Contents

ARTICLES

Farewell Editorial, Kenneth H. Silber 2
A Job Well Done. Thomas Schwen, for the JID Editorial Board 2
Assessing Competencies: Lessons from a Library/Media Project, Evelyn H. Daniel and Donald P. Ely 3
The Design of Instructional Materials: A Top-Down Approach, Paul Harmon 6
An Analysis of University Training Programs for Instructional Developers, Kenneth H. Silber 15
A Typology for Generating Needs Assessments, Allison Rossett 28
Systematic Lesson Design for Adult Learners, Jodi Bonner 34

DEPARTMENTS

Book Reviews, edited by Allison Rossett 42
Survey of Instructional Development Models with an Annotated ERIC Bibliography, by Kent L. Gustafson. Reviewed by Roberts A. Braden 42
Job Analysis: Methods and Applications, by Ernest J. McCormick. Reviewed by Karen Morse 43
ERIC Reports on ID, Edited by Barbara B. Minor 44

About this issue...

As you will discover in his Farewell, and in the tribute from the editorial board, this issue marks the end of Ken Silber’s long and fruitful editorship of the Journal of Instructional Development.

This issue also contains a number of articles of exceptional interest. Daniel and Ely describe a study of the difficult task of assessing the competencies which school media programs must teach in order to attain certification.

Paul Harmon offers a new model for the analysis and development of instructional materials—a “top-down” method which combines behavioral and cognitive approaches. He illustrates the method with an example of its application.

Ken Silber reports the findings of his study of nine graduate programs in instructional development, covering the spectrum of Residential PhD, Commuter PhD, and MA Only institutions.

Allison Rossett presents a lucid analysis of needs assessment, as well as a method for establishing which questions the developer should ask in this phase of front end analysis.

Jodi Bonner’s article emphasizes the differences between children and adults as learners, and offers an extension of the Gagne-Briggs model of instructional design to accommodate the unique characteristics of adult learners.

In this extra-long issue of JID, you will also find our regular book reviews, as well as ERIC reports of interest.
FAREWELL EDITORIAL

Kenneth H. Silber, JID Editor
Governors State University
Park Forest South, IL 60966

This 19th issue of JID marks a beginning and an ending in the history of the Journal.
It marks the beginning of the 6th year of JID’s publication.
It also marks the end of my term as Editor of JID.
The Editorial Board and I have agreed that 5 years is long enough for one person to have borne the responsibility and burden of editing the Journal, and that it is now time for someone else to take on the editorship.

During these years, I have experienced a great sense of achievement from starting JID, setting its editorial direction, keeping the Journal alive despite financial problems, editing what I consider to be the finest ID Journal available, and working with an excellent Editorial Board and authors whose contributions have helped make the Journal what it is today.

In retrospect, I have seen and overseen the publication of 107 articles related to instructional development, plus numerous Book Reviews, ID Training Modules, ID Project Abstracts, Instructional System Reviews, and ERIC Reports on JID. To do this, I have read about 1,500 manuscripts, and coordinated the 4,500 reviews of those manuscripts by the Editorial Board and Consulting Editors.

I have seen the paid circulation of JID grow to about 2,000 and have seen 3 to 4 times that number of people read the Journal through department subscriptions and use of JID issues and articles in ID classes at universities throughout the Country.

I have seen the Journal go from an idea I had in the Spring of 1977 to a Division of Instructional Development publication in the Fall of 1977, thanks to the support I received from the AECT Board of Directors.

I have seen the Journal go through two years of financial crises, and was instrumental in saving it by seeking an alternative publication arrangement. I am grateful to Bob Morgan, Director of the Learning Systems Institute at Florida State University for agreeing to publish JID for AECT.

I have worked with 25 Editorial Board members who reviewed the manuscripts and coordinated the reviews by the 60 Consulting Editors. I want to thank them for their dedication to JID, for the important contributions they made to JID, and for all I have learned from them about ID during my tenure as Editor.

But over 5 years of soliciting manuscripts, reading manuscripts, getting reviews from Editorial Board members, corresponding with authors—telling most of them that we could not publish their submissions, working with managing editors on the technical details of printing each issue, and negotiating and politicking with various boards and individuals to keep JID alive takes its toll.

The late nights, lack of time for my own research, complaints from rejected authors, organizational hassles, and constant pressure to meet four deadlines a year can be outweighed by the achievements for only so long, then one needs to move on to something else.

The Editorial Board and I agree that now is that time for me.

I have contributed my ideas, energy and time to JID for the past 5 years; now it is time for someone else to do the same.

I leave this post, of course, with a great deal of ambivalence. It is not easy to let one’s “baby” go, to be out of the decision and policymaking role that determines how that baby grows.

I will miss reading all those submitted manuscripts, being in constant contact with the Editorial Board and Consulting Editors—some of the best thinkers in our field, and the responsibility for putting each issue together.

I look forward, however, to finding other, different ways of putting my talents to use.

I have done my best to get JID established and set its editorial direction. I hope that that direction has met the needs of the Journal’s readers, and that it will continue to under JID’s new leadership.

I wish the new editor, Norm Higgins, the best of luck in the direction of JID, and hope you will give him your support as you gave it to me.

I bid you, the readers of JID, farewell as your editor.

A Job Well Done

Ken, JID is a job well done. I remember when you started with a glimmer of a concept six years ago. You persisted through all sorts of initial criticism and apathy. The Journal developed rapidly, attaining a surprising level of maturity in a short period of time.

JID has served us well, exposing theoretical and professional issues in a scholarly manner. A wide variety of experts have addressed various issues in a sophisticated and sustained manner. For example, the attention to cognitive science developments and instructional development practice has signaled a revolutionary change in our methods of analysis. In this case and others, your attention to substantive issues and persistence in developing authors’ and editorial response have clearly been the key variable in the rise of JID.

How you’ve managed your many other commitments to the profession, the program at Governors State, and JID has been a mystery to me. Certainly, this is a good time to pass the Journal along to other competent hands. We wish you well. Certainly your contribution will be felt for a long time.

It is truly—A Job Well Done.

—Thomas Schwem for the JID Editorial Board

JOURNAL OF INSTRUCTIONAL DEVELOPMENT
Assessing Competencies
Lessons from a Library/Media Project

Evelyn H. Daniel
Dean, School of Information Studies
Donald P. Ely
ERIC Clearinghouse on Information Resources
School of Education
Syracuse University
Syracuse, NY 13210

Abstract. Professional education programs and state certification offices have developed competencies for school media programs but relatively little attention has been paid to assessment. This paper reviews the current state of competency assessment, describes a procedure for categorizing assessment strategies, and presents an approach to determine which competencies and assessment strategies are used in professional courses. A case study of one university is used as an illustration.

Competency-based programs for school media specialists are increasingly being adopted by state agencies as a basis for certification and by educational institutions as a procedure for educating media professionals. The effort in developing these programs has been heavily (indeed, almost exclusively) weighted towards the generation of competency statements with little attention being paid to the more difficult problem of competency assessment. The American Association for School Librarians (AASL, 1976) Certification Committee observed that:

...the art of competency assessment is woefully behind...Our lack of experience in the task of performance assessment, the identification of data gathering techniques—including what data will be required and under what conditions, the validation of assessment criteria, the need for competent evaluators to implement the assessment process, the cost of candidate assessment in terms of time and dollars, and reaching consensus on the levels of certification all pose serious concerns for the profession.

To some extent, the general lack of attention to evaluation is an artifact of the sequential process of development. Competency-based education for school media specialists is still a new area. Competencies must first be identified and agreed upon before there can be any concern with whether or not a person has achieved a given competency or set of competencies.

For the authors there was a natural and logical sequence of events leading to a concern for assessment. A plan for the development of an integrated competency-based program for the preparation of media professionals was created and carried out at Syracuse University in response to a mandate from the New York State Education Department (Daniel and Ely, 1978). The realization that the major work lay ahead in wrestling with assessment methodologies became clear as a result of that project.

This paper summarizes the current activities in competency assessment, describes a category scheme with definitions for assessment strategies, and relates the methods used in determining which assessment strategies were used by various faculty members in their courses.

The State of the Art of Competency Assessment

Major work on competency-based education (CBE) for school media personnel goes on apace. Eleven states now have competency-based certification programs and another 19 are in various stages of development. Of these, Maryland (through the graduate library school), Utah (through the State Education Department in conjunction with several teacher training institutions), and New York (through the program at Syracuse University) have provided printed materials of particular relevance. Both Maryland and Syracuse University work within existing curricula of large library schools which are only fractionally concerned with the school media program. Thus both tend to take an incremental approach—identifying opportunities where students can attain competencies through general school courses, developing new courses, modifying older ones, and, in general, working with faculty styles of assessment. The State Education Department in Utah opted to support the development of a comprehensive pencil and paper testing program that established indicators for each competency and objective questions to assess student performance on the indicators.

Chisholm and Ely's book (1976) attempts to amalgamate previous work in CBE. The American Association of School Librarians' publication, Certification Model for Professional School Media Personnel (1976) is also a seminal work. The AASL group attempted to go beyond pencil and paper tests by providing examples of situations using jury panels of experts and actual performance activities.

General research on evaluation also provides some useful insights. DeFruscio and Lienier (1975) describe current evaluation models in a concise but thorough review for media program evaluation. Hall and Jones (1976), in a general presentation of the theory and state-of-the-art of CBE raise and discuss a number of provocative questions affecting competency assessment. Houston and Howsam (1972) review CBE with emphasis on teacher education, while Hodgkinson and Levine (1975) focus on assessment in the higher education area. Harris and Kelly (1977) elaborate the higher education assessment work more fully. Finally, two recently published books demonstrate the substantial growth in the field. On Competence (Grant, 1979) brings together review articles by experts on major aspects of CBE. Of particular interest in this volume is the fine state-of-the-art review on assessment by King. In the second recent book, Gilbert (1978) proposes a behavior engineering model.

From the aforementioned and a number of other sources, it is possible to identify particular problems and approaches to the assessment of competency. Many people speak almost synonymously of evaluation and assessment. There now
seems to be a growing consensus that evaluation is the broader term relating to programs and products more than to individuals, whereas assessment refers to the specific evaluation of learning outcomes.

Three major problems have been identified:

(1) Precise definitions of performance assessment do not exist.

(2) There is no agreement on how to determine what a "significant" sample of behaviors might be.

(3) Validating the assessment procedures is difficult.

These three problems seem to be more or less sequential. A first step must be the determination of precise definition of performance. For CBE assessment this means that assessment strategies must be described. During the course of the study a brief description of performance assessment strategies for the competency-based program for media professionals at Syracuse University was developed.

Classification and Definitions of Assessment Strategies

Eight strategies were identified which seemed to represent the most comprehensive, conventional, and feasible methodologies for assessment. The definitions of the eight assessment strategies are presented below.

(1) Field Experience. Field experience refers to assessment which occurs in the real world context; that is, assessment which occurs in a real job situation or internship. Performance which occurs in this situation is subject to real world effects and tends to demonstrate competence at its most functional level.

(2) Actual Demonstration. Actual demonstration is assessment which occurs in a field setting where many but not all of the real world effects are allowed to influence student performance. Since student access to field settings occurs through invitation or through agreement with cooperating institutions, some control exists to limit real world effects.

(3) Simulated Demonstration. A simulated demonstration refers to a microcosm type demonstration. In this case many of the variables affecting performance are controlled or manipulated. Effects due to change or real world contingencies play only a small part in the assessment situation.

(4) Portfolio. A portfolio is a collection of written materials, audiovisual, artistic, or craft products which are submitted as indication of field competence. A portfolio is generally composed of materials developed during the course of a program or some professional experience and is used to infer job-related competence.

(5) Paper/Projects. Normally paper/ projects refers to a product emerging from a major assignment. Examples include term papers, slide/tape productions, musical compositions, and so forth. Paper/Projects may also refer to smaller assignments and projects. The idea here is that the work produced by the student is examined and assessed as an indicator of some knowledge, attitude, or skill obtained during instruction.

(6) Oral Presentation. Oral presentations are student-controlled summaries and discussions which reveal (1) the activities involved in, (2) the progress of, and (3) the findings related to student projects or papers. The oral presentations are more than impromptu conversations. They allow the audience to ask questions or make comments which may require the extension of ideas through in-depth responses. Thus, such testing is more flexible than written presentations, though less detailed.

(7) Oral Test. An oral test is a strategy in which students respond to a set of questions specified by an examiner or group of examiners. This strategy allows flexibility in pursuing answers more fully and clarifying responses, though this is generally at the expense of the organization and detail present in a written response.

(8) Written Test. Written tests are generally of two types: selected response (true-false, multiple choice), and constructed response (short answer, essays). There is virtually no interpersonal interaction in such tests, and competence is assessed on the one-way communication of the student with the written materials.

These strategies can be separated into:

(a) Measures of Competence
(1) Field Experience
(2) Actual Demonstration
(3) Simulated Demonstration

(b) Indicators of Competencies
(4) Portfolio
(5) Paper/Projects
(6) Oral Presentation
(7) Oral Tests
(8) Written Tests

Assessment strategies as measures are distinguished from strategies as indicators because measures assess actual performance in real or simulated job settings, while indicators assess behaviors thought to be more or less related to job performance. The assessment strategies of (1) field experience, (2) actual demonstration, and (3) simulated demonstration are said to measure competence because they attempt to record the existence of specified, necessary job skills and attitudes (i.e., the identified competencies). The assessment of (4) portfolio, (5) paper/projects, (6) oral presentations, (7) oral tests, and (8) written tests are said to be indicators of competencies because they do not test actual performance either in simulated or actual job situations. Instead, from these strategies, one infers what performance might be like in these situations.

