979).

The problems with student skill deficiencies in the volunteer service in part reflect inadequacies that have been identified in our country's educational system. Our educational system has been criticized for contributing to an increase in the number of students who lack basic reading and mathematical skills and for failing to contribute to students' overall intellectual development and psychological maturity (Sprintall, 1980). The nature of the skill-deficient recruit's problem is likely to be more comprehensive, then, than the lack of basic reading and cognitive skills. In fact, it has been suggested that in addition to skill deficiencies resulting from inadequacies in our educational system, the skill-deficient trainee may have additional motivational skill deficiencies resulting from a "Me Generation" values orientation (Sheehy, 1979).

Other evidence of the comprehensiveness of skill deficiencies for students of lower ability or lower educational levels is provided by Gade and Peterson (1977). They discuss the fact that students at lower levels of ability—along with possessing poor decision-making and analytic skills—also exhibit low levels of vocational maturity and often lack clear values and goals. In addition, one can speculate that given the age of the average military trainee (between 17 and 20 years), many trainees are experiencing the typical conflicts of their developmental stage (between adolescence and adulthood). These conflicts may lead to other kinds of affective skill deficiencies of an attitudinal or motivational nature.

In general, therefore, skill deficiencies in the military recruit population entering technical training may stem from educational, philosophical, and developmental sources. These deficiencies may encompass skills in both the cognitive and affective domains. Learning strategies research and application in the military student population must address both these skill areas—a position in keeping with that argued early by Piaget (1952) and more recently by Hurst (Note 5) and Zajonc (1980). These researchers have argued that affect and cognition are inseparable yet distinct. Neither process domain should be neglected in remedying the problems of the skill-deficient trainee. This is particularly true when considering that student cognitive and affective problems become even more severe when students are faced with adjusting to a wide variety of new circumstances and requirements.

The learning strategies project described here was undertaken to first identify specific cognitive and affective skill deficiencies—as well as problems in the areas of conation or the will to learn—that are related to ineffective and inefficient military trainee performance in a computer-managed instructional (CMI) technical training environment. Information on specific skill training needs was then used to develop specialized skill training packages that could remedy the particular cognitive, affective, and conative skill deficiencies identified. The following sections describe the context and products developed in an ongoing four-year learning strategies research program and discuss four specific research problems that have been addressed in the course of this research program. In the four problem areas, solutions that were attempted are discussed, along with lessons that have been learned.
The Research Context

The context for the learning strategies research program was the Air Force Advanced Instructional System (AIS): a prototype, multimedia, computer-based instructional system designed to improve the effectiveness and efficiency of Air Force technical training and to provide an operational research facility for assessing innovations in instructional technology. This system currently supports three technical training courses representative of many cognitive and performance skills required by enlisted Air Force personnel.

identify those strategies which effectively help students cope with these problems; (c) develop and evaluate a small set of self-instructional modules for helping students acquire the skills necessary to adapt and perform in a CMI environment; and (d) investigate procedures for individualizing the assignment of these self-instructional materials so as to minimize training time and cost.

During the second phase of this learning strategies research program, the objectives were to (a) extend the findings of the first phase by identifying additional cognitive, affective, and conative skill deficiencies of students performing unsatisfactorily in technical training; (b) develop and evaluate a set of self-instructional skill training materials for helping students acquire specific skills identified in the cognitive, affective, and conative domains; and (c) develop and evaluate appropriate classes of adaptive decision models and rules for use in the individualized assignment and reassignment of the developed skill training materials.

This learning strategies research program has led to the development of three sets of skill training materials. Two sets of skill training materials were developed in the first phase of the project and a third set was developed in the second phase of the project.

"How does one go about identifying the types of learning strategies and skill maintenance strategies likely to have the most payoff?"

Military trainees learn their respective course materials via self-paced, individualized, and computer-managed instruction. Within this system, students progress at a rate determined by their individual skills, abilities, and interests.

The new learning requirements of a CMI training environment, encountered by a growing number of military trainees, make the inadequacies of various cognitive and affective skills even more apparent (McCombs et al., 1979). In the CMI environment, students are expected to (a) be attentive and motivated; (b) make learning meaningful by the appropriate use of learning strategies and skills; (c) practice personal responsibility skills required for self-initiated, self-directed, and self-paced learning; (d) interact effectively with both their peers and their instructors; and (e) set appropriate course and life goals.

During the period of the development of the AIS (1973–1977), it became apparent that many students in this instructional environment experience problems exercising the preceding responsibilities. In the Fall of 1976, under the funding auspices of the Defense Advanced Research Projects Agency’s (DARPA) Learning Strategies Program, efforts were begun to analyze student learning strategy/skill training needs in this context and to develop products to remedy these needs.

Learning Strategies/Skill Training Products

In the first phase of the program, the objectives were to (a) determine the characteristic problems which students encounter in a CMI environment; (b) students performing unsatisfactorily in technical training; (b) develop and evaluate a set of self-instructional skill training materials for helping students acquire specific skills identified in the cognitive, affective, and conative domains; and (c) develop and evaluate appropriate classes of adaptive decision models and rules for use in the individualized assignment and reassignment of the developed skill training materials.

This learning strategies research program has led to the development of three sets of skill training materials. Two sets of skill training materials were developed in the first phase of the project and a third set was developed in the second phase of the project.

"...First identify specific cognitive and affective skill deficiencies—as well as problems in the areas of conation or the will to learn—that are related to ineffective and inefficient military trainee performance."

(1) Materials for helping students become aware of the requirements of a self-paced, individualized, and computer-managed instructional environment. These materials include an Orientation to CMI Module and a Time Management Module (Dobrovolny, McCombs, & Judd, 1979; McCombs, et al., 1979). The Orientation Module compares and contrasts the characteristics of a typical CMI environment with those of a conventional lockstep environment and details the habits and skills. The purpose of this measure is to (a) predict student performance on AIS course materials and (b) identify those students in need of specific kinds of study skills remediation.

The four Study Skills Modules cover cognitive skill areas identified as troublesome for students in CMI: Reading Comprehension, Memorization, Test Taking, and Concentration Management. The materials in each of these areas are packaged individually so that a student can...
receive any or all of the modules as deemed necessary by an instructor or the AIS computer’s adaptive assignment capability. The philosophy generally emphasized in the Study Skills Modules is that learning and remembering new information becomes easier if the student changes it in such a way as to make it meaningful to him or her. The Reading Comprehension Module recommends that students ask questions about the main ideas in new technical information, that they draw

Study Skills Modules.

(3) Materials for developing motivation, personal responsibility, and effective life coping skills through positive self-control strategies. These materials are designed to address general student skill deficiencies in the cognitive, affective, and cognitive domains for those students performing unsatisfactorily in technical training (McCombs & Dobrovolsky, Note 4). Seven individually packaged, self-instructional modules and an instructor orientation and

Learning Strategies/Skill Training Material Format

All student skill training materials developed in the learning strategies program are in a printed, self-instructional format. The materials are formatted in an easy to read, low density style which includes the use of visuals, where appropriate, as well as periodic embedded questions and practice exercises. Time to complete each module ranges from about 30 minutes to about four hours.

Following the initial self-instructional skill training, students are encouraged to use three basic types of skill maintenance strategies and techniques. First, students are instructed on the use of specific self-monitoring, self-charting, or self-recording techniques. Second, students are taught the importance of rewarding themselves for reaching goals or making desired changes in performance or behavior, and are instructed in the use of various self-reward strategies—from using positive self-talk or self-praise to purchasing desired products or engaging in desired activities. Third, students are encouraged to use their instructor as a learning strategies expert and as someone who can assist them in acquiring and maintaining particular skills. In turn, instructors are trained to perform the role of learning strategies expert.

The choice of the format and instructional approach to use in the student skill training products was determined both by an extensive review of relevant literature and by the empirical process of seeing what worked best in particular skill areas. The documented literature review can be found in McCombs and Dobrovolsky (Note 4). A discussion of research issues and problems that led to the selection of particular methodologies and approaches in this learning strategies research program is presented in the following sections and in the article by Dobrovolsky in this issue.

Research Problems, Issues, and Approaches

Four specific research problems that have been addressed in the course of this learning strategies program will be discussed along with various approaches that were taken to these problems and lessons that were learned.

Research Problem 1: How does one go about identifying the types of learning strategies and skill maintenance strategies likely to have the most payoff in military technical training?

The approach taken in this program was
to first analyze where learning strategies problems are being reflected in technical training. This analysis led to the selection of four criterion measures which were open to further analysis in determining the types of learning strategies likely to have the most payoff in this military training environment. The criterion measures were (a) attrition rates (percentage of students dropped from a particular technical training course); (b) times-to-complete (the training times for various units of instruction, such as a block or a course); (c) criterion test scores (scores obtained on engagement in self-motivation strategies.

Following the analysis of relevant information and the formation of a preliminary list of potentially beneficial skill training/learning strategies areas, the percentage of students having problems in each area was determined. This was done in order to determine if the sample size was adequate for statistical methodologies that could describe the specific learning needs of students with learning problems, as well as identify specific students who would benefit from skill training. At this stage—using information from attrition rates, state anxiety subscale of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970):

(c) had poor logical reasoning skills, as measured by the Logical Reasoning Test (Hertzka & Guilford, 1955), low reading comprehension ability, as measured by the Reading Skills Scale (McCombs, Note 8), and poor study skills, as measured by the Study Skills Questionnaire (McCombs & Dobrovolsky, Note 9); and

(d) were generally younger students with less educational experience, as indicated in biographical data collected by the AIS.

These findings confirmed information we had obtained from the literature, our observations and experience with AIS students, and discussions with AIS students and instructors regarding student learning strategies/skill training needs. But we needed to know more in order to define specific skill training packages and student populations in need of those packages. That led us to seek answers to the next question.

Research Problem 2: What methodologies are appropriate for identifying segments of the student population most in need of specific types of skill training?