General Competency Assessment by Faculty

One of the first activities was to examine how effectively competencies were presently being assessed within the regular courses of the library school and the school of education where the Syracuse joint program is set. Two questions of concern here were:

(1) What is the distribution of competencies within courses?
(2) What is the distribution of assessment strategies for these competencies within courses?

Distribution of Competencies within Courses. A year and a half earlier, all the faculty of the School of Information Studies and of the Area of Instructional Technology, School of Education were interviewed to determine which competencies were taught in their classes in order to advise students. Advisement followed a thorough diagnosis of each
student's present level of skills and abilities with a joint determination by advisor and student of where the student needed to become more proficient. After the determination of a desired set of competencies to be acquired or enhanced, the courses were then examined to see which group of courses would be the most appropriate for the student.

During this part of the project, the researchers went back to the faculty to ask them not just which competencies they taught, but which ones were actually assessed and in what manner the assessment took place. Outlines, activities, and assignments were collected from faculty for each relevant course and then classified by type of assessment strategy. The interviews were analyzed, and a new competency-by-course matrix was drawn (Figure 1). Not surprisingly, it was found that the faculty teach more competencies than they actually assess.

A basic assumption that guided the work throughout the project was that the school media competency program must fit within a larger library school context composed of courses, many of which are general in nature, and directed to students who will work in a variety of library settings. The importance of this approach should be underscored. The alternative assumption would be that the school media program would be treated as a closed system isolated and apart. Under this assumption, there would be a school within a school with a set of courses tailored to fit the school competency-based program, and which prospective school media specialists would take by themselves away from the rest of the school.

The broader approach has a number of advantages. It allows school media specialist students to relate their work to the larger context. Of equal or greater importance, it enlarges faculty awareness of the special needs and contributions being made by the modern school media center. This positive benefit more than offsets the requirement for regularly checking with all faculty—old and new—for changes in courses, new content, and new methods. Competency assessment then becomes a dynamic process continually being adjusted to the changing issues and the changing environment.

Distribution of Assessment Strategies within Courses. In second interviews with faculty it was found that there were redundancies—many competencies taught and addressed from different points of view in different courses.

![Figure 1. Course By Competency Matrix.](image)

There were also some gaps where competencies were not assessed at all through formal courses. Those competencies not being directly assessed through course work may be assessed through field work, independent projects, or on an individual or small group basis outside of courses. As a result of the analysis, suggestions were made for course revision to include and/or to measure the attainment of other competencies where appropriate.

Data did not always fall out as neatly as the researchers might have liked. In some cases, the data revealed that the courses allowed students to demonstrate only a few of the competencies, while in other cases, many competencies could be demonstrated. In all cases, however, the courses considered more than the competencies of interest to the project and the faculty were assessing more than just those competencies. This is important as it means the competency-based program sets a floor rather than a ceiling. Many qualifying statements accompanied faculty responses. These statements explained the use of a given assessment technique. They emphasized the degree to which the technique assessed a given competency. And they revealed the instructor’s approach to assessment, which led to an exploration of the impact of differing faculty styles of assessment.

Most of the within-course assessment uses indicators of competencies—primarily paper/projects or written tests. Few competencies were actually measured through demonstration or simulation. The validity of competency assessment by one method rather than another is yet to be determined, but the establishment of the categories makes it possible to carry out such a comparison in the future. The value of this comparison lies in being able to determine the trade-offs between costs and effectiveness.

Although it seems reasonable to have more confidence in measures of competencies than indicators of competencies, it is also reasonable to believe that the former will be a more costly process than the latter. In the competency assessment study the primary concern was on measures of cost effectiveness. A model was developed and protocols for collecting data on costs were designed. A comprehensive description of the process is included in a report on the project (Daniel and Ely, 1979).

Next Steps

The competency-based program is in place. The assessment procedures are being implemented in the spirit of field testing. A Governing Council of practicing school media personnel, school principals, classroom teachers, and University faculty is monitoring the program and making recommendations for improvement. Studies of cost and effectiveness will continue with the hope that a validated model will be available for use at other institutions.
The Design of Instructional Materials
A Top-Down Approach

Paul Harmon
Harmon Associates
3752 Sixteenth Street
San Francisco, CA 94114

Abstract. This article describes a new model for the analysis and development of instructional materials. This model is in the tradition of human performance engineering. The model combines behavioral and cognitive approaches in a single, systematic approach that has proven successful in a number of different applications. The key to the model lies in its top-down approach to problem analysis. The performance analyst begins by analyzing the overall performance situation, then moves to a general analysis of the appropriate behavioral sequence. After the behavioral sequence is identified, the analyst determines antecedential and performance heuristics. Finally, the analyst describes or develops subject matter theories to support the use of the heuristics. The design and development process parallels the steps in a top-down task analysis and therefore results in an elegant and efficient developmental effort. The general steps of this approach are described and then illustrated by explaining how it was used to guide the design of an instructional package to teach bank officers how to sell financial services.

Overview
This article describes a new model that facilitates the effective design of instructional materials using a top-down approach. The model is based on the assumptions of instructional technologists who are working in the tradition of human performance engineering. The model combines behavioral and cognitive insights into a comprehensive approach that has been successfully tested in a number of practical applications.

Performance Engineering and Instructional Technology
The model described in this article is in the tradition of human performance engineering, as it has been propounded by Gilbert, 1962, 1978; Mager & Pipe, 1970; Harless, 1974; Rummell, 1976; Horn, 1976; Harmon, 1980b; and Bailey, 1982 (See Figure 1). This approach to instructional technology has its roots in Gilbert's work on Mathetics and is based on the following assumptions:

- Performance problems can be analyzed in terms of deficiencies in the environment, deficiencies in available feedback and consequences, deficiencies in management and overall task organization, and deficiencies in skill and knowledge. Instruction is only appropriate when one is dealing with skill and knowledge deficiencies.
- Experienced or master performers are available and their work can be studied.
- Instructional outcomes can be specified in terms of job outputs that can be measured in a real working environment.
- Trainees will be able to apply what they learn on a job soon after they complete the instructional program.
- Developmental testing can be done and the instructional materials can be revised until they produce the desired results.

Although other "disciplines" in instructional technology share some of these assumptions, they don't tend to be as concerned with them as the practitioners of human performance engineering are.

Educational technology, as defined by Cagne, 1977; Cagne and Briggs, 1974; Merrill, 1977; and Scandura, 1973, for example, seems to have developed its models and techniques primarily to facilitate the development of instructional materials to be used in school environments. Likewise, the military services have supported the development of a set of instructional models and techni-
ques, collectively known as ISD, that focus on the particular problems of military training. Recently a new “discipline” seems to have begun to form around the special problems involved in using computers to facilitate or administer instruction.

Human performance engineering, from its inception, has always focused primarily on the problems of business and industry. These problems range from training employees to perform very structured production-line jobs to educating managers to make reasonable decisions in very unstructured environments. Moreover, the problems of business and industry require that the performance analyst pay equal attention to the environmental, motivational, and instructional factors that impact employee performance to assure that training is only developed when it is likely to provide cost-effective solutions.

The model described in this article shows the common concerns of human performance analysts, but focuses primarily on the problems involved in the design of instructional programs.

The Basis of an Integrated Approach to Instructional Design

The dominant metaphor in psychology today is the human as a computer. By likening human thought to information processing, psychologists have sought to clarify the processes by which humans solve problems. Figure 2 presents a simplified model of how humans process information. The stimulus to the left of the box and the response to the right of the box are traditional variables of operant psychology. The box represents a person. Two major variables of cognitive psychology are indicated inside the box. Heuristics refer to the if-then statements that an information processing system uses to analyze new data and select an appropriate response. Knowledge structures refer to the portion of an information processing system’s memory that is activated or utilized when a particular stimulus is encountered. Notice that two variables impact a person’s analysis of a situation: (1) the external stimuli and (2) the information from memory that is associated with that external stimuli. Further, people can take either of two actions. They can either (1) search their memory for more information to better analyze the situation, or (2) they can make an overt response.

In the language of computer science, heuristics (or algorithms, which are just very precise heuristics) are the imperative statements that comprise programs, while knowledge structures are the declarative information contained in the memory of the computer. (Some would say that a knowledge structure is analogous to just that portion of the memory that is available in the computer’s active memory when the computer is working on a problem.)

By this analysis, preparing students for complex performance requires that we consider: (1) the actual stimuli they will encounter, (2) the skilled responses they will be required to execute, (3) the heuristics they use to analyze situations and select responses, and (4) the structure and content of that portion of their memory that they use when thinking about the particular performance. The approach described in this article addresses these concerns by suggesting that instructional designers approach training problems by way of three successive levels of analysis. (See Figure 3.)

The first level of analysis involves determining the sequential behavioral steps that structure the overall performance. In preparing an analysis the designer begins by entering names for the behavioral steps, one after another, across the center of a page (Circle 1 in Figure 3). In effect, the words indicate stimuli and the connecting arrows signify the performer responses that result in subsequent stimulus situations.

Next, the designer describes the heuristics that the performer uses to determine or guide his or her response (Circle 2 in Figure 3). For practical purposes, it is useful to divide heuristics into two types: (1) procedural heuristics and (2) attitudinal heuristics. Procedural heuristics are those rules of thumb the performer uses to actually determine or guide specific actions. Procedural heuristics, for a salesperson, might include: “Get the prospect talking” and “End comments with checking questions” to be sure the prospect understands and agrees.” Attitudinal heuristics are more abstract rules of thumb. In fact, they are
often broad metaphors or rhetorical statements that the performer uses to structure his overall approach and conversation. Attitudinal heuristics, for a salesperson, might include: “Selling is a Win-Win process” and “It’s important to keep talking about a sales as a process in which both parties win.”

The third level of analysis involves identifying or creating the subject matter models that a performer uses when he or she thinks about the environmental stimuli and decides which heuristics should be employed (Circle 3 in Figure 3). Just as heuristics are rules of thumb that don’t apply in all situations, subject matter models are simplifications of reality. They highlight the most important things to look for and the most likely events to anticipate.

Task analysis and instructional design both proceed in this top-down manner. First the overall behavioral sequence is documented. Then appropriate heuristics are identified. Finally, the specific subject matter necessary to facilitate the use of the heuristics is described or developed.

A General Procedure for Developing Instructional Materials

Figure 4 pictures the major steps involved in the development of instructional materials.

1. Overall Analysis of Problem.

This step has been called a Performance Audit (Rummel, 1976, Gilbert, 1978), a Front End Analysis (Harless, 1974), and a Needs Assessment (Kaufman & English, 1979). Whatever it is called, if it’s done in a comprehensive way it results in a description of what constitutes mastery performance for some well specified situation.

The overall analysis of the problem should result in a description of the interaction between the performer and the environment in which the performer will act. In developing an overall analysis, we ask such questions as:

- What needs to be done and by whom?
- On what occasions does it need to be done?
- How will we know it’s been done correctly?
- What are the differences between the best performers and average or typical performers?
- What constraints exist that will limit or dictate particular presentation strategies, media, etc.

The overall analysis doesn’t describe the details of what needs to be done; it provides an overview of the occasions for performance, the activity to be performed, and the likely consequences of performance.

The main purpose of the overall analysis is to assure that one does not develop unnecessary instruction. Consider, for example, a request to train loan officers to make agricultural loans. Without an overall analysis, one might simply do a task analysis of all the behaviors that go into making agricultural loans and then proceed to teach the entire procedure. In effect, one would undertake a behavior task analysis without having first adequately defined the situation. An overall analysis would probably reveal that agricultural loans were sufficiently similar to commercial loans so that only a limited number of additional things would need to be taught. Further, studies of agricultural loan officers themselves might show that average performers and master performers only differed on a few specific behaviors. These considerations, combined with allowances for the role of motivation/incentive and environmental variables, and coupled with cost considerations, should define and focus the training before one begins to think about how to teach the specific behaviors that will need to be taught.

The overall analysis may also establish the cost-effectiveness of undertaking an instructional development effort. One of the most important professional obligations of human performance analysts is to recommend against a training effort when it is not likely to be cost-effective.

2-B. Recommend Environmental Changes.

The overall analysis will often indicate that changes in physical aspects of the work environment, the feedback/
3. Analyze Heuristics (Rules of Thumb)

Once the performance analyst has identified the sequence of behaviors that typify a task, each step can be analyzed to determine what heuristics guide the skilled or master performer when he or she decides to undertake that specific behavior at that point in the task. This analysis, often coupled with an analysis of the subject matter to be taught, is often referred to as a cognitive task analysis (Cf. Greeno, 1980).

If the analyst represents the behavioral sequence as a decision flowplan, each branch point on the flowchart requires a decision. If the decisions are complex, the procedural heuristics will necessarily be more general and open-ended. If the decisions are specific enough, an algorithm can be developed. An algorithm is simply a heuristic that is so specific that it guarantees the correct outcome whenever it can appropriately be applied. Most heuristics only guarantee outcomes in terms of probabilities, and the analysis will frequently need to specify that several different heuristics should be applied in combination to assure a reasonably high probability of a successful outcome.

Attitudinal heuristics usually take the form of general propositions, metaphors, or rationalizations for an overall course of action. In some cases the performer states the attitudinal heuristic to him or herself to prompt more specific statements or actions. In other cases, the performer states the attitudinal heuristics in public to explain why he or she will be undertaking a specific course of action. In negotiating, for example, it's useful to publicly state that one is seeking to negotiate a deal that both parties can live with, and to subsequently identify how specific actions do or do not correspond with that goal.

In analyzing heuristics, the instructional designer asks such questions as:

- What decisions does the performer need to make at each step?
- What rules of thumb do experienced performers use to help them make those decisions?
- Which rules of thumb are more salient and under what circumstances?
- What sorts of general rhetorical statements do master performers make? Do the statements tie together into a general metaphor?
- Can we develop very specific heuristics (algorithms) to describe the correct response at each step, or must we rely on more general heuristics or on some mix of general heuristics and algorithms?

Figure 4. General Procedure for Developing Instructional Materials to Teach Complex Performance.

Consequence system, or in supervision will improve performance. While such changes are not a direct concern of the instructional designer, they should be recommended. If they are implemented, they often lead to a more effective instructional design that is easier to implement.

2. Analyze Behavior (Procedures).

The analytic effort leading to a description of overt performer behavior is typically referred to as a task analysis. In fact, task analysis begins with the overall analysis of the problem and proceeds, step by step, throughout the developmental process being described. The advantage of a top-down task analysis is that one doesn't go into greater detail than one is forced to by the particular problem being analyzed (Harmon, in press). The objective of step 2 is to define the overall procedure and the specific behaviors that the student is to master. A good analysis emphasizes how the student will respond to all of the typical stimuli he or she is likely to encounter on the job. The behavior should initially be described in terms of large steps, each of which should be clearly observable when actual performers do their jobs. As necessary, the analysis can include more specific behaviors.

In analyzing behavior, the performance analyst asks such questions as:

- Exactly what is it that the student need to do to exhibit mastery?
- What are the overt steps the student must perform? Exactly what skills are involved in performing each step?
- Which behaviors are already in the student's repertoire and which will have to be taught?

The behavioral analysis usually results in a step by step procedure that provides the backbone for organizing the instructional design effort.
The heuristic analysis usually results in the identification of a number of procedural rules of thumb and a few propositions. Heuristics define the thought processes the performer must go through when he or she analyzes a problem and decides on a course of action.

4. Analyze Subject Matter
(Knowledge Structures/Concepts).

Once one has identified the heuristics used to perform a particular task, one then proceeds to identify any body of declarative knowledge that the performer must access whenever he or she wants to apply a particular heuristic. If, for example, one identifies a heuristic that states: "To qualify as a prospect, the business should have a current ratio of at least 1.8 to 1," one can logically determine that to be able to use that heuristic, the trainee must either already know or be taught about "current assets," "current liabilities," and that the "current ratio equals current assets divided by current liabilities." More broadly, the trainee must understand those basic financial models of a business that are called financial statements.

To analyze the subject matter or knowledge structure required to perform a particular task, one describes all of the definitions, discriminations, generalizations, patterns of interrelationships and logical transformations that the performer must understand in order to be able to effectively use the heuristics identified in step 3. Cost-effective instructional design requires that the analyst carefully review each heuristic to assure that any terms or concepts implicit in that heuristic are explicitly defined in a subject matter model. Subject matter not implicit in the heuristics, of course, should be strictly avoided.


Once one has identified the overt behaviors and the heuristics to be taught, one must decide on a strategy to get the students from their present repertoire to the desired repertoire.

In order to develop a strategy for shaping behavior, the designer must ask questions like these:
• Can behavior modeling be used to demonstrate the overt performance?
• Does the student need to memorize particular behavioral sequences, heuristics, or subject matter models, or can they be prompted by means of job aids?
• What skill or knowledge must be taught first? How long must these be practiced before additional skills or knowledge is introduced?
• What will criterion performance consist of? How closely can we stimulate the ultimate performance situation?
• What general pattern of successive approximations can be used to introduce behaviors, integrate them together, and finally provide the students with a sufficient variety of practice in performing the ultimate mastery task(s)?

6. Develop Model (Theory)
to Encode Subject Matter.

After one has analyzed the heuristics and determined the subject matter that must be taught, one must decide how to present it to the student. If the subject matter is at all complex, the subject matter should be organized into one or more subject matter models.

"This model combines behavioral and cognitive approaches in a single, systematic approach that has proven successful."

A model is a simplification of reality; it is a representation in which some amount of detail has been omitted. Models can either be physical representations, like an architect's small model of a proposed building, or symbolic representations, like the architect's blueprints of a building. In either case, the model is expected to communicate information about the elements or the pattern of an object, event, or situation without being as complex as the real thing. At their best, models allow their users to examine a situation and make predictions about it before actually becoming involved in the situation itself.

Subject matter models are sometimes called domain theories (Gilbert, 1962) or epitomes (Merrill, 1977). Scardua (1973) and others in the developmental tradition have argued that the creation of this core model of a subject matter is the main function of instructional design.

The subject matter model describes the key elements and the relationships that master performers typically consider when they analyze a situation. A good subject matter model modifies the way a student conceptualizes the environment. The key thing about subject matter models is that they do not describe action; they are structural, rather than functional. They provide performers with a way to describe and analyze the situation they find themselves in and to predict what might happen next. Subject matter models may be encoded onto paper, etc., but more frequently they are in the memory of the master performer and simply serve to guide his or her covert classification and decision making. One of the main functions of instructional developers is to make subject matter models explicit and therefore easily available to a new trainee.

Subject matter models are composed of declarative statements. They define, relate, and establish the rules that describe how the subject matter can be manipulated. The source of subject mat-
Introducing the subject.

In developing a subject matter model, we ask such questions as:

- Exactly what subject matter does the student need to know in order to perform?
- What are the elements and the transformations that the student must be able to identify and anticipate?
- What is the general pattern or patterns that the elements take?
- What notation system do experts use to describe the subject matter?
- What are the elements and transformations that the notation system is designed to record?
- When do the performer's heuristics require that the performer consult his or her memory?
- Does the model describe a largely static situation or does it seek to portray a dynamic situation?
- Is the subject matter essentially concrete or formal? Are the students primarily concrete or formal operators? (Harmon & King, 1979).
- Can the subject matter be described with an analogical notation system (i.e., pictures or graphic notation)?

To analyze a subject matter, the instructional designer must often interview master performers or subject matter experts several times until all of the key components and relationships in their models or notation systems are clearly established.

All possible transformations and the boundaries or limits of the subject matter must also be identified. Once the instructional designer has determined the overall subject matter, he or she must clump and reclump the components until a simple model of from three to five elements results. This simple model is ideal for introducing a new subject matter because it respects the information processing capacity of human active memory which seems to be able to handle about four chunks at a time. The simple model should be able to display all of the critical patterns and transformations to be taught. This simple model is the domain theory or the epitome. It is taught first and then developed, by stages, into a more complex subject matter model (Cf. Simon, 1979, and Van Lehn, et al., 1980).

If one wanted to teach loan officers about financial statements, for example, one would want to begin with an explanation that was limited to 2 to 5 major concepts. Thus, one could begin by saying that a Balance Sheet was comprised of entries organized under three categories: Assets, Liabilities, and Owner Equity. One would proceed to define and relate these three terms before going into any details about the specific items that make up assets, etc.

The presentation of a subject matter model is usually a three step process which begins with the presentation of a familiar analogy that displays the essential pattern found in the subject matter model. Then the initial analogy is refined to include all relevant details of the ultimate subject matter model. Finally, exercises are provided to teach the student to “see” the real situations in terms of the subject matter model. (See Figure 5.) Thus, as the instructional designer develops and refines the subject matter model, he or she must simultaneously be seeking simple, commonplace analogies to the subject matter model that will facilitate introducing the student to the subject matter. Graphics and audiovisual treatments are often especially effective ways to encode, introduce, and develop subject matter models.

7. Design Instructional Package.

The final instructional design combines the strategy for encoding subject matter with the strategy for shaping behavior. Several approaches for combining the components together into a well organized instructional package have been suggested (Gagne and Briggs, 1974; Gilbert, 1978; Horn, 1976). In essence, an overview and a subject matter model are presented first. As appropriate, the subject matter model is elaborated and followed by practice in analyzing specific situations and making overt responses.

8. Develop Instructional Package.

The actual development of the instructional package may involve writing textual materials, preparing job aids, developing audiovisual materials, scripting presenter's lectures, or a host of related tasks which we will not pursue in this article.


The instructional package should be given a trial and then revised as necessary. An instructional package can almost always be improved once the designer sees how real students react during instruction or how they perform as a result of the instruction.

---

Figure 5. The Development of a Subject Matter Model (Harmon, 1980)
This brief overview of instructional analysis and development makes the design of instructional materials seem more logical and sequential than it actually is. Often one step reveals problems that require reconsideration of several previous steps. In a complex project, the designer typically moves back and forth among the steps. The general progression, however, is more or less as it is pictured in Figure 4.

Educators sometimes focus exclusively on the development of subject matter models while ignoring considerations of how someone might actually use declarative knowledge of a particular subject matter outside the classroom. Trainers, on the other hand, occasionally focus so exclusively on specific, overt behaviors to be taught that they neglect to give the student sufficient grounding in subject matter or theory to facilitate generalization. And both educators and trainers often ignore the analysis of the heuristics used by master performers. It is the heuristics that ultimately link and coordinate both the behavioral and subject matter components into an effective instructional program.

The remainder of this article will discuss the analysis and development of an instructional package designed to teach bank officers how to sell financial services. This example illustrates the application of the procedures discussed in this section.

An Example: Cross Selling Financial Services

The application of this approach to the analysis and design of an instructional system is illustrated by a recent project undertaken to design a sales course for a bank. The bank wanted to train individuals sitting at desks in branch office lobbies to sell financial services to customers who approach their desks. The individuals are called platform officers. In some cases they were already "selling" new checking or savings accounts to customers who entered the branch. The bank wanted them to become more sales oriented and sell additional services to new customers and to customers who were already doing some business at their branch office.

In bank jargon, selling additional services to existing customers is termed "cross selling." Investigation determined that most platform officers working for the client institution had not had sales training. Some of the officers did a very good job of cross selling services, while others sold no services at all. We pro-
ceeded to interview those officers whom the institution identified as doing an outstanding job of cross selling (master performers) to determine what sorts of things they were doing and when they did them. Based on these interviews, we determined that there were, in fact, two different occasions on which cross sales typically occurred.

In one case, an individual approached the officer and asked about a particular financial service. In this case, the officer proceeded to try to sell the individual that particular service and would then bring up other services that might also be of use to that individual. Another approach would have proposed a sales course that was tailored for platform selling. A third possibility was to tailor a sales course for platform selling that would incorporate practice in selling the specific financial services the bank wanted to sell. In this particular case, we elected the latter course since by offering very specific training we could minimize the problems associated with generalization and transfer, and assure that the officers learned both product knowledge (subject matter) and sales skills (behaviors and heuristics) in the most coordinated and efficient manner.

"The main purpose of the overall analysis is to assure that one does not develop unnecessary instruction."

The second situation occurred when an individual approached an officer with a complaint or a question. Most officers simply answered the question or dealt with the complaint as best they could and did not see the occasion as a sales opportunity. The best officers, however, typically answered questions and dealt with complaints by seeking opportunities to offer new services to the individual which would eliminate the complaints. Then the officer would proceed to cross sell any additional services deemed appropriate.

In addition to investigating the platform officers and the sales opportunities they encountered, we considered environmental, feedback/consequence, and supervision factors that impacted branch sales. The bank had recently installed an incentive system that provided feedback and rewards to platform officers who made sales. The resources for selling were available. Many branch managers, however, failed to pay sufficient attention to the platform officer's sales efforts so it was recommended that a course be provided to teach branch managers how to coach and reinforce sales efforts. The bank took this recommendation. Thus, the remaining effort could focus entirely on providing the officers with the skill and knowledge required to make them more effective at selling.

One approach would have been to offer the institution a generic sales course. Time and cost constraints established by the financial institution led us to select a presenter-led workshop as the appropriate method to present this course and to utilize flipcharts and blackboard illustrations in place of more elaborate audio-visual presentations. On the other hand, since our audience was not very sophisticated in sales, we elected to use videotape to show modeled examples of each of the skills to be taught. To maintain the specific product focus desired, we scripted and videotaped each of the typical officer-customer interactions that led to cross sales.

When our overall analysis of the problem was completed, we proceeded to identify the overall behavior sequence that described a typical sale. Then we turned our attention to the specific behaviors and heuristics used by those platform officers designated by the bank as master performers. The procedural heuristics were of two general sorts. One set of heuristics was employed to determine which questions to ask in order to qualify or disqualify a customer for a particular service. The other set of performance heuristics were involved in determining how to explain and sell services to different types of customers. In other words, one set of heuristics depended upon a subject matter model that classified the financial products of the bank, while the other set of heuristics was activated by a subject
A second subject matter model was developed to help platform officers classify customers and predict what sort of specific sales techniques would be most appropriate with each type of customer. We considered several different personality and communication models that seemed likely to make platform officers a little more sensitive to the different types of customers with whom they might interact. We selected a matrix model that described four generic prospect styles. The model was simple enough that we could teach it in the time required, and it generated enough intercustomer discrimination that we felt its use would significantly increase the variety of techniques the typical platform officer would use with prospective customers.