Some potentially effective methodologies for identifying the types of students most in need of skill training in the cognitive, affective, and conative areas identified had been disclosed in answering the first question—by the analysis of relevant literature, discussions with students and instructors, and analysis of available empirical data. These approaches were also judged as appropriate for further defining the student in need of skill training. In the first phase of this learning strategies program, discussions with students and instructors formed the primary method by which skill training needs in the area of an orientation to CMI, time management skills, and study skills training needs were identified. The training packages developed in these areas filled a pressing need, but did not solve all the learning problems of that one quarter of the trainee population that was still performing unsatisfactorily. Further definition of this population was undertaken by conducting student and instructor interviews—interviews which yielded further information that could be used in designing a set of individual difference measures.

Interviews with students and instructors were conducted in three AIS courses. The major purpose of the interviews was to ascertain instructors' perceptions of the characteristics which distinguish students.
performing well versus poorly in their courses and to solicit suggestions on the
types of skill training they felt would be
most beneficial. The major purpose of the
student interviews was to (a) obtain ad-
tional information—from students
classified into "good," "average," or "poor"
performance categories on the basis of
instructor and supervisor recom-
mendations—on students’ perceptions of
their problems with the course and their
strategies for coping with these problems;
and (b) determine whether this information
differs for good versus poor students.
Both instructor and student interviews
indicated that the kinds of students having
the most difficulty successfully completing
their course were those who exhibited the
following characteristics (which dis-
tinguished them from students who had less
difficulty):

- take responsibility for their own learning;
- (e) perceptions of their ability to deal with
  various sources of stress; (f) ability to make
  responsible decisions; (g) achievement
  motivation or fear of failure; (h) suc-
  cess/failure attributions; (i) learning-related
  self-verbalizations; and (j) problem solving
  or critical thinking skills.

The battery of items in these areas was
subjected to a validation process for the
purpose of identifying the smallest set of
items which (a) could reliably discriminate
satisfactory and unsatisfactory performance
groups in two A1S courses; and
(b) could define particular skill training
strategies or treatments for those students
performing unsatisfactorily. In general, the
evaluation of the original set of 140 items
produced a reduced subset (30 factors) that
are reliable (internally consistent) and
predictive measures of the kinds of students

"Students performing unsatisfactorily had low
general interest,...experienced high levels of test-
taking anxiety,...had poor logical reasoning
skills,...and were generally younger."

(a) In the conative domain, the poorer
students consistently were those with low
motivation to learn, with few military or
personal goals, and who could be classified
as being low in maturity, with little self-
discipline or the ability to take respons-
ibility for their own learning.

(b) In the affective domain, the poorer
students were generally those with high
levels of anxiety toward learning and
toward taking tests, and who lacked ef-
fective skills for coping with the demands
of technical training.

(c) In the cognitive domain, the poorer
students were generally those with poor
reasoning and comprehension skills,
and/or those who lacked decision-making
or problem solving skills in technical or
personal areas.

Based on this information and the in-
formation from the data analyses, a set of
individual difference measures was selected
from available measures or designed by us
in the case where existing measures that
tapped particular student variables of
interest could not be located. In general,
this battery of measures assesses student’s
(a) personal values and goals; (b)
emotional or psychological and vocational
maturity; (c) self-concept or self-esteem; (d)
expectations about the demands of the
military, technical training, or being able to
performing satisfactorily versus unsat-
factorily in a CMI military technical
training environment. The battery also
formed theoretically and conceptually
meaningful constructs suggestive of skill
training deficiencies and needs—a set of
variables that might have both predictive
and diagnostic utility in terms of iden-
tifying students in need of particular kinds
of skill training in the conative, affective,
and cognitive skills domains.

The question of whether this approach
and methodologies involved are ap-
propriate for identifying segments of the
student population most in need of specific
types of skill training still remains to be
demonstrated. Reduction of DARPA’s
funding in the learning strategies area has
forced us to delay answering this question
until other funding sources can be obtained
for investigating individualization
parameters in this motivational precourse
skill training area. In the meantime, there
are other research issues and problems in
the area of the training materials them-
selves—one of the most important of
which is addressed by the following
question.

Research Problem 3: What are ap-
propriate evaluation criteria and research
designs to apply in this military CMI in-
structional context where practical benefits
are judged in terms of increased student
efficiency?

There are four major types of evaluation
criteria that can potentially be used to
assess the benefits of learning
strategies/skill training materials in this
context. First, one can measure any
changes or improvements in the skills that
the training addresses. Second, one can
observe changes in behaviors that are
associated with the skills the training
addresses. Third, changes in attitudes or
interests in learning as a result of the skill
training can be assessed. Finally, changes in
learning performance in courses which
require these skills can be measured.

Directly measuring changes in the skills
addressed in a particular learning
strategies/skill training package—whether
these be cognitive, affective, or conative
skills—is a difficult task at best. This task
becomes even more complex when the
skills addressed are of the general and
global nature of those in this learning
strategies program. Although it is certainly
possible, and perhaps desirable, to analyze
and define the underlying processes and
skills necessary in areas such as time
management, study skills, career
development, values clarification, goal
setting, effective communication, stress
management, or problem solving—this
was clearly an effort that has not been
adequately completed to-date and one that
was beyond the scope of our contracted
research program. It could also be argued
that given the research goal of producing
skill training materials that result in im-
provements in student learning efficiency in
the operational training environment,
changes or improvements in particular
skills are not the appropriate evaluation
criteria. We thus considered other kinds of
measures by which we could evaluate the
cost-effectiveness or practical benefits of a
skill training program that was aimed at
remedying general kinds of skill deficiencies
present in student populations performing
unsatisfactorily in military technical
training.

Observing changes in the behaviors
associated with the skills addressed by a
14 particular training package is also difficult
and beset with numerous methodological
problems. First, observing behavior relies
on subjectively gathered information which
can only be recorded in a semi-objective
format. Second, it requires a careful and
time-consuming analysis of the behaviors
one would expect to be demonstrated as a
result of the acquisition of particular skills.
Third, it requires the use of a number of
trained observers who can devote substantial amounts of their time observing student behaviors in the classroom. These considerations made the value and feasibility of using observations of changes in behaviors questionable, and it was decided not to use this type of evaluation criteria in assessing the practical benefits of the developed skill training materials. It was also decided, however, that other types of subjective and anecdotal information from instructor observations of student behavior following skill training provided a valuable source of information that could supplement other sources chosen to address the practical benefits of the skill training.

Assessing changes in student attitudes or interests in learning or performing well in technical training can be accomplished by objectively scored paper and pencil measures. This information can also be obtained from instructor observations or discussions with students. In analyzing the relationships of this attitudinal information to the type of skill training packages developed in this learning strategies program, it can be argued that they provide an important source of information about predicted affective outcomes. For example, goals theoretically motivate performance, and effective management of stress theoretically eliminates or reduces negative effects of anxiety on performance. For this reason and because improved attitudes toward performing well in technical training is a variable of potential interest for demonstrating practical benefits in a military technical training environment—this evaluation criterion variable was deemed appropriate and feasible. General classes of attitudinal variables considered important include student attitudes toward the learning situation, toward performing well, and toward themselves as responsible and able to achieve in a self-directed learning environment.

Measuring changes in student performance (times-to-complete, test scores, failure rates, attrition rates) as a result of the skill training appeared to be the most easily obtained and potentially appropriate measure of practical benefits. This measure is not without its problems, however, one of which is the nature and strength of the relationship between the acquisition of particular skills, such as goal setting skills or stress management skills, and performance as measured by times-to-completion or criterion test scores. In addition, there is the problem of controlling for other sources or factors that might be responsible for positive changes in performance—sources or factors that must be controlled in order to reach any valid conclusions about the practical benefits of this type of skill training.

Along with the concern over appropriate evaluation criteria comes the concern for appropriate research designs that can be applied to an operational military training context. In this regard, two critical issues are the (a) feasibility of research design implementation and (b) user acceptance of any conditions imposed on the instructional environment by the research design. In the course of our four-year learning strategies program, these two issues were taken into consideration in determining appropriate research designs, and three designs have been identified as having varying degrees of appropriateness.

The first and most desirable design from the standpoint of statistical control is a simultaneous matched control group design. In this research design, experimental and control groups—composed of students identified as likely to benefit from the skill training and randomly assigned to these two groups—are exposed or not exposed to the skill training materials, respectively. For this design to work most effectively, however, it is necessary to have large numbers of students who can be classified as skill deficient within the same course—making the use of this design feasible only in courses with a large student flow. In addition, it is desirable that experimental and control group students are not exposed to the same instructors, in that instructors associated with experimental students have been given specialized training as learning strategies experts. Meeting these two requirements is often difficult, if not impossible, in the operational military technical training environment.

A second possible design which avoids some of the problems associated with the first design is a sequential matched control group design. In this research design, experimental group students are compared with a matched group of students who progress through the course and treatment effectiveness is measured by changes in the student’s performances before and after skill training, relative to average changes in performance for other students in the course for the same units of instruction. The major problem with this design is that it necessitates waiting to administer the skill training treatment until a sufficient baseline performance level has been obtained—restricting the amount of time that performance changes can be observed, and potentially attenuating results.

To date, we have not been successful in resolving the problems associated with selecting appropriate evaluation criteria and research designs. The fact that this is true in this context and other applied research contexts points to a need for reconceptualizing what is appropriate given the goals of learning strategies or skill training research in an applied setting. These problems notwithstanding, it has to date been possible with the use of each of the foregoing evaluation criteria and research designs in the context of the AIS learning strategies research program to demonstrate performance gains in the areas of training time, test scores, and student and instructor attitudes following skill
training in time management techniques and study skills strategies for becoming actively involved in the material to be learned (McCormick et al., 1979). That brings us to our next research problem.

Research Problem 4: What assumptions can be made about the generalizability of research findings from a military learning strategies/skill training program which emphasizes general cognitive, affective, and cognitive skills related to effective and efficient learning?

In addressing this question, additional assumptions need to be made about the context, the skills and strategies presented and taught in these self-instructional modules would be expected to be of some benefit.

Arriving at the answer as to whether the products produced in this research effort will generalize in terms of their effectiveness to other student populations and instructional contexts requires an empirical test. In addition to tailoring the examples and perhaps the format of these skill training materials to other student populations—tailoring of the goals and objectives and the benefits expected from this type of skill training have yet to be accomplished. The question is not one of whether there is a need for and a benefit from this type of learning strategies/skill training research in applied settings. The question is how are we going to measure it and under what conditions.