We later combined the customer style model with three steps in the behavior selling model: probe, present, and close, and taught the students to modify each step according to the style of the customer with whom they were interacting (e.g., How to ask questions to an excitement seeking customer, How to make presentations to a details seeking customer, etc.) We used videotaped sales sequences and group exercises to teach the students to discriminate customer styles and shift their sales approach in an appropriate manner.

The customer style model was only introduced after the students had mastered the general sales model so as to not overload the subject matter content of the initial presentations. Later the students were taught specific modifications in each step that would tailor that step for a specific customer style. Students then role played sales in which they modified their approach for different types of customers. It helped, in this case, that the sales environment and the services being offered were limited. This allowed us to provide each student with step-by-step behavior interaction scripts (procedures) and considerable practice in working through those scripts.

As indicated in Figure 6, we combined the behavior sequence and the subject matter models into a general "sales model" that we used to provide an overview of the course. The product knowledge flipchart was integrated into this overall procedural description of the instructional program. The customer style model was introduced later in the program and led to the development of four different ways of actually handling the procedures, depending upon the cus-
customer being served. The entire program was tested and revised until it produced platform officers who could effectively obtain the cross sales the bank desired. The bank is currently using this course to train all its new platform officers.

Summary

This article has described a general model for the analysis and design of instructional materials. The overall approach works in a top-down fashion. It begins with a determination of the exact nature of the instructional problem. Then the overall behavioral sequence is identified. Each behavioral step is subsequently studied to determine exactly what heuristics the performer will need to use to determine how to proceed beyond that step. Finally, the heuristics are reviewed and the subject matter necessary to support the heuristics is identified.

Once all of the skill/knowledge components are identified, strategies are developed that effectively package the subject matter as one or more models. Then the designer orders the entire instructional effort in a manner that will smoothly and effectively shape the trainee's behavior toward mastery.

Some instructional technologists are expert at designing instruction based on a behavioral analysis or on an analysis of subject matter. The master performance analyst, however, must be able to analyze all of the successive levels of a performance situation, synthesize models that will communicate the key elements of appropriate subject matter, and then integrate the resulting models with practice in the use of heuristics and specific behaviors to create an effective instructional experience.

References


Paul Harmon is president of Harmon Associates, a consulting firm specializing in the analysis of human performance and the development of training programs for computer companies and financial institutions. He is especially interested in integrating the cognitive and behavioral aspects of improving human performance.

JOURNAL OF INSTRUCTIONAL DEVELOPMENT
An Analysis of University Training Programs for Instructional Developers

Kenneth H. Silber
University Professor of Educational Technology
Governors State University
Park Forest South, IL 60466

Abstract
This article summarizes a study of the curricula of nine graduate programs in instructional development in three categories: Residential PhD, Commuter PhD, and MA Only. It briefly describes the methodology used. It then presents general comparisons among the institutional categories on nine variables: purpose/orientation, curriculum development processes, number and types of ID courses, where/how ID is learned, types of synthesizing projects, emphasis on faculty/organization development and performance solutions, orientation to evaluation, orientation to ID, and number of students, number of faculty, and student/faculty ratio. It presents the data on the amount of time individual programs and categories of institutions spend in their curricula on 82 ID related competencies in five Domain of Instructional Technology functions and 15 competency areas. The author then compares institutional categories on the general variables and the specific competencies, and individual institutions on the specific competencies, pointing out interesting and unexpected results. Finally, the author draws several conclusions about the emphases of the institutional categories and individual programs, and raises questions about issues related to ID training that seem to require more research.

Each year, hundreds of students leave graduate programs in instructional development with Master's and Doctoral degrees to seek employment practicing, researching, and teaching ID in the real world. And each year, hundreds of students enter these same graduate programs to gain the competencies they need to become proficient in some aspect of ID.

While the ID field is beginning to come to some agreement about the core set of competencies needed by an instructional developer (Task Force on ID Certification, 1981), virtually no analysis has been done of how students gain those competencies in their graduate programs. Patridge and Tennyson's (1978-1979) analysis of 9 graduate programs included only demographic data about those programs, and rankings of very general competency areas which current programs contained, or which should be contained in an ideal program. Moore's (1981) study yielded only a rank-ordering of institutions considered most prestigious by respondents.

There has been, to date, no in-depth analysis of the curricula of graduate ID programs to determine exactly what competencies students gain while in those programs.

Objectives of this Study
The present study was undertaken to provide an in-depth analysis of nine graduate ID programs which were divided (as explained below) into three categories. The objectives of the study were:

1. to compare nine ID graduate programs, in three categories, on general characteristics: purpose of the program; emphases of the programs; processes used for developing the curriculum; number of students and faculty; number and types of ID courses; orientation to ID, evaluation, and performance analysis; types of synthesizing projects; and where ID is learned;
2. to compare nine ID graduate programs, in three categories, on the specific curriculum offered to students, using a competency-based comparison;
3. to describe overall strengths and weaknesses of graduate ID training in general.

Institutions/Categories Studied
When one thinks of ID graduate programs to study, one immediately thinks of the "name" PhD institutions, such as those studied by the authors described above. This investigator, however, felt that there were two other categories of institutions that this approach omitted, and they were added to this study. The three categories of institutions included in this study were:

(1) Residential PhD—oriented to younger, full-time students, more theoretical; not specifically job oriented (some academic, some business emphasis)
(2) Commuter PhD—oriented to older, working students in urban areas; more practical; oriented to practitioners in business and industry
(3) Master's (MA) Only—offer the MA degree only; oriented to older, working students in urban areas; more practical; oriented to practitioners in business and industry.

The investigator identified many institutions in each of these categories, wrote to their department chairs about the study, received expressions of interest from some, and then made the final selection of institutions to study based on the following criteria: category; willingness to participate; national reputation; geographic diversity; philosophical diversity; diversity in type of student served; and logistical factors, such as time, resources, and scheduling.

The institutions selected for study in each category are listed below. It is important to note that inclusion or exclusion of an institution in the study is not an indication of, and was not influenced by, the investigator's opinion about the quality of the institution's ID program.

Residential PhD—Florida State University, Indiana University, Syracuse University
Commuter PhD—University of Pittsburgh, University of Southern California
MA Only—Governors State University, Rochester Institute of Technology, San Diego State University, San Francisco State University
Methodology

Three phases of the methodology used in the study will be described briefly here: instrument design; site visits; data analysis. Instrument Design. The author began with the competencies specified by the Task Force on ID Certification (1981). Since these only represented a proposed "core," he added competencies related to ID following the functions of the Domain of Instructional Technology (AECT, 1997). This draft list was circulated to the faculty at FSU and several other participating institutions for review. Deletions and additions were made based on this feedback — using the guiding principal of being inclusive, rather than exclusive, to allow for institutional diversity. A total of 82 competencies representing all 9 DIT functions were finally selected for inclusion on the "Competency Comparison Checklist." A "General Comparisons" instrument was also developed, which contained 10 items related to program purposes, orientation, processes for curriculum development, number and types of ID courses, where students learn ID, types of synthesizing projects, attention to faculty/organization development and performance analysis; orientation to ID and to evaluation, and student/faculty ratio.

Site Visits. Rather than rely on college catalog information for the study, the investigator chose to visit each ID program to gather the data in person, using interviews and course syllabi as primary data sources.

During the 4 days spent at each institution (except for one, where only 2 days were spent) the investigator followed the same procedure:

1. Talk with chairperson to get overview of program, and find out which faculty it would be appropriate to talk to and which classes it would be appropriate to sit in on.
2. Talk with faculty members who taught ID and ID-related courses.
3. Read course syllabi for ID and ID-related courses.
4. Sit in on ID classes.
5. Talk with students about the program in general and the ID courses in particular.
6. Fill out the "General Comparisons" and the "Competency Comparisons Checklist."
7. Have a summary session with the chairperson, reviewing both instruments to ensure that all courses related to each competency were included, and that all information was accurate.

Results — General Comparisons

The results of the General Comparisons among the three categories of institutions are shown in Table 1.

I. Purpose/Orientation—MA and PhD

The purposes and orientation of the instructional development programs of the institutions in the 3 categories showed that Commuter PhD and MA Only institutions have significantly different goals and approaches from those of the Residential PhD programs. Therefore, it was indeed appropriate to have included them in the study, and to analyze the data from those institutions separately and to compare them to the Residential PhD programs.

The results seem to indicate that:

(1) MA Only programs view the ID skills they provide at the MA level as sufficient for a developer to be competent on the job, while both groups of PhD programs view what they do at the MA level as only "basic," and imply that the advanced ID skills they provide at the PhD level are necessary to make one competent.

(2) Commuter PhD programs form a bridge between the other two categories — with the "advanced design competencies and research" orientation from the Residential PhD programs on the one hand, and the "job related application in business and industry" orientation from the MA Only programs on the other.

(3) Residential PhD programs view the MA as preparation for the PhD, rather than as a terminal degree leading to a job, and they view the PhD as a less specifically job-oriented degree.

(4) MA Only and Commuter PhD programs are more concerned with "job oriented" ID skills, while Residential PhD programs are more concerned with "theory and research."

(5) The focus of the "advanced ID skills" differs between the two PhD groups, with the Commuter group defining them (like the MA Only group) in

"There has been, to date, no in-depth analysis of the curricula of graduate ID programs."
## Table 1
Summary Profile of the Three Types of Institutions Studied
Based on General Comparisons

<table>
<thead>
<tr>
<th>Item</th>
<th>Residential PhD</th>
<th>Commuter PhD</th>
<th>MA Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Purpose/Orientation</td>
<td>Basic design competencies; preparation for PhD</td>
<td>Basic design competencies; job related</td>
<td>Practical design skills for careers in the private sector</td>
</tr>
<tr>
<td>MA Degree</td>
<td></td>
<td></td>
<td>(believe MA level skills sufficient for jobs)</td>
</tr>
<tr>
<td>Purpose/Orientation</td>
<td>Advanced design competencies; theory-based research, design, management, evaluation.</td>
<td>Advanced design competencies; ID with base in prod. and research applied in Bus/Ind.</td>
<td></td>
</tr>
<tr>
<td>PhD Degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Curriculum Development</td>
<td>Faculty perceptions; grad input.</td>
<td>Input from grads, community; literature</td>
<td>Community advisory groups &amp; needs assessment</td>
</tr>
<tr>
<td>IV. Where/How ID learned</td>
<td>Internship</td>
<td>Courses plus jobs</td>
<td>Courses; honed in internships</td>
</tr>
<tr>
<td>V. Synthesizing Projects</td>
<td>Comp. Exams/Thesis; Theory-based development &amp; validation project; Database-based research</td>
<td>Developed &amp; validated IS; Theory-based development &amp; validation project</td>
<td></td>
</tr>
<tr>
<td>MA PhD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI. OD/OD/Performance</td>
<td>Virtually none; IU-minor; internship</td>
<td>Virtually none</td>
<td>Virtually none GSU—courses</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII. Orientation to</td>
<td>Project</td>
<td>Product</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIII. Orientation to ID</td>
<td>Varies by individual institution; Some systematic/scientific; Some systematic/holistic; Some synthesis of models; Some prescribe model; Some have students synthesize models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX. # Students</td>
<td>Larger No. of students</td>
<td>Larger No. of students</td>
<td>Smaller number</td>
</tr>
<tr>
<td># Faculty</td>
<td>Larger prop. of MA</td>
<td>Larger prop. of PhD</td>
<td></td>
</tr>
<tr>
<td>Student/Faculty Ratio</td>
<td>Largest</td>
<td>Middle</td>
<td>Smallest</td>
</tr>
<tr>
<td></td>
<td>Smallest—58% of other two: 14.5/1</td>
<td>Larger—24/1</td>
<td>Larger-24/1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equals MA Only</td>
<td>Equals Commuter PhD</td>
</tr>
</tbody>
</table>

(1) The MA Only programs, which were most concerned with providing skills for jobs in the private sector, made extensive use of formal needs assessments and formal, ongoing, business and industry advisory groups.
(2) The residential PhD programs, which were most concerned with theory and research skills, made most extensive use of the subject matter experts in those areas—their own faculty. One went even further and had an instructional developer from the campus service work with the ID faculty as SME.
(3) The Commuter PhD programs, whose orientation was a mix of these, used an approach which was also a mix, combining student/faculty development teams with community input.
(4) The emphasis placed on faculty perceptions concerning curriculum, as opposed to student and community perceptions, was much less in the MA Only group than it was in the two PhD groups.
(5) The emphasis placed on the professional literature related to ID com-
petencies and training was much less in the Residential PhD group than in the other 2 groups.

III. Number/Types of ID Courses

"How to do ID" skills courses were offered at all institutions; some offered, in addition, courses related to the theory, philosophy, model building, and research on ID. The numbers in Table 1 show some expected, and some unexpected, results:

1. All three groups offer the same number of "how to" ID courses. Though PhD students take an additional 60 credits, they learn no more of the "how to do's" than MA students.

2. Only Residential PhD programs offer additional courses beyond the 3.5 - 4.0 "how to's," and these fall in the theory/research category—which is missing from the more practically oriented MA Only and Commuter PhD programs.

3. While not evident from Table 1 alone, the number of reported "ID Courses" here does not match the number of course weeks devoted to ID competencies to be reported in the Specific Competency Comparisons later in this article. Those numbers seem to indicate approximately 1 less course in each category for all 3 groups. This discrepancy indicates the danger of analyzing curricula using merely course titles and descriptions—it includes courses with ID titles that do not really address ID competencies, and excludes courses without ID titles that really do address ID competencies.

IV. Where/How ID is Learned.

One would expect, given the purposes of the programs, the number of "how to" ID courses offered, and the number of "how to" ID courses that students take, that those courses would be where students learn how to do instructional development. Interviews with both faculty and students indicate, however, that this is not the case—as shown in Table 1.

1. The MA Only programs were the only group in which both students and faculty clearly indicated a primary emphasis on learning the ID skills in the courses students took, though they believed these skills should be further honed in real-world internships.

2. The Residential PhD programs placed almost exclusive emphasis on internships—which, they admitted, not all students could get—as the place to learn the ID skills; "the courses were not for that purpose," they said.

3. The Commuter PhD programs again were the bridge, relying equally on the courses and the students' real-world jobs, where skills were applied, for learning.

V. Synthesizing Projects

The type of culminating experience a program expects from a student (exam, project, thesis, dissertation) can be seen as one way of operationalizing the purpose/orientation of that program. As the data in Table 1 shows, this is the case for the ID programs studied:

1. At the MA level, the more practically oriented Commuter PhD and MA Only programs accepted fully developed and validated instructional systems as synthesizing projects, while the theoretically oriented Residential PhD programs preferred exams or theses.

2. At the doctoral level, both Commuter and Residential PhD programs would accept theory based development and validation projects, but some of the Residential programs preferred, and in some cases demanded, a data-based research study.

VII. Orientation to Evaluation

The evaluation of the instructional systems developed is often the responsibility of instructional developers—whether as part of their development responsibility or as part of a full-time evaluation/quality assurance assignment in their organizations. Sometimes, instructional developers move into evaluation completely and work at the program evaluation level (à la Stufflebeam, Stake, Scribner, Guba). As summarized in Table 1, the groups of programs studied showed the following differences in their emphasis on evaluation:

1. The Residential PhD programs emphasized program evaluation, which is consistent with the research orientation of those programs, and with the desire of many of the faculty and students at those institutions to see the students work as pure evaluators or as evaluators in an ID context.

2. The Commuter PhD and Master

"The curricula of nine institutions were studied in three categories: Residential PhD, Commuter PhD, and MA Only."

VI. Faculty Development/
Organizational Development/
Performance Analysis

In their jobs, most instructional developers will not only develop instructional systems, but will also have to apply techniques from three additional fields: faculty development; organizational development; and performance analysis. These three areas are widely discussed in the ID literature. According to some authorities, all three are related to, but not part of, ID. According to others, all three (especially performance analysis) are an integral part of ID. Yet the results of this study (Table 1) indicate that:

1. There is virtually no preparation in any of these three areas in any of the groups of institutions studied.

2. Only 1 institution (GSU) offers a course on solving performance problems using Gilbert's model.

3. Only 1 program (Indiana) is at all concerned with faculty development, and this occurs during an internship experience.

Only programs emphasized the formative and summative evaluation of instructional systems and products, which is consistent with their business and industry orientation, and the expectation that graduates would be doing only this type of evaluation on their jobs.

VIII. Orientation to Instructional Development

As the literature in the field clearly indicates, there is a great difference of opinion among instructional developers about the philosophy underlying ID (Performance and Instruction, September, 1981) and models of how to do ID (Journal of Instructional Development, Winter, 1980-81). These differences are reflected in the orientations to ID held by the nine programs studied, as summarized in Table 1:

1. Unlike the other variables studied, there were no differences by categories of institutions; rather, the orientations varied by individual institution.

2. Some institutions seemed to hold the view that ID was a "systematic/ scientific/replicable" process (FSU,
Syracuse, GSU, San Diego, and San Francisco—with FSU being the strongest adherent to this position). While others held that it was a “systemic/holistic” process (Indiana, Pittsburgh, and RIT seemed to fall into this category—with Indiana being the strongest advocate).

(3) Some institutions seem to favor one ID model at the best, while other institutions present the students with many models and have the students synthesize their own models.

(4) Of those institutions that favor one model, some use a model based on one particular theory or author, while others use a model which represents a synthesis (by the faculty) of several elements of many different models.

IX. Students/Faculty/Student-Faculty Ratio

The numbers game is important in today’s shrinking higher education population, so the investigator decided to compare numbers of students, number of faculty, and student/faculty ratio for the programs. On some variables, however, there was no such congruity, or even pattern among categories of institutions. Conclusions and implications of these results will be discussed later.

Analysis Based on General Comparisons

Based on the 9 general comparisons made among the 3 categories of institutions, the author drew the following analysis about similarities and differences among the 3 types of programs. Those marked with an asterisk will be discussed in the Conclusions section.

(1.1) The institutions within each of the three categories seem homogeneous in their overall program purposes/orientations.

(1.2) The overall program purposes/orientations are different for each of the 3 categories of institutions.

(1.3) Commuter PhD and MA Only programs are more job-related and more oriented toward business and industry; though students from Residential PhD programs actually offering more time on ID competencies than do the Commuter PhD programs.

(2.1) The process used by each category of programs is congruent with its purpose/orientation. Each selects the methods which provide the information to develop a program which meets its purposes.

(2.2) No group used all the possible methods of gaining information for curriculum development, though MA Only programs tended to use more sources. The source least frequently used, except by MA Only programs, was community input through some formal mechanism.

(3.1) All 3 categories of institutions offer the same number of “how to” ID courses. This goes against “conventional wisdom” which would lead one to believe that a student would learn more “ID skills” if s/he went for an additional 60 credits of course work.

(3.2) It is congruent with their purpose/orientation that Residential PhD programs offer “research/theory of ID” courses, while MA Only programs do not. It is surprising to find, however, that Commuter PhD programs do not offer any more or more advanced ID courses than do the MA Only programs, since this is not congruent with the purpose/orientation of the Commuter programs.

(4.1) It was interesting and surprising to discover that only the MA Only programs consider their courses as the primary place where one learns to do ID. It seems that if one wants to learn ID through formal, designed instruction, the MA Only institutions are the most appropriate places to go. On the other hand, if one wants to learn ID through informal, apprenticeship type experiences, then the Residential or Commuter PhD institutions are the most appropriate places.

(4.2) It is difficult to identify what is learned, and how it is learned, during an internship, and therefore it is difficult to say what ID skills people who learn ID through this approach actually learn. Further, it raises the question of where students who do not get internships learn to do ID.

(5.1) The types of synthesizing projects required by all three categories of institutions match their purposes/orientations as well as the practical nature of the ID field. The field seems to have moved away from accepting only the traditional experimental research dissertation as a synthesizing experience.

(6.1) There is an almost total lack of...
interest in, and time spent on, faculty development, organizational development, and the solving of performance (as opposed to instructional) problems, though these activities are, according to both the literature and actual practice, a significant part of the developer's problem-solving and solution implementation process. Perhaps academic programs lack input from the business community, which stresses this area.

(7.1) The orientation to evaluation of all three categories of programs is congruent with their purposes/orientations: Those in Commuter PhD and MA Only programs head for jobs in business and industry concentrate on product evaluation; those in Residential PhD programs headed for research and evaluation jobs concentrate on program evaluation.

(8.1) There is no clear cut analysis of the orientations of different institutions toward the instructional development process. Since this orientation can have direct practical effects on the variables on looks at and how one looks at them (as, for example, does qualitative vs. quantitative evaluation), more research is needed regarding the differences between the systematic and systemic, the one model and the multi-model, the synthesized and the unsynthesized orientations to ID.

(9.1) The larger number of students in the two PhD program categories makes sense because the programs contain both MA and PhD students.

(9.2) An interesting difference between the two PhD program categories is the proportion of MA to PhD student populations. The Residential category has equal numbers of MA and PhD students, while the Commuter category has a greater percentage of PhD students. One would expect this to lead to the offering of more advanced, and fewer basic, courses by the Residential programs; yet the data indicate that exactly the opposite is the case.

(9.3) The favorable student/faculty ratio for Residential PhD programs is not surprising, and the high MA Only student/faculty ratio may be difficult for Residential PhD faculty to sustain such a low ratio to understand. The surprising, and probably not pleasant, high student/faculty ratio for Commuter PhD institutions certainly raises questions about stretching those faculty that thin.

Results—Specific Comparisons
The number of course weeks spent on the 15 groupings of competencies analyzed in this study are shown in Table 2. This section will explain the competencies in each grouping, and address the intercategory similarities and differences, as well as specific institutional similarities and differences related to time spent on the competency areas.

Design Competencies—(1) Front-End Analysis. The area of identifying what the problem "really is," and selecting which problems to work on given limited resources, is considered by many authors (Kaufman, Harless, Mager, Gilbert, Burton and Merrill) to be the most important step in the ID process. Three competencies from this study were grouped into this area for analysis:
- select appropriate ID projects
- conduct needs assessment
- identify non-ID/performance problems

The results show that:
(1) Overall, the nine institutions spend relatively little time on these competencies (average 4.3 weeks)
(2) The MA Only institutions spend the most time (average 5.9 weeks), followed by the Residential PhD programs (4.2 weeks), the Commuter PhD programs spend the least amount of time (3.5 weeks)
(3) The strongest individual programs on these competencies are GSU (with 14 required course weeks covering all 3 into this area:
- identify non-ID performance solutions
- develop job-aids
- develop algorithms.

Design Competencies—(2) Performance Solutions. The front end analysis indicates that the developer is not faced with an instructional problem, then s/he should be able (according to Gilbert, Mager, Performance and Instruction, Bullock) to devise other solutions to the problem, within the limits of the ID field. These might include the development of information in the form of job aids or feedback systems, or suggestions about instrumentation, motivation, incentives, management, and organizational development. The competencies from this study were grouped

Design Competencies—(3) Learner/Setting Analysis. That developers should know something about the learners for whom they are designing instruction, and that they should know the resources and constraints of the setting in which they are to develop and deliver the instruction, is common wisdom in the ID field. The competencies from this study grouped into this area were:
- analyze learner characteristics
- analyze setting characteristics.

The results showed that:
(1) There was almost no difference among either institutional categories or individual institutions on the number of course weeks spent on these competencies, with all very close to the average of 3.7 weeks.

"Commuter PhD: Universities of Pittsburgh and Southern California."
Table 2
Course Weeks on Competencies

<table>
<thead>
<tr>
<th>Competency Areas</th>
<th>Overall</th>
<th>Res. PhD</th>
<th>Com. PhD</th>
<th>MA Only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Function</strong> (Total)</td>
<td>35.1</td>
<td>44.4</td>
<td>27.0</td>
<td>37.3</td>
</tr>
<tr>
<td>1. Front End Analysis</td>
<td>(4.3)</td>
<td>(4.2)</td>
<td>(1.5)</td>
<td>(5.9)</td>
</tr>
<tr>
<td>2. Performance Solutions</td>
<td>(1.4)</td>
<td>(0.9)</td>
<td>(0.0)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>3. Learner/Setting Analysis</td>
<td>(3.7)</td>
<td>(4.1)</td>
<td>(3.8)</td>
<td>(3.2)</td>
</tr>
<tr>
<td>4. Job/Task/Content Analysis</td>
<td>(7.3)</td>
<td>(9.7)</td>
<td>(4.5)</td>
<td>(7.6)</td>
</tr>
<tr>
<td>5. Objectives/Tests</td>
<td>(5.7)</td>
<td>(6.3)</td>
<td>(6.0)</td>
<td>(5.0)</td>
</tr>
<tr>
<td>6. Organization/Sequencing</td>
<td>(5.0)</td>
<td>(7.0)</td>
<td>(2.5)</td>
<td>(4.8)</td>
</tr>
<tr>
<td>7. Strategies/Activities</td>
<td>(8.7)</td>
<td>(12.2)</td>
<td>(8.7)</td>
<td>(6.0)</td>
</tr>
<tr>
<td><strong>Evaluation Function</strong></td>
<td>13.2</td>
<td>20.5</td>
<td>7.2</td>
<td>9.1</td>
</tr>
<tr>
<td><strong>Personnel Management Function</strong></td>
<td>6.5</td>
<td>3.3</td>
<td>1.2</td>
<td>11.5</td>
</tr>
<tr>
<td><strong>Organization Management Function</strong></td>
<td>19.1</td>
<td>29.9</td>
<td>7.2</td>
<td>17.1</td>
</tr>
<tr>
<td>(Total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Project Management</td>
<td>(11.9)</td>
<td>(14.5)</td>
<td>(4.0)</td>
<td>13.9</td>
</tr>
<tr>
<td>2. Diffusion/Change</td>
<td>(7.2)</td>
<td>(15.0)</td>
<td>(3.2)</td>
<td>(3.2)</td>
</tr>
<tr>
<td><strong>Research/Theory Function</strong> (Total)</td>
<td>64.4</td>
<td>93.8</td>
<td>62.9</td>
<td>43.3</td>
</tr>
<tr>
<td>1. Conduct/Cite Research</td>
<td>(24.4)</td>
<td>(35.3)</td>
<td>(27.0)</td>
<td>(15.0)</td>
</tr>
<tr>
<td>2. Educ. Technology Theory</td>
<td>(10.2)</td>
<td>(15.0)</td>
<td>(9.8)</td>
<td>(6.8)</td>
</tr>
<tr>
<td>3. ID Theory</td>
<td>(9.8)</td>
<td>(16.2)</td>
<td>(5.3)</td>
<td>(7.4)</td>
</tr>
<tr>
<td>4. Theories from Other Fields</td>
<td>(20.0)</td>
<td>(27.3)</td>
<td>(20.8)</td>
<td>(14.1)</td>
</tr>
<tr>
<td><strong>Overall Totals</strong></td>
<td>136.6</td>
<td>191.1</td>
<td>105.5</td>
<td>118.5</td>
</tr>
</tbody>
</table>

(3) There are non-category-related differences, with Indiana and RIT spending the greatest amount of time (15 weeks), FSU and GSU spending the next greatest (8 weeks), and the other 5 institutions spending much less time (average 4 weeks).