References


To date, we have not been successful in resolving the problems associated with selecting appropriate evaluation criteria and research designs.

References


Transitioning Learning Strategies Research into Practice: 
Focus on the Technical Training Instructor as a Learning Strategies Expert

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Abstract. Techniques for transitioning applied learning strategies research from the status of temporary research project to that of a permanent part of the classroom or learning center are discussed. Lessons learned during an ongoing, four-year effort to improve the skills of military technical training students via three sets of learning strategies/skill training materials are presented as the basis for the recommended transition techniques. The focal point of these techniques is the active involvement of instructors in all phases of the project. The advantages and disadvantages of including and not including instructors in applied learning strategies research are discussed. This is followed by a discussion of four important issues to be considered when choosing to involve instructors in a learning strategies research project.

Transitioning learning strategies research into practice is essentially an exercise in organizational change, and since most people are at least initially resistant to change, this can be a very complex task. The unlearning of old and familiar practices and the relearning of new ones often evokes considerable anxiety, insecurity, and resistance on the part of most individuals. Given these realities, effective organizational change necessitates a conscious and deliberate effort on the part of the change agent such that the change process becomes an integral part of the entire program.

After a review of educational research programs, Fullan and Poomfret (1977, p. 394) conclude that “if there is one finding that stands out, it is that effective implementation of social innovations requires time, personal interaction and contacts, in-service training, and other forms of people-based support.” Hartley (1979, p. 53) extends this concept by stating that, “Although a project can benefit from the whole-hearted support of top officials in the system, resistance will be less and change is more likely to occur if those affected feel that the project is their own—not one devised and operated by outsiders. Resistance will be less if participants have joined in diagnostic efforts leading them to agree on what the basic problem is and to feel its importance.” Diran’s (1978) research also supports this approach and his data reveal that system acceptance is more likely if (a) the system is perceived as operating in the interests of various constituencies and (b) these constituencies have meaningful input into the design, development, and evaluation of the program.

Involving instructors in all phases of a program would, therefore, appear to be an effective technique for transitioning learning strategies research into practice. This extensive type of involvement does, however, produce some important implications not only for the learning strategy itself, but also for the evaluation of that strategy. For example, if instructors are to be involved in all phases of a program, the learning strategy will have to be flexible and general enough to withstand the modifications, expansions, and deletions that instructors will make. It will have to be capable of maintaining its inherent effectiveness through numerous revisions and manipulations. Additionally, if instructors are to be involved in all phases of a program, they will become a critical variable in the evaluation design and the implementation of the strategy. They will assume the role of facilitating student acquisition of special skills and
assisting student maintenance of these skills. In short, an instructor will become a learning strategies expert—an individual who helps students understand, apply, and maintain new learning strategies and skills.

Although these are ambitious goals, we have experienced some degree of success in achieving them in our learning strategies program conducted within an operational CMI environment. This program began as most educational research programs strategies materials discussed earlier. With the exception of the two most recent sets of learning strategies materials, these new strategies have been implemented without the active involvement of instructional personnel in any of the phases of the program. The results were consistently characterized by initial dramatic effects but a diminishing of these effects as soon as the program was transitioned to military course personnel. For example, before the evaluation of the first set of learning strategies materials, the average course completion time for students enrolled in the course was approximately 27 days. During the evaluation of this program, the average course completion time dropped to approximately 23 days. Within two months of this evaluation, however, the average course completion time was up to approximately 25 days.

Excluding instructional personnel from active participation in all phases of various AIL programs brought the following benefits: It was not necessary to control for instructor effects, and control over experimental procedures was thought to be increased. It is important to point out, however, that the control established was far removed from “experimental control” in the true sense of the word.

“By excluding the instructors from active involvement in all phases of the first project, we created a very artificial situation which made the replicability, generalizability, and representativeness of our findings somewhat questionable.”

To Include or Not Include Instructors in Applied Learning Strategies Research: The Trade-Offs

Cost versus Benefits of Not Including Instructors in All Phases of a Program

Throughout the history of the AIL, numerous new strategies have been implemented into the learning center, including the three sets of learning strategies materials discussed earlier. With the exception of the two most recent sets of learning strategies materials, these new strategies have been implemented without the active involvement of instructional personnel in any of the phases of the program. The results were consistently characterized by initial dramatic effects but a diminishing of these effects as soon as the program was transitioned to military course personnel. For example, before the evaluation of the first set of learning strategies materials, the average course completion time for students enrolled in the course was approximately 27 days. During the evaluation of this program, the average course completion time dropped to approximately 23 days. Within two months of this evaluation, however, the average course completion time was up to approximately 25 days.

Excluding instructional personnel from active participation in all phases of various AIL programs brought the following benefits: It was not necessary to control for instructor effects, and control over experimental procedures was thought to be increased. It is important to point out, however, that the control established was far removed from “experimental control” in the true sense of the word.

“We also created feelings of mistrust and anger among the instructors.”

In an operational—on-going—learning environment, strict experimental control is impossible to achieve. One simply cannot control all the variables such that two groups of students are identical except for the treatment they receive.

The control which was established in our first learning strategies project was, therefore, a crude approximation of what a researcher would ideally like to have. What it cost us was not worth what was gained. A respectable implementation and evaluation strategy was gained but at the expense of creating an artificial setting and precipitating a great deal of instructor mistrust and anger.

By excluding the instructors from active participation in all phases of the first project, an artificial situation was created. Instructors assisting students is the normal situation in a learning center or classroom. Even in a self-paced environment, the instructor helps students clarify, practice, and apply new concepts and skills. By not explaining to the instructors the techniques and concepts we were trying to teach the students, a very artificial situation was created, and this made the replicability, generalizability, and representativeness of our findings somewhat questionable.

By excluding the instructors from active involvement in all phases of the first project, we also created feelings of mistrust and anger among the instructors. Since instructors were not informed about the skill training packages being implemented in their learning centers, a “We-They” attitude quickly developed. Instructors began to create their own information to fill the void left by the lack of information provided by the researchers. This information was often inaccurate and inappropriate and it perpetuated the “We-They” attitudes.

Costs versus Benefits of Involving Instructors in All Phases of a Program

With the second and third sets of learning strategies materials, instructors were involved in all phases of the project— from the conceptualization of the project through the implementation, evaluation, and transition of the project. This approach produced five significant benefits. First, by creating a more realistic situation between students and instructors, the generalizability of the results was greatly increased. Second, involving instructors in all phases of a project created a team-effort attitude. Instructors viewed the project as
"If instructors view the project as ‘theirs,’ they will naturally want to incorporate it into their daily operations."

in the project, it was possible to greatly benefit from their expertise. For example, since most instructors intimately knew and understood most of their students, they knew how to exemplify theoretical concepts with believable, interesting, and challenging applications. They often had good ideas, suggestions, and comments that made the material attractive to their students. Instructors also provided valuable information about obstacles and barriers likely to occur in the implementation stage and issues to be considered when developing the evaluation design.

The fourth important benefit realized by involving instructors in an experimental project relates to the area of student skill maintenance. Our experience indicates that if instructors know, understand, and can apply the concepts that the experimental project is trying to teach students, they can provide a valuable skill maintenance tool. They can answer student questions about the skills, provide students with new and different applications of the skills, and periodically remind students of how and when to use these skills. In fact, we have discovered that a truly effective instructor can be one of the most effective maintenance tools that a researcher can find.

Easing the transition between an effective experimental project and a permanent program is the fifth benefit realized by involving instructors in all phases of a project. That is, our experience indicates that when an experimental project proves effective, instructors who were involved in the project from its inception are often more than willing to institute the materials and procedures as permanent aspects of their classroom or learning centers. Again, if they view the project as “theirs,” they will naturally want to incorporate it into their daily operations. Adapting an experimental project to an operational project becomes relatively easy for instructors who are interested in the project, know how and why it works, and are proud of it. If instructors have not been included in the project, they are likely to view its operationalization as a considerable threat—a threat which they will often vigorously resist.

Although much was gained by including instructors in all phases of our second learning strategies skill training program, there were some costs. First, we had less control over experimental procedures. On at least one occasion, evaluation data was lost due to a misunderstanding of procedures. Second, due to the positive reaction of instructors to being included in all phases of the program, a “halo effect” was probably operating. Third, it was impossible to separate the effect of the learning strategies skill training materials from the effects of individual instructors.

Table 1 summarizes the costs and benefits of including versus excluding instructors in all phases of applied learning strategies research. As can be seen, both approaches have their merits and their drawbacks. If one desires to transition a research program into practice, the benefits of involving instructors in all phases of the program seem to outweigh the costs.

**Issue 1:**
**Approach to Stimulating Instructor Interest and Involvement**

The approach which we use to stimulate instructor interest and involvement is to recognize and utilize the expertise that the participating instructors bring to the program. Specifically, at the beginning of each phase, participating instructors are given information concerning the Critical Issues of the phase and the results of the previous phase (except for the first phase—Conceptualization—for which there is no previous phase). They are then given the opportunity to provide the researcher with relevant information, suggestions, comments, and critiques concerning this information. Numerous Critical Questions are used to catalyze this instructor

| Benefits vs. Costs of Instructor Involvement on Applied Learning Strategies Research |
|-----------------------------------------------|------------------------------|
| **Benefits**                                 | **Costs**                    |
| NO INSTRUCTOR INVOLVEMENT                    |                              |
| 1. No need to control for instructor effects | 1. Creation of artificial setting |
| 2. More control over experimental procedures  | 2. "We-They" attitude, mistrust, etc. |
|                                              | 3. Effects influenced by affect |
|                                              | 4. Instructor expertise is lost |
|                                              | 5. Instructors cannot help students maintain their new skills |
| INSTRUCTOR INVOLVEMENT                       |                              |
| 1. More externally valid data                | 1. Less control over experimental procedures |
| 2. Team-effort: "We" attitude                | 2. Effects influenced by affect |
| 3. Capitalize on instructor expertise         | 3. Difficult to separate learning strategy effects from instructor effects |
| 4. Maintenance of student skills             |                              |
| 5. Built-in transition mechanism             |                              |

WINTER 1981-82, VOL. 5, NO. 2 19
input. Table 2 details the Critical Issues and Critical Questions which we have identified for each phase of a program.