Design Competencies—(5) Objectives/Tests. Preparing objectives which state what the learner will be able to do after instruction (whether they use 1, 3, 4, or 5 parts), and writing criterion-referenced tests which measure those objectives have been part of the ID field since the early Programmed Instruction movement. The following competencies from this study were grouped into this area:

* write behavioral objectives
* write criterion referenced tests.

The results showed that:

(1) There was almost no difference among institutional categories, with all spending very close to the average of 5.7 course weeks.

(2) There was one individual institution that stood out, with FSU spending 12 course weeks at the MA and PhD levels on the "write criterion referenced tests" competency.

Design Competencies—(6) Organization/Sequencing of Instruction. One of the growing theoretical, research, and practical areas of ID is the application of principles of learning and instruction to the psychologically optimum sequence for teaching a series of objectives or a body of content (two examples are Gagne's "types of objectives" and "learning hierarchies" and Reigeluth's "elaboration theory"). The competencies from this study grouped into this area for analysis were:

* classify behavioral objectives/learning outcomes
* sequence skills/objectives.

The results showed that:

(1) Overall, the nine institutions spend an average of 8.7 course weeks on this area.

(2) Residential PhD programs spend the greatest amount of time (average 7 weeks), with MA Only programs spending about the average time (4.8 weeks) and the Commuter PhD programs spending the least amount of time (2.5 weeks).

(3) There are non-category related differences as well, with Syracuse spending the greatest amount of time by far (14 weeks), GSU spending the next greatest (8 weeks), RIT and FSU spending about the average (5.5 weeks), and the other 5 institutions spending the least amount of time (average 2.5 weeks).

Design Competencies—(7) Instructional Strategy/Activities. Theory and research indicate that instruction can be designed more effectively through the use of macro and micro level principles for designing instructional strategies and activities, e.g., the work of Gagne and Briggs, Merrill and Tennyson, Reigeluth. The competencies in this study that were grouped into this area for analysis were:

* identify appropriate events of instruction and conditions of learning
* create specifications for instructional activities/events
* specify instructional strategy
* prepare specifications/prescriptions for materials.

The results show that:

(1) Overall, the nine institutions spend an average of 8.7 course weeks on this area.

(2) Residential PhD programs spend the greatest amount of time (average 12.2 weeks), with Commuter PhD programs spending the average time (8.7 weeks), and MA Only programs spending the least time (6 weeks).

(3) The great range of times within each category may make those averages less meaningful than individual institutional comparisons.

(4) The individual institutional differences show Syracuse spending the most time by far (22 weeks), with USC a close second (16.5 weeks); FSU, GSU, and RIT come next, all grouping around 9 weeks, while the remaining four institutions all group around 3 weeks.

Evaluation Competencies. Evaluation,
growing from the developmental and validation testing of program instruction, has become a rhetorical—if not always practiced—part of the ID process, as well as a field in and of itself. Formative and summative evaluation of instructional systems and products are part of virtually all ID models. In addition, based on the work of Stake, Stufflebeam, Scriven and Guba, evaluation of complete projects and all types of programs has developed into a field in which many ID program graduates seek employment. The competencies in this study which were grouped into this area for analysis were:

- conduct formative evaluation
- conduct summative evaluation
- conduct project evaluation.

--- Overall: 

1. The average time spent by the nine institutions on all three competencies taken together is 13.2 course weeks.

2. Residential PhD programs spend the greatest amount of time by far (average 20.5 weeks), with MA Only programs spending the next greatest (9.1 weeks) and Commuter PhD programs spending the least (7.2 weeks).

3. There is an extreme range in the amount of time spent on evaluation by individual institutions, from a low of about 4.5 weeks at Pittsburgh, GSU, San Francisco, and RIT to a high of about 25 weeks at FSU and Syracuse, and 17.5 plus a complete minor at Indiana; this represents one of the greatest variations among all the competencies.

"MA Only: Governors State, Rochester Institute of Technology, San Diego State and San Francisco State."

The results, for each competency separately and for the area overall, show the following:

--- Formative Evaluation:

1. Overall, the nine institutions spend an average of 4.4 weeks on this competency.

2. Residential PhD programs spend the greatest amount of time (average 7 weeks), while Commuter PhD and MA Only programs spend less time (average 3 weeks).

--- Summative Evaluation:

1. Overall, the nine institutions spend an average of 2.8 course weeks on this competency.

2. The Residential PhD and MA Only programs spend the greatest amount of time (average 3.2 weeks), with the Commuter PhD programs spending less (1.5 weeks).

--- Project Evaluation:

1. The median time spent by all nine institutions on this competency is 6 weeks, with the distribution being trimodal.

2. The Residential PhD programs spend a far greater amount of time (at 10 weeks, not including available minors in the area) than do Commuter PhD and MA Only programs (3 weeks).

3. Three of the programs (one Commuter PhD and 2 MA Only) spend no time on this competency.

--- (4) Much of the work in evaluation at 3 of the institutions is optional rather than required.

Personnel Management Competencies. Instructional developers have to interact and consult effectively with others (both subject matter experts and media producers), work effectively in a group or team, and supervise others. Interpersonal skills have received a great deal of attention in the literature—including, but not limited to, a special issue of IDP and 2 issues of Performance and Instruction. The thrust of the arguments in this literature is that ID is a “people” job as well as an “information” one, and that a developer must be effective with people to succeed on the job. The competencies in this study related to this area were:

- consult effectively with SMEs
- use appropriate group process skills
- communicate effectively with media producers
- supervise people successfully.

The results show that:

1. Overall, the nine institutions spend relatively little time in this area, with an average of 6.5 course weeks.

2. MA Only institutions spend by far the greatest amount of time (average 11.5 weeks), with Residential PhD programs spending the next greatest (5.3 weeks plus informal learning in internships) and Commuter PhD programs spending the least (1.2 weeks).

3. There are great institutional differences in time spent, with GSU and RIT spending the most by far (17 weeks), San Diego, San Francisco, and Syracuse spending the next greatest (6 weeks), and the rest spending far less (1.2 to 2 weeks—with some informal training in internships).

Organization Management—(1) Proposal Management. While some of the skills involved in project management may be performed only by advanced level ID managers, proposing, managing, monitoring, costing, timing, budgeting, and reporting on ID projects are activities most developers will recognize as part of their jobs. These activities must be performed to enable the design and evaluation functions to be performed at all, to ensure they are done on time and at reasonable cost, and to enable them to be done again in the future. The competencies from this study that were grouped into the Project Management area for analysis were:

- manage an ID project
- monitor an ID project
- use time/cost management system (PERT/cost effectiveness)
- develop budget for an ID project
- develop manpower requirements for an ID project
- write proposal/reports for ID related projects
- develop plans for an ID organization
- develop budget for an ID organization
- develop manpower requirements for an ID organization.

The results showed that:

1. Overall, the nine institutions spent an average of 11.9 course weeks on this area.

2. The Residential PhD and MA Only programs spent about the same amount of time (about 14.1 weeks average), while the Commuter PhD programs spent significantly less time (4 weeks).

3. There are non-category related differences, with Syracuse and San Francisco spending the greatest amount of time (average 26 weeks), FSU, GSU, Indiana, and RIT spending the next greatest (10.2 weeks), and Pittsburgh, San Diego, and USC spending the least (4.7 weeks).

4. There is a great range in time spent, from a low of 2 weeks to a high of 30 weeks.

Organization Management—(2) Diff-
fusion/Change. Since most institutions are new to, and/or skeptical of, ID, the dissemination of information about ID and the application of adoption and change strategies to make the organization more receptive to ID are crucial to the establishment and maintenance of a viable ID program within an organization. The following competencies in this study were grouped in the Diffusion/Change area:

- apply diffusion and adoption principles
- apply ID organizational change heuristics
- develop plan to change the organization to implement ID.

The results show that:

(1) Overall, the nine institutions spent an average of 7.2 course weeks in this area.

(2) Residential PhD programs spent a much greater amount of time (average 15 weeks) than did the Commuter PhD and MA Only programs (3.2 weeks each).

(3) Two institutions, FSU and Indiana, offer extensive optional coursework in this area.

Research/Theory Competencies—(1) Conduct/Cite Research. Instructional development principles and practices are based on research, such as that summarized and synthesized by Gagne, Fleming and Levine, Allen, and Chronicle and Snow. It is important for developers to be able to conduct the research needed to substantiate existing, or create new, ID principles and practices. The competencies in this study summarized for analysis in the Conduct/Cite Research area are:

- conduct research related to ID
- locate research related to ID
- cite research related to educational technology
- cite research related to educational media.

The results show that:

(1) Overall, the nine institutions spend an average of 24.4 weeks on this area.

(2) The Residential PhD programs spend the greatest amount of time on this area (average 32 weeks), the Commuter PhD programs spend the next greatest amount (27 weeks), and the MA Only programs spend the least time (15 weeks).

(3) There are great individual institutional differences within categories, and the individual institutions fall into 5 groups (a) Syracuse, with by far the greatest amount of time at 50.5 weeks; (b) Indiana and USC with about 31 weeks; (c) FSU, San Diego, Pittsburgh, and GSU at 20-25 weeks; (d) RIT at 15 weeks; (e) San Francisco at 15 weeks.

Research/Theory Competencies—(2) Educational Technology Theory. Instructional development is considered to be part of the larger field of educational technology, and all of the programs offered coursework, and even majors, in at least some of the areas of educational technology (media production, media management, research, and evaluation). To some extent, all institutions offered coursework to help students understand the total field of educational technology, where it comes from, where it is now and where it is headed. The competencies in this study related to this area were:

- explain history of educational technology
- explain theories/definitions/models of educational technology
- cite philosophy/values relevant to educational technology
- cite issues/jobs/trends in educational technology.

The results show that:

(1) Overall, the nine institutions spend an average of 10.2 course weeks in this area.

(2) Residential PhD programs spend above this average amount of time (15 weeks), Commuter PhD programs spend about the average (9.8 weeks), and MA Only programs spend less than the average (6.8 weeks).

(3) There are 3 individual institutional differences worth noting: with FSU spending one-half of its group average (7 weeks), and GSU and Pittsburgh spending much more than their group averages (12.5 weeks).

Research/Theory Competencies—(3) ID Theory. If a developer is to be more than a technician, s/he must be able to go beyond mechanically applying procedures, and be able to understand and apply theory to the ID problem at hand. The ID theories referred to in this area are those theories/models/values/issues developed for, and applied almost exclusively in, the systematic design of institutional, (e.g. mathematics, elaboration theory, structured learning). The following competencies in this study were analyzed in the area of ID theory:

- explain history of ID
- compare ID and non-ID models
- cite philosophy/values relevant to ID
- compare/synthesize different ID models
- cite jobs/issues/trends in ID.

The results show that:

(1) Overall, the nine institutions spend an average of 9.6 course weeks on this area.

(2) Residential PhD programs spend the greatest amount of time in this area (16.2 weeks average), MA Only programs spend the next great amount (7.4 weeks) and Commuter PhD programs spend the least (5.5 weeks).

(3) Two individual MA Only institutions were significantly above their group average, and at or above the overall average, with GSU at 9.5 weeks, and San Francisco at 13 weeks.

Research/Theory Competencies—(4) Theories from Other Fields. ID is not a pure field, and many of the theories it applies were developed for, and drawn from, other fields which relate to part of the ID process (see Fleming and Levine for an example). The principles and theories developers may draw on come from the fields of (a) motivation, (b) communication, (c) perception, (d) attitude change, (e) systems, (f) cybernetics, (g) developmental psychology, (h) learning psychology, and (i) media/symbol theory. For this area, this study looked at the competency "apply theory X to ID" for each of the 9 fields listed as (a) through (i) above.

The results showed that:

(1) Few institutions exposed all students to all the possible fields from which theories and principles could be derived and applied to ID.

(2) Overall, the nine institutions spend an average of 20 weeks on this area.

(3) The Residential PhD programs...

"Some institutions regard ID as a systematic/replicable/scientific process, while others regard it as a holistic/systemic process."
spend above this average time (27.3 weeks plus the possibility of minors in some areas), the Commuter PhD programs spend on average (20.8 weeks), and MA Only programs spend less than the average (14.1 weeks).

(4) Two of the MA Only institutions, GSU and San Francisco, were closer to the overall average than to their group average, with about 18 weeks.

Production Competencies. This study originally intended to make the same kind of comparison as has been done above for production competencies, including all types of media and, especially, programmed instruction and CAI. An analysis of the raw data indicated that this would be neither possible nor helpful for the following reasons—which can also be considered conclusions about how production is included in ID curricula across the board:

(1) All nine institutions offered 30 course weeks worth of work in writing programmed instruction and CAI—but this was all optional coursework.

(2) A great deal of media production coursework was available at all institutions.

(3) Each institution seemed to favor learning production in a specific medium, but there was no pattern by category or rationale for this selection.

(4) An “optional” rather than “required” approach to students’ learning media production (similar to learning P/I/CAI) is followed.

Comparisons to the Average

In an attempt to further synthesize the results presented in Table 2, and discussed above, the author devised a norm-referenced measure—the comparison to the average. This measure involved taking the overall average number of course weeks for each of the 15 competency areas and comparing it with (a) the average number of course weeks for each of the three categories of institutions for each of the 15 areas, and (b) the number of course weeks for each of the nine institutions studied for each of the 15 areas.

The results of these comparisons, summarized in Table 3, show, for each category of institutions and for each individual program, the number of competency areas—both by DI/IT function and by total—on which it is above the overall average, at the overall average, and below the overall average.

These results show that, in descending order of time spent:

(1) The three categories of institutions have very different profiles, with:

<table>
<thead>
<tr>
<th>Type</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res. PhD</td>
<td>10</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>MA Only</td>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Com. PhD</td>
<td>1</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

(2) The nine programs can be divided into three groupings based on time spent on all 15 competency areas:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSU</td>
<td>6</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Indiana</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Syracuse</td>
<td>8</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSU</td>
<td>4</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>RIT</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsburgh</td>
<td>0</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>San Diego</td>
<td>1</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>San Fran.</td>
<td>1</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>USC</td>
<td>2</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

(3) The nine programs can be divided into four groupings based on time spent on only the 7 Design function competency areas:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSU</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>RIT</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSU</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Syracuse</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>USC</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 4</th>
<th>Average</th>
<th>Below</th>
<th>Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsburgh</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>San Diego</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>San Fran.</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Summary. This section has compared the institutions studied on the amount of time, measured in course weeks, spent on 15 groupings of competencies related to instructional development. It has given overall and institutional category average times, and, when indicated, times for individual institutions when they were significantly different from category times. It has also compared each category and institution to the overall average. Conclusions about some of the meanings of this data will be presented later in the article.

Analysis Based on Specific Comparisons

Based on the number of course weeks data presented in Table 2, and the comparisons to the average data presented in Table 3, and the discussion of those results, the author rewrote the following analysis of how institutional categories and individual programs compare on the amount of time they spent in their curricula on the 15 competency areas studied. Those marked with an asterisk will be discussed in the conclusion section.

(1.1) Residential PhD programs spend the largest total amount of time on all 15 competency areas (191 weeks, or 12.7 courses, or 38 credit hours). This amount is much larger than either of the other two institutional groups. It is also larger than the average overall time spent by all categories (136.7 weeks, or 9.1 courses, or 27.3 credit hours). This is not surprising, since it is congruent with the purpose/orientation of the Residential PhD programs, and with the fact that PhD programs have 60 credit hours more than do MA Only programs.

(1.2) Residential PhD programs spend above average amounts of time on 10 out of 15 competency areas. This is far more "above average" than either of the other two categories. Again, this is congruent with their purpose/orientation and amount of time available.

*2.1) MA Only programs spend a larger total amount of time on these competency areas (118.5 weeks, or 12.7 courses, or 24 credit hours) than do the Commuter PhD programs (110.5 weeks, 12.7 courses, or 24 credit hours). This is surprising to the author. Since the Commuter PhD programs have "advanced ID skills' as part of their purpose/orientation, and 60 more credits in their total program, one would expect them to have more courses on ID, rather than less. The number of credit hours for the MA Only programs (24) is about all that is available to them for the competencies—since when added to 2 optional production courses and a project/thesis, it fills up the required 30-34 credit hours for an MA. While the Commuter PhD programs have 60 more credits in their programs, it is not clear from this study what these are used for in terms of ID skills.

*2.2) The MA Only programs have more above average, and fewer below average, amounts of time on the 15 competency areas than do the Commuter PhD programs. This is surprising also, for the same reasons given above in 2.1.

*3.1) On the 7 Design function competency areas, MA Only programs spend only slightly less time (39.3 weeks, 2.5
courses) than do Residential PhD programs (44.4 weeks, 3 courses) while Commuter PhD programs spend considerably less (27 weeks, or 1.8 courses). This is surprising for two reasons. First, one would expect the Residential PhD programs to spend more time than the MA Only programs due to their purpose/orientation ("advanced ID skills") and the extra 60 hours in their programs. Second, one would expect the Commuter PhD programs to be equal to the Residential PhD programs, and greater than the MA programs, for the same reasons discussed in 2.1 above: purpose/orientation and number of credit hours available.

*(4.1) Given their near equality of time spent on the Design function competencies, the major part of the total time difference between Residential PhD and MA only programs is in the 4 Research/Theory competency areas. These Research/Theory competencies account for 50 weeks of the total 70 week difference between the 2 categories. This difference is to be expected, given the research/theory orientation of Residential PhD programs and the practical orientation of the MA Only programs.

*(4.2) Commuter PhD institutions fall in between the other two categories (20 weeks more than MA Only and 30 weeks less than Residential PhD) on Research/theory competencies. This finding is congruent with their purpose/orientation which is more theoretical than MA Only programs and more practical than Residential PhD programs.

*(5.1) The Evaluation and Organization Management function competency areas account for the other 20 weeks of the total time difference between the Residential PhD and MA Only institutions. Given the Residential PhD programs' orientation to turning out ID managers and toward project evaluation, in addition to product evaluation, this result is congruent with the orientations of both categories.

*(5.2) It is surprising, however, that Commuter PhD programs spend less time on competency areas covering Evaluation and Organization Management, given their purpose/orientation and additional 60 credit hours.

*(6.1) MA Only programs spend a much larger amount of time (more than 2/3 of a course) on Personnel Management (interpersonal skills) competencies than do either of the other two categories—and are the only programs that spend a significant amount of time on them. This is surprising since these skills are, according to the literature, important for all developers at whatever level and in whatever setting they work—and should be even more important if one is in the kind of managerial role the PhD programs suggest they prepare students for.

*(7.1) Within the Design function competency areas, all institutional categories spend relatively small amounts of time on the front-end analysis competencies. This is surprising, given the importance—according to the literature—of appropriately identifying the problem before trying to solve it.

*(7.2) Within the Design function competency areas, all institutional categories essentially ignore (with the exception of 1 institution) the Performance analysis and solutions competencies. This is surprising, given the literature (and a whole professional association—NSPI) which indicates the frequency, importance, and cost-effectiveness of such solutions to the problems that initially seem to be instructional/training problems but really are not.

*(8.1) In terms of the groupings of institutions based on their above average, average, and below average amounts of time spent on competency areas, it is surprising to find two MA Only institutions—GSU and RIT—just below the Residential PhD programs overall, and above the Residential PhD programs in the Design Function competencies. One would expect them to be way below the PhD programs based on time available in the degree program. It is also surprising to find the Commuter PhD programs with the most below average times, both overall and for Design competencies, based on their purpose/orientation and the amount of time available.
Conclusions and Discussion

Based on the Results and Analysis presented in the previous sections, the author believes there are nine areas about which conclusions can be drawn and discussion is needed.

Limitations. Before the more specific conclusions and discussion to follow, it is necessary to state and discuss a more general one. The results of this study dealt with amounts of time spent on competencies in university ID curricula. They do not pretend to indicate, in any way:

(1) the quality of the performance of students graduating from the programs studied
(2) the quality of ID programs based on the variable studied or other variables
(3) whether spending more or less time on competencies in curricula, beyond some attention to them as indicated in the literature, is positive or negative.

The quality of student performance is the payoff for any graduate program in ID. That outcome can be influenced by any number of process variables, including the curriculum, the quality of the faculty, the quality of teaching, the quality of students entering the program, etc. There is no assurance that there is a relationship between the curriculum of an institution and the quality of performance upon graduation—though common sense would suggest there must be some or there would be no need for the curriculum in the first place. Further research is clearly needed in establishing such a relationship.

The "quality" of an ID graduate program is determined by all the factors mentioned in the previous paragraph. Therefore, when this study compares institutions' curricula and uses terms like "above average" and "more time than," it is not evaluating the quality of that institution’s ID program. It is simply comparing the curricula, and indicating which competencies an institution, or group of institutions, emphasize and do not emphasize.

How much time is "appropriate" to spend on a particular set of competencies in an ID graduate program has not even been studied, let alone determined. It does seem to make sense that if a competency is deemed to be important, and if students do not possess it when they enter the program, then some type of experience should be built into the program to assist the student in attaining it. Beyond that common sense notion, there is nothing to indicate what the nature or length of that experience ought to be.

Therefore the fact that an institution spends more or less time on a competency is neither "good" nor "bad"; it is, most probably, an indication of either (a) the relative importance the program attaches to that competency in the total ID process; (b) the research interests of the faculty; (c) the abilities and needs of the students based on entry level skills and job expectations; or (d) some combination of the above 3, and other, factors.

Utility of the Study. Given those limitations, the author believes the study does have important findings that can be useful to several different groups.

Students can use the study to help in their selection of a graduate ID program. While the study can, and should, be only one of the factors they consider, it does give them information about the orientations of the programs, about how the curriculum were developed, about how ID is learned, and about the competencies the programs emphasize by spending the largest part of their curricula on them. Students can match their own learning needs and styles, and job expectations, with this information, and (along with the other factors) select institutions that are perhaps more likely to meet their needs and interests.

"Further research is needed to determine if this amount of time is adequate to teach the complex competencies required in our field."

Faculty can use the study as one of the inputs to curriculum re-design. If a faculty sees, in looking at the data, an area or set of competencies which they feel they currently spend either "more or less time" on than do other institutions, they may wish to increase or decrease their emphasis on that area. At CSU, for example, the author used the data to identify the areas in which the program spent less than the average amount of time, and redesigned the curriculum to increase those areas he considered "weak."

Employers can use this analysis of curriculum as one of their inputs in deciding at which institutions to recruit prospective employees. If an employer wants an employee strong in project evaluation, then s/he can save time by looking primarily at institutions that emphasize evaluation and are oriented to project evaluation. If an employer wants an employee who can do front end analysis and implement performance as well as instructional solutions, s/he can primarily look at institutions that emphasize these areas in their curricula.

With this general discussion in mind, it is now appropriate to move to the more specific conclusions.

Commuter PhD Programs. The 2 Commuter PhD programs studied spent less time on every competency area than did the Residential PhD programs studied, and, surprisingly, less time on every competency but Research/Theory than did the MA Only programs. In light of their purpose/orientation, "advanced ID competencies with a base in production and research applied in business and industry," and the 60 credits beyond the MA they have available for courses in the program, this finding is extremely surprising.

One would expect, all other things being equal, that they would spend the same amount of time on the ID competencies used in this study as did the...
If one wants to learn/emphasize Design Competencies

Then these institutions emphasize it.

Residential PhD and MA Only institutions equally, with GSU and KIT more than any others.

Research/Theory competencies

Residential PhD institutions

Evaluation (esp. project) competencies

Residential PhD institutions

Diffusion/Change competencies

Residential PhD institutions

Interpersonal Skills

MA Only Institutions

Practical Business/Industry orientation

MA Only and Commuter PhD institutions equally

ID taught in formal courses

MA Only institutions

Individual Institutional Emphases. Based on the amount of time spent on the competencies in their curricula, the following institutions emphasize the competency areas next to their names by spending an amount of time far in excess of other institutions on it:

Florida State—Evaluation, Diffusion/Change, Front End Analysis
Governors State—Front End Analysis, Performance Solutions, Interpersonal skills
Indiana—Task/Content Analysis, Evaluation, Diffusion/Change
Rochester Institute of Technology—Front End Analysis, Task/Content Analysis, Interpersonal Skills
San Francisco State—Project Management
Syracuse—Project Management, Organization/Sequencing Instruction, Instructional Strategies, Evaluation, Conduct/Cite Research
University of Southern California—Instructional Strategies

Areas not emphasized. Based on the numbers of course weeks spent on the competency areas, both overall and by institutional category, there seem to be 5 areas that stand out as having relatively little, or no, emphasis placed on them in the curricula studied. Those competency areas are:

Front End Analysis—relatively little emphasis (4.3 courses overall)
Performance/FD/OD solutions—virtually none (except for 1 institution)
Interpersonal Skills—virtually none except in MA Only institutions
Evaluation—relatively little except in Residential PhD programs
Project Management—relatively little (less than one course average)

This is surprising in light of the importance placed on these areas in the literature (Diamond, Durzo, & Doughty, 1979; Bratton, 1979-80; Gilbert, 1978; Kaufman, 1972; Dick, 1980, and other writers on evaluation), and by employers both in academe and business/industry.

Number and Types of ID Courses. The overall average data from nine institutions studied showed that (a) the number of "how to" design function courses was about 3, (b) the number of "advanced ID" courses, which were really theory/research/management of ID, was about 5, (c) the total number of courses addressing the overall instructional development related competencies (excluding production) was about 8 overall, and 12 for Residential PhD programs. These numbers raise three questions for the author.

First, are 3 courses adequate to learn all the "how to's" one needs to be competent at the design portion of the ID process? There were 12 competencies in this study that fell into the design portion of ID, creating an average of 2½ course weeks, or 8 class hours, in the whole curriculum dealing with each competency. It seems to the author that this is a small and inadequate amount of time to teach the relative complex competencies that are required in our field. The author believes further research is needed to determine if this amount of time is adequate, and if not, how much is needed.

Second, what do PhD institutions really mean by "advanced ID skills." Since the Residential PhD and the MA Only programs had the same number of "how to" ID courses, the logical inference is that "advanced" ID skills were not more "how to" skills, but rather were skills related to theory/research and management of ID. The author believes the field needs to clarify what it means by "basic" and "advanced" ID skills, both so it can design appropriate curricula and so that it can communicate the difference to others—especially employers.