**Issue 2:**

**Three Factors to be Considered When Involving Instructors in Applied Learning Strategies Research**

1. **Using Volunteers**

There are three general issues to keep in mind when involving instructors in all phases of a program. First, it is important to decide whether instructors are going to be asked to volunteer for the program or if they are going to be required to participate. Numerous researchers have noted the importance of this evaluation question in student skill training programs (Dalton & Allen, 1979; Kanier & Grin, 1978; Komaki & Dore-Boyce, 1978), and it appears equally true that the same issues would be relevant for the instructors. Using volunteers allows one to have a small group of dedicated, motivated, and active instructors (or students). On the other hand, this small group of participants sometimes compromises the generalizability of the program to other instructor and student groups. Requiring instructors to participate increases the opportunity to randomly select instructors representative of the large instructor population of the program. This approach can, however, cause reluctance and resistance on the part of instructors who feel pressured into participating. If instructors are forced to participate, there is likely to be less enthusiasm for and internalizing of the program, and procedures are more likely to be ignored or forgotten. The trade-off, then, in deciding whether to use instructor volunteers is weighing the costs versus benefits of forcing participation (the negative attitudes, the disregard for established procedures vs. representative instructor group) against the costs versus benefits of using volunteers (positive attitudes, compliance with procedures vs. potentially biased group). In our judgment and experience, the scale tips heavily in favor of using instructor volunteers.

2. **Conveying Information.**

The second general issue to consider when involving instructors in a program is how the critical issues and questions at each phase of the program are going to be conveyed to the instructors. Although it is perhaps possible and efficient to use printed handouts and questionnaires to dispense and collect the appropriate information, “research has shown time and again that there is no substitute for the primacy of personal contact among implementers and between implementers and planner/consultants, if the difficult process of unlearning old roles and learning new ones is to occur” (Fullan and Pomfret, 1977). Face to face, personal contact was used in this program and was deemed to be the most effective approach.

If one decides to convey information to and ask questions of instructors via face-to-face contact, the next general issue to consider is a strategy for meeting with them. Three options are available: (1) Instructors can be brought together in a group; (2) instructors can be met with individually, on a one-to-one basis; or (3) both group and individual sessions can be utilized. Our experience indicates that the third alternative provides the most benefits and fewest costs.

When explaining the critical issues of the conceptualization phase to instructors, it is often not only efficient, but also effective to address a group of instructors. A sense of “group”—a “we” feeling—can be developed and the internalization process can begin. Group sessions are also beneficial for involving instructors in the summative evaluation and the follow-up and transition phase of the program. During the summative evaluation phase, group sessions are productive because they give instructors the opportunity to share ideas, exchange case histories, successes and failures, and again participate in a “we” feeling—a support group. These group sessions also give the researcher the opportunity to insure that the

<table>
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<th>Phase</th>
<th>Critical issues to be Explained to Instructors</th>
<th>Critical Questions to Ask Instructors</th>
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| Conceptualization | 1. The researcher's involvement or interest in the research program.  
2. The general purpose, objective, or goals of the program.  
3. The anticipated future or schedule of the program.  
4. The instructor's role in this program (i.e., an involved team member). | 1. What kinds of students often experience problems in your classroom or learning center?  
2. What kinds of problems do students often experience in your classroom or learning center?  
3. What kinds of students often do well in your classroom or learning center?  
4. What techniques or strategies do you use to help poorly performing students? How well do these strategies work?  
5. What other techniques do you wish were available? |
| Design     | 1. Results of Conceptualization phase: instructor input summarized and design guidelines recommended.  
2. Goals and purpose of the Design phase.  
3. Schedule and time frame of the Design phase. | 1. How do you feel about the results of the Conceptualization phase?  
2. Do you think any important concepts or data were missed?  
3. What treatments do you think would be effective given the data?  
4. What do you think is the best approach? |
| Development| 1. Results of the Design phase: instructor input summarized and design guidelines revised.  
2. Goals and purpose of the Development phase.  
3. Schedule and time frame of the Development phase. | 1. Is this what you had in mind?  
2. What needs to be changed?  
3. What needs to be added?  
4. What problems may this create?  
5. How can these problems be solved?  
6. What is the best format or media for these materials?  
7. Do you think these materials will be successful? |
<table>
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<th>Critical Questions to Ask Instructors</th>
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2. Goals and purpose of Formative Evaluation.  
3. Schedule and time frame of Formative Evaluation. | (After reviewing the materials developed)  
1. How do you like the materials?  
2. What needs to be changed?  
3. Do you like the format?  
4. Is it clearly written?  
5. Would this information be useful to students? (After instructors have used the materials for several weeks in their classroom or learning center.)  
6. How are the materials working?  
7. What problems do you have with the materials?  
8. What changes, modifications, or revisions need to be made? |
| Implementation Planning| 1. Results of Formative Evaluation: strong and weak points of the materials and changes that were made to the materials.  
2. Goals and purpose of the Implementation Planning phase.  
3. Schedule and time frame of the Implementation Planning phase. | 1. What is the best way to implement this product?  
2. What is the best time for implementing this product?  
3. What procedures are required for implementing this product?  
4. What problems will implementing this product produce?  
5. Are any major course changes or other changes likely to occur during the planned evaluation period? |
2. Goals and purpose of the Summative Evaluation phase.  
3. Schedule and time frame of the Summative Evaluation phase. | (During summative evaluation)  
1. How are the materials working?  
2. How are the procedures for using the materials working?  
3. What are some of the problems you are having with the materials?  
4. What are some of the successes you have experienced using these materials? (When Summative Evaluation has been completed)  
5. How well did the materials work?  
6. Did the students like the materials?  
7. Did the students benefit from the materials?  
8. Did the students understand the materials?  
9. What would be your overall rating of the materials?  
10. What changes need to be made in the materials?  
11. How could these materials be used on a permanent basis? |
| Follow-up and Transition| 1. Results of Summative Evaluation: changes in student performance.  
2. Who can use the materials.  
3. The future of the materials.  
4. Researcher's appreciation of the participating instructors' time and effort.  
5. If and when instructors can get copies of the final report or summary of same. | 1. How do you feel about your participation in this project?  
2. What procedures or activities do you think should be changed?  
3. Would you like to volunteer for another similar project? |

Evaluation procedures are understood and being followed uniformly. For the follow-up and transition phase of the program, group sessions are beneficial because the purpose of this phase is basically to debrief the participating instructors—to outline the final results and future of the program. A feeling of closure and perhaps even some mutual congratulations can be enhanced by the use of a group during this phase of the program.

Individual, one-to-one, sessions have been found to be effective for collecting answers to critical questions because they avoid the "peer pressure" and need for conformity that is often felt when a group of individuals get together. We have found that the answers we get from instructors to the critical questions asked them at each phase of the program (except during the summative evaluation when a group session affords the instructors the opportunity to benefit from each others' experiences) are most beneficial, useful and truthful when we ask these questions on an individual basis.

As was mentioned earlier, we have found that it is beneficial to use a group session to discuss the critical issues of the conceptualization and follow-up and transition phases. Group sessions might also be an efficient technique for explaining the critical issues of all of the other phases of the program. We decided to explain these issues on a one-to-one basis because of the difficulty of getting the participating instructors together. Explaining these issues to them individually proved to be beneficial in that we could individualize our presentation to each instructor and help him or her understand these issues. Explaining this information on an individual basis was also productive in that it provided an effective introduction and closure for the critical questions at each phase.


The third general issue to address when involving instructors in all phases of a program is the importance of effective communication skills on the part of the researchers. Employing "active listening" techniques; avoiding "yes - no" questions (which result in "yes - no" answers); and avoiding judgemental, defensive, or emotional reactions is critical to facilitating truthful, accurate, and therefore, meaningful instructor involvement.
Issue 3:
Training Required for Instructor Personnel to Maximize Student Acquisition of Identified Skills

Our experience indicates that in order for an instructor to be able to explain a concept or strategy to a student, he or she must have experienced some past success in applying the concept or strategy. In order to provide instructors with this type of experience, formative evaluation can be structured such that instructors read through the materials as if they were students completing all of the exercises and questions. After meeting with the researcher and individually answering the critical questions for the formative evaluation, all of the participating instructors meet in a group with the researcher to discuss the materials, discuss how and why the materials work, expand on the concepts and strategies, demonstrate other applications, and generate new examples.

Another useful technique for helping instructors maximize student acquisition of specific skills is to establish periodic—perhaps weekly—meetings with instructors to discuss any problems, insights, or successes they have experienced. Again, the emphasis is on sharing, discussing, and exchanging information among instructors and between instructors and researchers.

Discussing or reviewing with instructors the developmental needs and conflicts of the student population is a third effective technique for helping instructors maximize student acquisition of specific skills. Although many instructors have studied these concepts in the past, it is often very beneficial to review those which are relevant and applicable to the student population being addressed. This can result in not only an understanding of why the program is important and potentially effective, but also in an ability to individualize the materials in the program to meet the needs of various students in the classroom or learning center.

A fourth technique for helping instructors maximize student acquisition of specific skills is to help the instructor identify with the student. Having instructors complete unfinished sentences such as, “When I was a student I . . .” “My favorite instructor in school was . . .” and “If I were a student today, I . . .” can also increase the amount of practice that students experience in using these new skills by creating new situations which call for the use of these skills.

Fourth, instructors can monitor the progress charts or maintenance charts that students are required to keep as part of the skill training. This ensures not only that the students maintain these charts, but also allows the instructors to provide individual guidance to those students who need additional assistance in understanding and applying the new skills or maintaining the charts.

Issue 4:
Instructor's Role in the Acquisition and Maintenance of Student Learning Strategies and Skills

Instructors generally can help students acquire and maintain new skills in six different ways:

First, instructors can help students apply the new skills to new situations, sensitizing them to the feelings of their students, and this, in turn, can help them present the new skills and information to their students in relevant and meaningful ways.

Individual, one-to-one sessions have been found to be effective for collecting answers to critical questions because they avoid the 'peer pressure' and need for conformity that is often felt when a group of individuals get together.

“However, we have found that it is beneficial to use a group session to discuss the critical issues of the conceptualization, follow-up, and transition phases.”

Fifth, instructors can provide a very effective and consistent reward system for students participating in the new program. Again, personal contact is a strong force and can be used by instructors to motivate students.

Finally, instructors can make the new skills be learned enjoyable, entertaining, and even profitable for their students. By calling out the unusual, the humorous, or even the "sexy" aspects of the new skills, instructors can help students easily and quickly remember the new skills.

Transferring learning strategies research into practice was noted, at the beginning of this paper, to be an exercise in organizational change. An effective technique for catalyzing this change is to involve instructors in all phases of the program such that they internalize the program and view it as their own. The benefits of this type of instructor involvement far outweigh the costs. With a team-effort—"we" attitude—teachers and researchers can combine their expertise to produce effective skill training materials. Instructors can become learning strategies experts and provide a highly effective maintenance function. Finally, with a team-effort, instructors and researchers can transition learning strategies research into practice with a minimum amount of stress and conflict.
Guided Field Experience: A Must for Instructional Developer Preparation

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ABSTRACT. Successful product marketing in business and industry is always preceded by appropriate "field testing." Trainers of instructional developers could well follow this lead by incorporating into their training programs guided field experiences for aspiring instructional developers. The success of supervised interaction with real-life tasks while still in school has been documented in other fields. Trainers of instructional developers will ensure students' success and enhance their own reputations if their students have had experience in putting theory in practice.

Introduction

I am what I am, because I have been doing what I have been doing. (Author unknown.)

This short poem could serve as a motto for all trainers of instructional developers, for it is the essence of what we do. No matter how sound the theoretical training of budding instructional developers, a significant measure of their success will be the field experience they have undergone during their training period.

The purse from which educational institutions have received and continue to receive funds is not as well-filled as in previous years. Institutions are being asked to set priorities in terms of long-range goals. High on the list of priorities are goals and objectives that focus on student learning or student outcomes (North Carolina Central University, 1978). In an effort to ensure student outcomes, particularly in areas where the mastery of theory and the application of theory to practical situations are important, many educational programs are incorporating laboratory experiences and internships or guided field experiences as part of their curricula.

Guided field experiences refer to specified periods of time during which the student developers engage in a variety of supervised activities. It is not the intent of this article to point out the benefits to be derived by the experienced developer who will supervise the students or by the agencies in which the students and the experienced developers are to function. Instead, this article will point out the values of guided field experiences for students pursuing degrees in instructional development.

Values of Guided Field Experiences

Curricular experiences provided for students while they are in graduate school usually result in excellent preparation in terms of theory. However, certain academic areas also require practical application of the theory. Too often, educators provide "book learning" for their students and assume that mastery of the theory will assure success in a real-life situation. As there is little support for this assumption, we must provide guided field experience in areas where field experiences and practice are paramount. Imagine where the medical profession would be if medical students were not provided with opportunities to gain practical experience before becoming licensed physicians.

A review of the literature revealed little information related directly to guided field experiences or internships for students pursuing degrees in instructional development. There are, however, studies which point out the value of internships in other areas. Davies (1976), in writing about internships in Educational Administration,
remarked that an internship is designed to achieve specific objectives. After surveying the literature, he compiled a three-category list of objectives: those applicable to the intern, those applicable to the sponsoring field agency, and those applicable to the cooperating agency. Our focus is on those objectives which pertain to the intern. The objectives were as follows:

"No matter how sound the theoretical training of budding instructional developers, a significant measure of their success will be the field experience they have undergone during their training period."

1. To enable the intern to develop a more comprehensive view of educational administration. The difference between what is taught in the professional schools and what actually occurs in the day-to-day practicing situation can be substantial. The reasons are many: the time-lag between theory and practice; gaps in the professional curriculum; nuances of operations dealing with real people that are difficult if not impossible to explain in the classroom; and effects of community pressures for specific changes. These and other extensions of the on-campus part of an intern's professional preparation are provided by the internship.

2. To provide the intern with the experience of carrying real administrative responsibility. The purpose here is to offer direct experience as a teacher rather than relying on the various experiences of the campus classroom. Administration involves certain skills. By studying these skills, trying them, and eliminating those which do not work, the intern learns how to perfect his or her skills while carrying responsibility.

3. To enable the intern to benefit from lessons learned by the sponsoring administration during long professional experience.

4. To provide a testing ground for the beginning educator where the adequacy of training, his or her probable success as an administrator, and the type of position for which he or she is best suited can be determined. Just as automobile manufacturers need proving grounds and road tests to check the dependability and performance of their laboratory-designed and factory-built products, professional schools need a safety check on their selection and developmental processes. This is the guided instructional development. Guided field experiences or internships have proven useful in student teaching, nursing, other health related professions, and counseling (Broucan, 1965; Rodin, 1975).

Guided Field Experience in Instructional Development

A guided field experience should be arranged on a contractual basis. The student developer, a developer from the institution in which the student is enrolled, and the liaison person who will provide onsite supervision of the field experience, should agree to a written contract. The contract should specify the length of the field experience, the activities in which the student will engage, and the procedures which will be employed to evaluate the field experience. The contract should also include a schedule of conferences: (1) between the university developer and the intern, (2) among the liaison person, the developer, and the intern, and (3) between the intern and the liaison person. The purpose of these conferences should be to discuss the instructional problem under consideration and the progress of the student.

The guided field experiences should provide graduate students in instructional development with opportunities to learn how to:

1. Create an atmosphere of mutual trust with the client. The student developer should learn that this atmosphere is necessary if a successful working relationship is to be established. He or she should also learn that confrontations and highly critical behavior can interfere with these relationships.

2. Ask probing questions of the client. These questions should lead the client and the developer to understand what has to be done and should provide insight for both as to the nature and source of the educational problem.

3. Develop good listening habits and skills. The intern will learn to provide ample time for the client to fully describe his or her perceptions of instructional problems, especially in the early stages of curriculum revision.

4. Avoid the use of "instructional development jargon" since clients may not understand this jargon.

5. Value interpersonal communication skills and realize that face-to-face communication is superior to other forms of communication (Duncan, 1978).

6. Develop a more comprehensive understanding of the nature, scope, and intricacies of the instructional development process. By becoming directly involved, the student should enhance his or her abilities to:
   a. state instructional problems in a clear and concise manner.
   b. identify the complexities inherent in instructional problems.
   c. analyze instructional objectives in terms of types of learning.
   d. match media with objectives.
   e. provide alternative solutions to problems.
   f. evaluate instructional development efforts based upon field testing.

This integration of theory and practice during the guided field experience provides a testing ground for the student developer in which theory can be utilized in a real-life situation.

Guided field experiences in instructional development with the comfort of knowing that their professor is available to assist them if problems arise."
The guided field experience should also prove useful to the university developer and the liaison person.

Role of the University Developer and Liaison Person

The university developer and the liaison person serve a very definite role in the field experience. The university developer assumes the leadership role in determining the experiences for the intern. The university developer and the liaison person, working together, supervise all of the field experience activities. They assist the student by providing a sounding board, by sharing their experiences, and by offering alternative solutions to instructional problems. The liaison person, working in close proximity with the student developer, may be in a better position to supervise his or her activities than the university developer if the field experience is with an off-campus agency.

The guided field experience should also prove useful to the university developer and the liaison person. The university developer, by being involved in the internship, becomes aware of the kinds of instructional problems which surface in public schools, specialty schools, federal agencies, and business and industry. This information should prove useful for program planning or in curriculum revision. In a course such as an Instructional Development Practicum, these problems could be included as simulation activities. In addition, the university developer would be establishing contact with agencies that are hiring graduates from their programs, thereby increasing the chances that students will find employment after graduation.

Commentary on the Guided Field Experience

We have not mentioned the length of the field experiences, i.e., a semester or a quarter, or how many hours per week the student should be involved. Nor have we mentioned how many semester or quarter hour credits a student should receive for the internship. We recognize the importance of these considerations, but realize that they should be dealt with on a university-by-university or on an individual student basis.

There are many lessons to be learned by the student developer while engaged in guided field experiences. The experiences should approximate reality and should be developed in a systematic manner, thus affording experiences far beyond those available in the classroom. It is our belief that, through guided field experiences in instructional development, students will gain important practical experience and will be able to say, "We are what we are, because we have been doing what we have been doing."

References


Contracting for Instructional Development

A Follow-Up

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Abstract. Leitzman, Walter, Earle, and Myers (1979-80) suggest that contracting is a viable process for instructional developers. After looking more closely at their model, we reaffirm the value of contracts in instructional development consulting. Given our experiences and review of consultation literature, we conclude that the original rationale, process, and model do indeed have merit. However, we also find areas that need clarification. We review the contract elements and propose a new element, tasks. We make a distinction between project goals/objectives and instructional goals/objectives. Also, we explore when to contract and how to introduce the client to the contracting process. Recent experiences identify some benefits of using contracts. We have found that they provide a framework for building team relationships, handling project transitions, and providing for project documentation and evaluation.

Clarifications

Contract Elements

A review of the literature on consultation identified two major groups of elements commonly found in consulting models (Bell, 1979; Bell & Nadler, 1979; Brokes, 1975; Davies, 1975; Kolb & Frohman, 1979). One group includes goals, objectives, methods, resources, timelines, products and/or outcomes. These elements define project tasks. The other group includes roles, responsibilities, obligations, personnel, and expectations. These elements clarify relationships among project personnel.

Tasks: A new element. The literature supports the nine contract elements presented by Leitzman et al. (1979-80). However, we discovered another element that describes the specific tasks involved in a project. Writers use a variety of terms for this element: methods, procedures, strategies, plans (Bell & Nadler, 1979; Blocher, 1975; Brokes, 1975). We prefer the more direct term "tasks."

Our experiences have shown that including "tasks" in a contract provides a means of listing specific activities required to attain project goals and objectives. In this way both client and developer can more easily recognize the relationship between tasks and goals. Figure 1 contains an example of how tasks relate to project goals and objectives. Thus we propose expanding the original model to include "tasks" (see Figure 2.)

Goal confusion. Clients often have difficulty distinguishing between project goals/objectives and instructional goals/objectives. In reviewing the sample contract used by Leitzman et al. (1979-80), we found the authors did not distinguish between these two types of goals. An understanding of this difference makes it possible to write a more useful contract.

The goals and objectives in the con-

“Our experiences have shown that including ‘tasks’ in a contract provides a means of listing specific activities required to attain project goals and objectives.”

tracting model refer to the project itself, not to instructional content. They state what the client and developer seek to accomplish through the project. If one of the project goals is to develop instructional goals, then those instructional goals are part of the intended product(s) or outcome(s) of the project. Whether they appear in the contract depends on the client and developer. Figure 3 illustrates the two types of goals and objectives. Figure 4 illustrates a sample contract incorporating the new elements.

When to Contract

Leitzman et al. (1979-80) suggest that
contracting should occur soon after the initial meeting, but not until there is an understanding of the client's environment, the perceived problem(s), the proposed solutions, and any general information relevant to the client's style and concerns. Davies (1975) also indicates that developers negotiate contracts at the beginning of a project or during the entering stage of the relationship. Brookes (1975) divides this entry stage into three subphases—contact, negotiation, contract. We have found that the length of the entry stage varies from client to client and situation to situation. Hence, we reaffirm that developers proceed with the contracting process only when they feel that there is sufficient understanding of the project and its environment.

How to Introduce

Some clients are unsure of how an instructional developer can help them. Others are concerned about observations of their teaching—a sensitive issue. As a result, these clients could feel threatened by the development process. Using the term "contract" can also lead to some misconceptions. Most people associate a legal meaning with this term. Therefore, developers must introduce the concept of contracting carefully. Developers should clarify, at the outset, their definitions of contracting, consulting, and development. There is no set method by which to approach a client. The developer needs to ascertain how the client might react to the contracting process.

If the client appears open and confident in working with us, we establish the contract early in the relationship. However, if the client appears closed and hesitant, we begin with activities that clarify and define some of the elements before presenting the concept of contracting. For example, we generate goals, establish objectives, or discuss who will be responsible for the various tasks. We document these meetings for later inclusion in the contract.

Developers can use several variations of these approaches when introducing the concept of contracts. The dynamics of the situation determine the appropriate approach.

Insights

Team Relationships

The process of creating a contract serves to build relationships between the client and developer. Relationships are also established with others who work on the project. We have identified two types of relationships (see Figure 5).

<table>
<thead>
<tr>
<th>Goal</th>
<th>Objective</th>
<th>Task(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop and improve</td>
<td>To examine own</td>
<td>Video-taping of teaching, student feedback, peer</td>
</tr>
<tr>
<td>as a teacher.</td>
<td>performance as a teacher</td>
<td>observation.</td>
</tr>
<tr>
<td></td>
<td>through feedback on teaching skills.</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Relationship of tasks to project goals and objectives.

1. **Overview:** What characterizes the project? What is the project about?
2. **Personnel:** Who will participate in the project? What roles will they take? What do they expect?
3. **Goals:** What do client and consultant seek to accomplish through this project?
4. **Objectives:** What specific outcomes do the project goals dictate?
5. **Tasks:** What specific activities will attain project goals and objectives?
6. **Resources:** What do the participants need to attain project goals?
7. **Management:** Who will administer the project? How will participants coordinate project tasks?
8. **Products:** What tangible outcomes will result? Who will "own" them?
9. **Evaluation:** How will the participants assess the project? How will they review the products and the consulting relationship?
10. **Renegotiation:** How can participants change the contract? What is the plan to incorporate changes that occur?

Figure 2. Contract elements.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>To learn about course development.</td>
</tr>
<tr>
<td>Course</td>
<td>To engage in course development activities.</td>
</tr>
</tbody>
</table>

Figure 3. Types of goals and objectives.
PROJECT AGREEMENT: Dr. Alan Banks*  
Teaching Fellowship Project

1. Overview

This project is concerned with continued development of the courses E974, E975, E904, taught by Dr. Alan Banks in the Department of Engineering. Dr. Banks will also develop a seminar on teaching engineering, as well as refine his own teaching skills.

2. Personnel

a. Identification

The client is Dr. Alan Banks of the Department of Engineering in the School of Sciences. He has been awarded a Fellowship Grant, a postdoctoral teaching fellowship.

Other members of the client system who will be involved in this project are Gene Davis and Linda Childs. Both Gene and Linda are Associate Instructors in the Department of Engineering. Mark Lums, a work study student, will also be working on project activities.

The project's instructional development consultant is Suella Walter of the Division of Development and Special Projects (DDSIP), Audio-Visual Center (AVC), Indiana University. Other DDSIP staff will be involved as necessary for additional support or specialty areas.

The project's teaching consultant is the Assistant Director of the Fellowship Grant.

Other university agencies will be involved in the project as needed. Some of these agencies include: Teaching Resource Center (TRC), the Bureau for Evaluative Studies and Testing (BEST), Library Services (CARLS), an Audio-Visual Subcenter, and Administrative Computing Services.

b. Expectations

The client expects the consultants will:
1. provide expertise in instructional development and faculty development
2. manage and direct the project, and facilitate the process of completing the Fellowship goals
3. give concrete suggestions concerning the client's teaching approaches, methods, materials, and techniques
4. identify resources as needed and obtain them
The consultants expect that the client(s) will:
1. provide content expertise to the project
2. work collaboratively with the consultants on project activities
3. take responsibility for locating resources suggested (both human and material resources)
4. provide the consultants with the opportunity to observe and videotape lectures and discussion sessions
5. use suggestions made concerning his (their) teaching
6. share problems and concerns about the project
Suella Walter expects that the teaching consultant will:
1. manage the teaching consultation process (TCP)
2. inform of project related activities
3. participate fully in the consulting relationship
4. interact and advise with respect to project activities
5. share problems and concerns about the project
6. provide and share her teaching expertise
7. manage the Grant related activities (e.g., round table, library resources)
The teaching consultant expects that Suella Walter will:
1. be responsible for project management
2. inform of project related activities
3. interact and advise with respect to the TCP
4. provide and share her instructional development expertise

3. Goals

a. to assess and improve teaching
b. to review alternative approaches to teaching engineering
c. to review and revise courses (E974, E975, E904)
d. to implement revised courses, and determine the effectiveness of those changes

e. to report the results of project activities

Figure 4. Sample contract incorporating the new elements.
4. Objectives
   a. to identify course objectives and strategies for E974
   b. to identify teaching strengths and areas for improvement
   c. to review course evaluation forms
   d. to understand the advantages and disadvantages of teaching choices
   e. to design and coordinate a weekly teaching seminar
   f. to incorporate supplementary material in E974
   g. to make additional revisions to E974
   h. to review and revise E975
   i. to revise E904
   j. to prepare final reports
   k. to communicate the results of the project activities to a wide audience

5. Tasks
   a. Course development
      1. Identify E974 objectives by using a modified goal sort activity
      2. Analyze objectives and restructure
      3. Generate alternative teaching strategies
   b. Use Perry's structured approach
      1. Have students complete Perry Essays (Protocol)
   c. Engage in the teaching consultation process
      1. Observe lecture and discussion class
      2. Videotape lecture and discussion class
      3. Give TABS questionnaire to students
      4. Review sessions after each procedure
      5. Analyze data to suggest changes for improvement
      6. Implement teaching improvement activities
      7. Assess impact of teaching improvement activities
   d. Review course evaluation forms
      1. Determine important elements of a form
      2. Develop an individualized course evaluation form
   e. Prepare for and design a weekly seminar on teaching in engineering
      1. Obtain relevant material on general teaching, on how to teach students
      2. Write a paper that could be a possible text for the seminar
      3. Read relevant materials
      4. Brainstorm possible seminar topics
      5. Design seminar, develop syllabus
      6. Implement the seminar
   f. Revise courses
      1. Develop slide presentation for E974
      2. Select appropriate films to use in E974
      3. Modify 2 packaged interactive computer programs for use in E974
      4. Reformulate objectives and intended audience for E904
      5. Redesign laboratory and field experience part of E904
      6. Select music to introduce each lecture in E974
   g. Report activities
      1. Write a report to Teaching Fellowship
      2. Write a final project report (from DESEF)
      3. Make presentation to faculty and students
      4. Prepare article for a journal
      5. Prepare article for a university newsletter and/or
      6. Prepare presentation for the university community

6. Resources
   The client will provide content expertise and secretarial assistance for typing
   course related print material (syllabus, etc.) and any major xerographing of those
   materials.

   Two AIs are available to assist the client. A work study student is available to
   assist the client in retrieving identified resources (materials). Financial support for
   any outcomes will be obtained through the Fellowship Grant. If necessary, the
   client will contact other relevant campus resources for financial support.

   The consultants will provide instructional and faculty development expertise
   needed to attain course goals and objectives. The consultant system will also
   provide staff assistance where required for specialty areas. Limited xerographing
   will be handled by the consultants for development materials and project documents.

   University agencies such as the Audio-Visual Center (AVC), Bureau of Evaluative
   Studies and Testing (BEST), Teaching Resource Center (TRC), etc., are able to
   provide services to the client. The client can contact these agencies directly.

   Figure 4 continued on next page.
7. Management

Planning and feedback meetings are scheduled on a weekly basis. The Fall Semester meetings will be held on Thursdays from 9:00 to 9:15. Wednesday mornings may be used occasionally for special sessions. Memoranda will be used to review decisions, assignments, and any project agreement changes.

A budget is available through the Fellowship Grant. This budget will be used for the purchase of relevant books and other resources. Additional monies have been provided for purchasing the Perry Essays (Protocols). If any additional funds are needed, the client will explore any options that may be available to each system. The client will be informed of the budget status as the project progresses.

A timeline has been established (see project chart) for project activities. Adjustments will be made as required.

8. Products

a. Reports
   1. the client will write a report for the Teaching Fellowship Grant
   2. a final report of this project detailing the process and its outcomes will be written by the consultants

b. Presentations
   1. demonstration of small group discussion
   2. Perry’s Structured Approach—article and/or verbal presentations

c. Other
   1. slide sets, ordered and developed
   2. revised syllabi for E394, E3974, E3975
   3. new syllabus for seminar on teaching engineering

9. Evaluation

The client’s report and the consultant’s final report will serve to formally evaluate the project. Two meetings will be scheduled for the client(s) and consultants to evaluate the project’s process and outcomes. The first meeting will be held soon after Thanksgiving. The second meeting will be held towards the end of the Spring Semester.

Informal evaluations will occur throughout the project. Client and consultants will use the project goals and objectives as criteria by which to evaluate progress with respect to project content as well as the process of the consultation.

10. Renegotiation

Any part of this agreement may be revised at any time by mutual consent.

*Client(s) name(s) and department have been changed for professional reasons.

Figure 4 (concluded),

...take a product design role and the client a subject matter expert role. Both client and developer soon became frustrated by trying to perform new tasks while remaining in old roles. As a result, the project dragged on, an inappropriate instructional medium was selected, and inefficient management procedures were used. To complicate matters, personnel changes occurred during the second phase. Renegotiating the contract at the start of the second phase and at the time of the personnel change would have avoided these problems.

As each phase of a project ends, we suggest the client and developer renegotiate the contract to clarify the new roles, responsibilities, tasks, and expectations. In this way, smooth transitions between phases avoid potential threats to a project’s success.

Other Uses of Contract Elements

Project documentation. Documentation is a collection of decisions, materials, products, and insights gathered throughout a project. It records the events and character of a project. Developers refer to this record when reviewing decisions, planning future meetings, and evaluating progress. Lowe and Schwen (1975) present components of documentation which are similar to our contract elements. However, there are important differences between a contract and documentation.

The contract plans for and outlines project tasks, personnel roles, and management procedures. Documentation details what happens in the project as it progresses. We have found that the contract provides a framework for subsequent documentation and project reports. Each contract element suggests an area to document.

Project evaluation. We use contracts to evaluate a project with respect to both outcomes (products) and the consulting process itself. Basically, the elements of a contract become criteria to judge project success (Swaert & Lippitt, 1979; Ulrich, 1978). The information contained in each element provides a basis for determining whether objectives were attained. By reviewing the contract together, both client and developer can evaluate the success of the consulting relationship as well as project outcomes.

Conclusion

Although use of a contract does not necessarily guarantee project success, a contract can help instructional developers to be more effective consultants. Many variables affect the success of a project and the effectiveness of an instructional developer. Contracting is one of these. Although we did not systematically attempt to study the effects of contracts on project success, we found that contracts improved not only our relationships with clients but also our management of project activities.

However, the matter of consultant effectiveness demands our professional attention as instructional developers. The effects of contracts on the development process continue to merit further inquiry.
References


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Job Aids: Descriptive Authoring Flowcharts for Phase I—ANALYZE of the Instructional Systems Development Model (ISD). It contains an introduction to the use of job aids, as well as descriptive authoring flowcharts for Blocks 1.2 through 1.5. The introduction includes definitions; descriptions of classification systems and flowchart symbols; instructions for using the Job Aid Manual; a description of the Job Aids Resource Manual; an explanation of the reporting system; information on the use of field surveys and panels; and an example of a closed form questionnaire together with procedures for its administration. A flowchart is provided for each of the four activities in Phase I—ANALYZE: (1) selection of tasks for training, (2) task analysis, (3) analysis of the existing course, and (4) selection of instructional setting.—Microfiche 91¢, paper copy $8.60 plus shipping as document ED 203 864.


The introductory materials in these resource guides repeat much of the information provided in Job Aids: Descriptive Authoring Flowcharts for Phase I—ANALYZE of the Instructional Systems Development Model (reviewed above). Each manual then identifies and explains the activities covered in the phase, or provides flowcharts for each of the activities.—Microfiche 91¢ for each document; paper copy $6.95 as document ED 203 865; paper copy $20.15 as document ED 203 866; paper copy $8.60 as document ED 203 867; paper copy $23.45 as document ED 203 868. All prices plus shipping.


This study assessed the field independent/field dependent tendencies of 143 Mexican American pupils in two rural South Texas high schools. Teachers were given training on the educational implications of cognitive style on the learning process, as well as how to operate a classroom model designed to accommodate a specific cognitive style, i.e., global or analytical. Pupils participated in a week How to Study unit which both matched and mismatched pupils with teacher style and with the preferred and non-preferred mode of delivery of instruction by individual teachers. An analysis of variance of pre- and post-tests on the content of the unit indicated that teacher-pupil style matching did not account for differences in cognitive performance; however, significant differences were found to be related to the preferred or non-preferred mode of delivery of instruction by teachers at the .035 level.—Microfiche 91¢, paper copy $2.00 plus shipping as document ED 203 899.

This discussion of the "state-of-the-art" of instruction within the context of the mastery learning model points out that little has been said in the past about specific instructional strategies that are applicable to particular instructional units or objectives, or to the daily classroom life of teachers. The first of six major sections in the paper outlines the general instructional conditions, and procedures described in books and articles on mastery learning. The remaining sections focus on two aspects of the initial group-based instruction, i.e., teaching to objectives and the use of appropriate teaching methods or presentations: the importance of proper sequencing of instructional activities and units; corrective instruction: types of activities used in existing mastery learning programs; and the role of classroom management in implementing a mastery learning instruction program. Many of the instructional strategies described are those which research indicates are related to increased student involvement in learning and/or increased student achievement.—Microfiche 91¢, paper copy $2.00 plus shipping as document ED 203 759.


This guide for administrators and educators provides descriptions of ways to start, develop, and operate transitional bilingual programs in accordance with Washington State's Transitional Bilingual Instruction Act of 1979. The three main sections of the guide present: (1) an outline of the selection and description of instructional program models for either full partial bilingual instruction, or an English as a second language (ESL) instructional program, always with emphasis on the transitional nature of the model; (2) a description in outline form of outreach and in-class delivery models; and (3) a checklist of bilingual education components to be implemented by school districts. Five appendices present flowcharts for program selection by elementary and secondary schools with fewer than 20 limited English speaking (LES) students and for processing elementary and secondary LES students.—Microfiche 91¢, paper copy $2.00 plus shipping as document ED 203 655.

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This report describes the implementation at Creighton University of the Total-System Design (TSD) approach, which involves the application of systems science principles to the analysis of needs and to the delivery of instruction in educational programs. In a four-project year, TSD principles were used to produce the uniform systematic, and complete definition of a medical technology major within a program of study leading to the B.S.M.T. degree. Faculty members used a precise language of instruction and a top-down approach to define the knowledge, skills, and attitudes essential to entry-level generalist practice in medical laboratory science, and the familiar behavioral objectives were extended and adapted to produce formal goal statements encompassing the complexity of the subject matter, the performance level at which the student will be tested, and the relative difficulty of the unit in terms of concentration and initiative required. The top-down analytical process begins with the concept of an ideal entry-level practitioner (graduating student), and each goal statement is further specified by a branching tree of substatements until the content level is reached. Specific instructional activities also facilitate the identification of prerequisites. A software management system (COM/IES) is used to enhance the usefulness of these complex and extensive bodies of information. Study guides, personalized clinical instruction, instruction in human values, and information/resource sharing are also part of the approach.—Microfiche 91¢, paper copy $3.65 plus shipping as document ED 202 892.

Evaluating Instructional Technology is intended as a "primer on evaluation for those involved in instructional technology." Depending on what one believes a primer should do, the book has either met its aim or it falls somewhat short of that. If one believes a primer should impart specific basic competencies, the book will be found wanting. If, however, one expects a primer to provide a survey of a field of knowledge or the general flavor of what it would be like to work in that field, then this is the book to read. In fact, there should be more books like this even if they are as "personal" and "somewhat idiosyncratic" as Knapper's little volume is by his own admission. Students trying to decide on a course of study or a career would find it an excellent orientation aid, as would people who need to quickly acquire some ability to talk to evaluators of instructional programs. The book would appear equally useful as an introductory reading assignment during the first week of a course on evaluation in education to be followed by more detailed texts designed to impart professional skills. For the practitioner in the fields of instructional technology or evaluation, the book provides something like a quick flight at high altitude over familiar terrain. Most of the prominent landmarks are clearly visible, albeit sometimes from a bit of an unusual angle. The nitty-gritty details remain in a merciful haze. In short, Evaluating Instructional Technology is a good introductory survey and will serve well as an advance organizer. It is not suitable as a basis for the acquisition of specific competencies and does not make any pretense to that.

The book is divided into seven chapters which, according to the author, are organized along the steps in the evaluation process. This organization does get confusing even though it is explained in prose and picture. Disregarding the author's explanation of the organization of the book, we find that the first four chapters are devoted to the introduction and explanation of basic concepts and theory. The fifth chapter provides appropriate practice in the form of four case studies. The last two chapters deal with methodological problems and lessons for the future.

There should be more books like this even if they are as 'personal' and 'somewhat idiosyncratic' as Knapper's.

Chapter one begins by laying the foundation for the rest of the book with a fairly elementary survey of the field of Instructional Technology. Although he appears to have some difficulty with a precise definition of the field, Knapper clearly distinguishes three general approaches to instructional/educational technology: the use of technology to provide teaching aids for conventional instruction, the use of technology to achieve the individualization of learning, and technology for the purposes of serving the remote learner which is termed "distance education". The focus of the book is on the latter two approaches. This classification is quite interesting and original, although its validity is doubtful. Individualized Instruction and Distance Education are not really mutually exclusive categories. The chapter concludes with a section on the organization and delivery of instructional technology, covering media centers, instructional development units, and the role of governments and foundations.

In chapters two and three, the subject of evaluation proper is addressed. Historic notes on the emergence of evaluation during the late '60s as a major concern of the educational enterprise lead to a discussion of the peculiar difficulties that the science of evaluation faces when it is practiced in the field of education. One of these difficulties lies in the demonstration of causal factors of student learning and a second is concerned with the determination of long-term effects of instruction, particularly the transfer of learning to real-life or on-the-job situations. From this background discussion, the book turns to technical matters. The first step in any evaluation is seen as a statement of the goals or objectives of the teaching process to be evaluated. In the context of this topic, Knapper devotes considerable space to the subject of behavioral objectives which is later picked up again in the third chapter which includes a brief discussion of Bloom's Taxonomy of Educational Objectives. Not only the goals of instruction, but also the goals
of evaluation must be set and once they are, the evaluator may use either formative or summative evaluation approaches and utilize criterion or norm referenced data.

Other methodological considerations are addressed in chapter three, beginning with a broad, general distinction between primarily descriptive methods and formal experimental methods. The notions of experimental control, validity and reliability of tests provided one sees a primer as an initial orientation.

The last two chapters, chapters six and seven, provide sort of a wrap-up. Chapter six begins with a discussion of the four major types of evaluation studies generally found in instructional technology. This discussion correlates with the four case studies presented in the preceding chapter. In a summary of the results of the thousands of evaluative studies done over the past 20 years or so, Knapper indicates that the outcomes appear relatively meager in relation to the effort expended. The reasons for this disparity are traced to methodological problems. Perhaps the most important points made in this chapter are that any type of evaluative research should be flexible enough to allow for the discovery of unlooked-for outcomes and that the question concerning the worth or value of a particular application of instructional technology is ultimately a matter of judgment. Whose judgment is an issue which remains unexplored.

The last chapter discusses lessons for the future. The focus here is not on how the business of evaluation should be conducted in the future but rather on what questions evaluative studies of instructional technology should address. Any brief treatment of such a global a question is, of course, likely to be highly biased. Knapper’s bias centers around the questions of matching in-technology-based instruction, advantages and disadvantages of individual versus group learning, and studies of the effects of educational evaluation on those who are being evaluated.

The book concludes with an annotated bibliography of 29 items which include only books, most of them published since 1970. The items were selected on the basis of availability, interest, readability, and relevance to the general reader. The bibliography includes general works on instructional technology, specific works describing particular instructional technologies and an assortment of general and specific works on the theory and practice of instructional evaluation.

This reviewer did not find the book flawless. There is first of all the matter of the title. Evaluating Instructional Technology does not mean, as one might surmise, that the book is an evaluation of the field of instructional technology but rather that it deals with the evaluation of applications of instructional technology. It is not before chapter two that the reader can become dimly aware of this fact of the book and it is not until chapter five that he can become completely certain. Even more disturbing is Knapper’s statement in chapter two (page 46) that “the evaluation of instructional technology is essentially no different from the evaluation of any other sort of teaching and learning.” If this is indeed the case, then why not make the book title Evaluation in Education, or, one might even more poignantly ask, why write the book at all?

Then there is the matter of the structure or organization of the book which appears unnecessarily redundant. For example, the topic of aims and objectives is treated in chapter two and then again in chapter three without

"Some omissions of content are disturbing even for a primer."
crystalline form.

These organizational flaws may not disturb a novice to the field as much as Knapper's fairly imprecise use of the technical vocabulary. For example, in the summary to the seventh chapter on page 143, Knapper uses the terms medium, teaching strategy, technique, and instructional technology as if they were interchangeable synonyms. This does not exactly come as a surprise at this point: There are definitions in chapters one and two of five basic terms (e.g. "Instructional Technology") which also exhibit an unnecessary degree of fuzziness.

Finally, there is the matter of completeness of content. It is obvious that a primer, be it of the first or second kind, should not and cannot treat a subject as big as evaluation in any kind of exhaustive manner. The reader is reminded of that on numerous occasions by unnecessarily apologetic remarks. However, this reviewer found some omissions of content which are disturbing even for a primer. For example, the process of evaluation certainly would have deserved some explicit treatment, instead it is merely alluded to in several places. The sporadic allusions, however, do not come together in a complete and comprehensive picture which might be especially useful to a novice in the field. Other omissions such as the role of computer data processing and the basic techniques of statistical analysis are less important, in this reviewer's opinion. Brief treatments of the concept of instructional strategy and of the fact that Bloom's Taxonomy is not the only one around would have helped, but this may be a totally idiosyncratic opinion.

Nevertheless, as stated in the beginning, the book is a good primer of the second kind, i.e., a good survey and orientation aid for the field of evaluation in education. It is good because its orientation is highly pragmatic, because it points out the major signposts in the field, and because it is perhaps one of the most readable little treatises this reviewer has ever come across.

Reviewed by Fritz H. Brecche, Instructional Designer, Tactical and Training Systems Division, Logicon Inc., San Diego, CA 92138.

"It is good because its orientation is highly pragmatic, because it points out the major signposts in the field, and because it is perhaps one of the most readable little treatises this reviewer has ever come across."


"What is so difficult about developing a course?" Did this question ever send you searching for evidence of the complex decisions a good course developer must make in the process of creating a usable course? The next time you are faced with this challenge, refer the skeptic to Evaluating Instructional Technology. In his book, Christopher Kay Knapper has provided a provocative historical account of the growth of instructional technology.

"With each new concept or innovation presented, there is an accompanying analysis of its promise and its failings. The reader is left with the imprint of Knapper's cautious cynicism about innovation and a foundation for proceeding with care in the future."

With each new concept or innovation presented, there is an accompanying analysis of its promise and its failings. The reader is left with the imprint of Knapper's cautious cynicism about innovation and a foundation for proceeding with care in the future.

In the initial section of the book, basic premises of learning are examined against the instructional technologies which support learning. The development of individualized instruction is explored, charting its growth from the use of the first teaching machines to the development of computer-assisted instruction. Building on this background, Knapper provides an overview of the evaluation process. He examines the goals of evaluation, the use of behavioral objectives as the focus of the evaluation, and the forms an evaluation may take. Summative and formative, norm-referenced and criterion-referenced evaluations are reviewed.

The overview of evaluation methodology in the next section explores the selection of evaluation criteria and of data collection methods. Experimental and quasi-experimental designs are discussed, with an accompanying look at the impact of controllable and noncontrollable variables on the evaluation outcome. The use of learning taxonomies and concern with test validity form the final section of this overview.

Four case studies are presented in the next section of the book. The first of these studies is a descriptive account of the Keller Plan approach to individualized instruction. The second study presents a comparative look at computer-based instruction and traditional lecture-based instruction. An evaluation of the impact of teacher expectations on instructional innovation is used next to illustrate the role of control groups in the evaluation process. The fourth study is a program evaluation, focusing on the impact of instructional innovation on student performance in a variety of settings. Each case study is followed by a brief discussion of the evaluation results and a critique of the strengths and weaknesses of the study.

In the final section of the book, Knapper looks at the overall impact of instructional technology. Research findings indicate a generally favorable attitude toward any innovation, but do not support any significant gain in student performance as a result of the innovations. The author cites methodological problems that have plagued research in this area and cautions...
the readers against reliance on the results of any of these studies as the final word on the effectiveness of instructional technology.

From an historical viewpoint, Evaluating Instructional Technology provides an insightful look at the field of education in the past decades. The lack of valid research into the effectiveness of new strategies is painfully apparent, as is the failure of the educational system to match its needs with an innovation. From Knapper's description, one has the impression that the innovation occurs first, then a place for its use is found. The consequences of such an implementation strategy are large investments in facilities and supporting equipment which may not accomplish the instruction in the most effective way. One illustration of this is presented in a discussion of the ability of the language laboratory to endure. Knapper writes: "One reason for this may be that the chore of providing drill and practice is accomplished with fewer demands on the language teacher and with a reasonable degree of success; another advocates of evaluation in all branches of formal education."

The reader begins to develop the sense of a "reactionary" educational system as opposed to a proactive and analytical one. Underlying the discussions of the innovations in his book, Knapper is presenting his evidence to support the need for a more cautious and studied approach to solving educational problems.

This evidence is as far as the book will take the problem. No suggestions are presented for methods of avoiding the repeat of past errors. No formulas or plans for more valid evaluation studies are discussed. If there is a lack in this volume, it is in the author's failure to provide a direction for the future of instructional innovations. What can be done to more adequately assess instructional technology needs? How will an organization know that a particular innovation will be worth the financial and human resource investment it requires?

Knapper is honest in discussing the limited scope of the book; its focus is "a
to concentrate on what is the most "innovative" delivery method. Our limited financial resources should provide a criterion for decisions we make as a profession concerning course design and delivery.

Evaluating Instructional Technology provides an insightful overview of the evaluation process. It also provides a philosophical structure for analyzing instructional technology. The book will be useful for the person who needs both an introduction to the field of instructional technology and a critical bias in examining its products. Its lack of specifics in organizing the evaluation process will make it of less use to the practitioner. However, the issues raised by its findings will provide impetus to the reader to address the question of "where do we go from here?" for this reason, the value of the book goes beyond even its author's intention.

—Reviewed by Pamela Morais, Instructional Technology Consultant, General Telephone of California, Monrovia, CA 91016.

"The book will be useful for the person who needs both an introduction to the field of instructional technology and a critical bias in examining its products."

reason may lie in the considerable investment in physical resources represented by the language laboratory, which institutions may be reluctant to simply write off."

He cites that little research has been conducted on the effectiveness of such language laboratories. In a later discussion, he explores the responses of the educational system to changes in the economic environment:

"During one period of financial retrenchment in Britain, it was suggested that the yardstick of increased productivity should apply to university teachers seeking wage increases just as it did in the case of other workers...the practice of paying teachers by results had been implemented—with fairly disastrous results—in the nineteenth century school system and, fortunately, was not in the end reintroduced to the British University of the 1970's. However, this type of pressure, linked with continuing financial hardships and fewer job opportunities in education, provided constant encouragement for personal view of the evaluation process in education." It tells what has been developed in the field of instructional technology, what has worked, and what has failed. The reader is also presented with evidence that regardless of the instructional system used, students will continue to learn. Based on the findings presented in Evaluating Instructional Technology, the ability of students to endure in spite of the experimentation is welcome news. If student attainment of the instructional objectives is not really the problem, it may be of greater value to examine other factors in respect to innovation.

What is the most cost-effective means of instructional delivery? What type of instructional technology can impact the greatest number of students when distance learning is an issue? What instructional methodology is the simplest to revise if revision is constant? How can the long-term costs of instructional delivery be lessened? These are the types of questions that should be raised. It is no longer effective, given the evidence of no significant difference resulting in student performance.

Late Announcement on Pre-Conference Workshop

Managing Instructional Development will be held as an AECT pre-conference workshop on Sunday, May 2, 9-4 pm. Maximum enrollment 48. Register with AECT. Fee $35. Workshop conducted by Don Ely, Kent Gustafson, John Moldstad, and Fred Knirk.