Third, are 9 (or 13) courses (plus, perhaps, some production) all one needs to be competent in all areas of the instructional development process, and, if so, what are programs that require more courses than that teaching in the hours beyond 27 or 39 they require? As with the first question, the author believes that 9 or even 13 courses is not sufficient. The author was not able to ascertain what Residential PhD programs teach in the 10 additional hours they require. If those hours are reserved for related minors, we have the interesting situation in which the minor requires more hours than the major. The author believes that both parts of this question require further research.

Orientation to ID. As discussed in general conclusion 8.1, some institutions regard ID as a systematic/replicable/scientific process, while others regard it as a holistic/systemic process. Some believe in "one model," others in synthesizing models. Some believe in teaching a model, some in teaching many models and having students select/create their own. This study found no pattern among institutions as to their orientation, but it did find that the content and teaching approach of the program of the institution reflected on its philosophical orientation.

Virtually no work has been done on the different orientations to ID (beyond that in the September, 1981 issue of Performance and Instruction). Since orientation affects how one does and teaches ID (as do, for example, the differences in orientation to evaluation of Stake, Scriven, and Guba), it seems to the author that this is an appropriate and important for future research.

Summary

This article has summarized a study of the curricula of nine graduate programs in Instructional Development. It has discussed the methodology used, presented general comparisons among the categories of institutions, presented data on the amount of time individual programs and categories of institutions spend on ID-related competencies, analyzed the general and specific comparison results, pointing out highlights, drawn several conclusions about the emphases of institutional categories and individual programs, and raised questions about issues related to ID training that the author believes require more research.

If taken in the spirit in which the study was conducted and reported, the data, analysis, and conclusions presented here can be of use to students, employers, and especially to faculty at all ID training in-
A Typology for Generating Needs Assessments

Allison Rossott
Professor of Educational Technology
San Diego State University
San Diego, CA 92122-0311

Abstract. There are many techniques available to the developer who is attempting to understand a performance problem. Needs assessment is one of those techniques. The developer can interview, distribute questionnaires, ponder extant records... But what questions does the developer ask? Which behaviors should be observed? What feelings and priorities are sought? The challenge for developer is in the conception of the substance of individual items and groups of items. This article presents a typology which guides the developer in creating needs assessment items, the building blocks of front end analysis.

Introduction

Everyone agrees on the importance of understanding a problem before trying to solve it. The instructional development literature reflects this unanimity, providing developers with frequent and resounding calls to wage analytical wars on performance problems. Major and minor skirmishes are undertaken in the name of front and analysis for the worthy purposes of determining whether or not there really is a problem, who thinks there is a problem, the magnitude and priority of the problem and whether or not the problem will be susceptible to training solutions. These purposes are served through several analysis and assessment techniques which are carried out before objectives, specifications, and software are developed.

While the merit of problem or front end analysis is never in doubt and tools like critical incident, task, subject matter, goal and needs analysis are much touted, not all of these analyses enjoy equally detailed prescriptions. Nowhere is the presence of fervor and the absence of prescriptive detail more obvious than in the topic of needs assessment. As developers concur with the persuasive works of Joe Harless (cited in Littlade, 1975) and Roger Kaufman (1977), they are confronted with the reality of what Earl Misanchuk (1982) called a "field awash with adjectives." (p.1)

This paper presents a model for generating needs assessments. I am calling the activities which developers undertake to find out what learners think and feel needs assessment. The developer's challenge is to build print, observational and interview instruments which glean useful data from participating learners. This paper will review needs assessment history and extant techniques and offer a model for determining the substance of a needs inquiry.

Background

Kaufman and English (1979) join John Dewey (1933, 1939) to emphasize the importance of determining learner needs prior to developing curriculum for that learner. The link between Dewey and contemporary theorists is Ralph Tyler's curriculum rationale (1949). Monette (1977) notes that Dewey influenced Tyler's work and Miles (1979) identifies Tyler as the basis for current needs thinking. However, while John Dewey espoused the heresy of basing education on what children themselves perceived that they needed, he never clarified needs assessment. Archambault (1957) provides what appears to be one of the earliest lamentations on the absence of specific heuristics for needs assessment. He also introduced three themes which appear in the needs assessment literature: the question of the value of a curriculum built primarily on learner perception of needs; the importance of need prioritization; and the inclusion of attainability as a key variable in needs determination.

The desire to base curriculum decisions first and foremost on learner needs was supported by Federal mandates in the mid and late 1960s. Salis and Hengeler (1980) describe a 1963 Federal
requirement that Community Mental Health Centers do needs assessments prior to receiving federal support. Federal education agencies followed suit. Within (1977) reports that in 1965 needs assessments were required to receive ESEA funding.

This dominant presence of the learner in need determinations is typified by going to the learner with an unrestricted universe of possible areas of need and asking, 'What do you need?' Kaufman (1978) called that an alpha assessment; it serves as the theoretical basis for open-ended inquiry and contrasts with what he calls beta assessment. This is the first problem that developers confront as they construct needs assessment instruments. How much do they restrict the universe of possible needs? In what order are sources consulted to participate in that process? Finally, who has the last word in selecting one need over another? Figure 1 depicts the challenges. Each successive source narrows the needs and is in turn exposed to a diminished field of possible needs. While the first source enjoys the power of defining which or what kind of needs to be investigated, the last source is closest to that final selection of need (N) to be addressed.

James (1956), McGehee and Thayer (1961), and Moore and Dutton (1978) urge front end analysis which relies first and foremost on how the organization (management) perceives needs. Decen-Parker (1980) offers an excellent case study which models the challenge of integrating management's perspective with behavioral task analysis. In her work, the organizational perspective on optimal performance is dominant.

When trying to define needs, the developer usually solicits opinions on optimal and actual conditions from many perspectives. Knowles (1970) and Kaufman and Stakenas (1980) focus the developer's attention on still another source for opinions on learner needs: society. Kaufman and Stakenas (1980) turn that source into the ultimate optimal, a better society, and operationalize it as being made up of self-sufficient learners. More a contribution to the Reagan era than to the needs assessment literature, their ideas are significant, as well as controversial, for summative evaluators as a criterion against which to measure the performance of schools.

Techniques for Finding Needs

The search for substantive tools to determine needs continues, regardless of which sources are asked first or most. The literature provides some guidance. Steadham (1980) and Newstrom and Lillyquist (1979) detail criteria for selecting needs assessment techniques. Steadham's criteria are useful: time, resources, client involvement, politics, learner vs. client perception of needs, and confidentiality of data. Steadham lists analysis techniques (e.g., observations, tests, interviews, etc.) and their advantages and disadvantages in light of these criteria. Sallis and Hengeler (1980) dichotomize needs assessment approaches into hard and impressionistic techniques. They describe the methods mental health professionals use to ascertain community mental health needs. Nickens, Fugla, and Neriaga (1980) plumb the market research literature for needs techniques and describe the key informant, community forum, rates—under-treatment, social indicators, and survey methods.

Moore and Dutton (1978) credit McGehee and Thayer (1961) with the introduction of an idea which is crucial to front end analysis. That is the notion of levels of analysis, of repeated studies of increasing detail involving more and varied sources. Zemke (1981) divides sources into primary and secondary sources; primary data is gathered from learners directly or through observation of them and secondary data comes from other's opinions about learner performance. An interesting distinction is drawn by Inderlied and Bates (1980) when they define primary data as new information and secondary data as information gleaned from extant sources like accident reports and attendance figures.

While these authors focus on how and where to investigate, Kaufman (1977), Kaufman and English (1978) and Kaufman and Stakenas (1980) call the developer's attention to when to seek gaps between optimal and actual circumstances. Kaufman and his colleagues urge examination of gaps between desirable and actual conditions throughout the process of instructional systems development. While gaps can occur at all stages in an instructional system, they press for restriction of the word need to gaps in the results of the system, in products, outputs, and outcomes. Thus evaluation and front end analysis are appropriately linked through what they call the Organizational Elements Model of needs assessment.

Techniques for Selecting Needs

The literature offers more guidance to the developer who is attempting to prioritize and select a need than to the developer who is identifying needs. Since selected need(s) serve as the basis for the goals of education and training programs, most authors acknowledge the importance of first finding and then prioritizing needs. Moore and Dutton (1978) compliment Thomas Gilbert for his work on selection of training needs. Gilbert determines priority training needs by multiplying the value of overcoming the discrepancy times the number of trainees and dividing by the cost of training. Unfortunately, this formula, like so much of the literature, suffers from a lack of prescriptive detail.
A Typology for Needs Assessment

There are numerous techniques available to the developer who is conducting needs assessments. One can interview, observe, distribute questionnaires, and ponder extant records. But what questions does the developer ask? Which behaviors are observed? Which feelings are sought? The challenge is at the item level, as the developer creates the small building blocks of assessment instruments which will serve to structure the inquiry.

The purpose of front end analysis is to better understand the performance problem. What does "better understanding" mean? What is the information the developer needs from all sources, and in this case, the learners themselves? The answer to these questions provides the basis for systematic construction of needs assessment instruments.

The needs assessment typology is based upon the purposes of front end analysis. Each purpose corresponds to a type of item. There are five general purposes and five types of items. Figure 2 presents this relationship. Since needs assessments are done for as many as five purposes or just a few or for only one of the possible purposes, instruments are assembled after the developer has figured out what the purpose of this particular query is.

**Type 1: Problem Finding**

This question type seeks the nature of the problem. The developer confronts two possible challenges: finding problem(s) and finding details of a particular problem. Finding problems is an alpha assessment activity occurring, for example, when a community college program planner conducts a survey to find out what enrichment courses are desired by his/her constituency. Developers will more frequently find themselves conducting a search for the details of a given problem—an activity Kaufman calls a beta inquiry. A developer who is told to build a training program for hotel night clerks on how to use a new computer software package will conduct a beta search for details on the pre-specified problem.

Type 1 questions ask, "Is there a discrepancy?" "What is the discrepancy?" and "What is the exact nature of the discrepancy?" Note that the developer is narrowing in to acquire information which will enable development to occur.

**Examples:**

1.1 What experiences have you had which have led you to enroll in this engine safety class?
1.2 Fill in the following as honestly as you can: "When I go for a job interview, I worry that I will..."
1.3 "Compared to other job seekers, I think that I..."
1.4 You are taking a seminar called **Contract Negotiation for Instructional Developers.** List the questions that you have about this topic.

1.5 It is Friday. You will be going on a job interview on Tuesday. There are many ways to prepare to succeed at this interview. Look at the list that follows. Check as many of the listed items as concern you. Feel free to check as many or as few as you think you would like to learn more about.

---

**TYPOLOGY SUMMARY**

```
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Item Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of problem?</td>
<td>1</td>
</tr>
<tr>
<td>Priorities within problem?</td>
<td>2</td>
</tr>
<tr>
<td>Subject matter/skills?</td>
<td>3</td>
</tr>
<tr>
<td>Attitude towards?</td>
<td>4</td>
</tr>
<tr>
<td>Cause of problem?</td>
<td>5</td>
</tr>
</tbody>
</table>
```

Figure 2.

---

A Typology for Needs Assessment

What is the value of erasing a particular need? What does it cost not to address a need? This complex and political question has been answered differently by many authors. Three factors emerge from the literature:

**Size of Discrepancy.** A comparison between optimal and actual yields the magnitude of the problem. While this sounds simple, it isn’t. As Misanchuk (1982) noted, more progress has been made in assessing the trainer’s current abilities than in determining and quantifying desirable outcomes. Consider Tyler’s (1966) work on the National Assessment for Educational Progress and Sweigart’s 1977 Atlanta study of what children were able to do. Those extensive efforts at assessing status quo performance stand in contrast to ill-defined compilations of desirable outcomes.

**Attainability.** Kimpton and Stockton (1979) criticize selecting needs based only on size of the discrepancy. They and McNeil and Laosa (1975) cite likelihood of success as an important component in need prioritization. These pragmatists see force field analysis as a tool for needs assessment.

**Perceived Value through Rating and Ranking.** Sources are often asked to rate or rank their opinions about needs. Ranking involves comparing each identified need with the others and putting them in some kind of order. Rating involves comparison with a standard; many needs can be rated as a major priority, some priority, or no priority at all. Ranking, if a limited number of choices are provided, causes the developer few problems. Rating is the challenge. On what standard do you rate? McNeil and Laosa ask respondents to rate 15 goals on “tradition fundamentals,” future significance, ability of the organization to achieve, and contribution to cultural pluralism. A tripartite needs model is described by Misanchuk (1982). He asks respondents to rate each need on its relevance, learner competence, and desirability. Techniques for rating and ranking are described by Russell, Plakos, and Cox (1978) and Marshall, et al. (1982). Oppenheimer (1982) presents an interesting management development case study. He found significant positive correlation (p<.001) between ratings and rankings using Spearman Rank Order Correlation. Thus he suggests that either rating or ranking could be used to determine source priorities.
are you best at doing? Put the letter here:

2.4 Which of the above (question 2.1) causes you the most problems as you try to do your job? Put the letter here:

2.5 Rank the following skills based on how much training will contribute to your ability to get a job. Let the number 1 indicate greatest impact and the number 4 indicate least impact or no impact at all. Ability to:
  - make stand up presentations
  - write business and technical letters
  - program in at least one computer language
  - use statistical packages

Type 3: Knowledge/Skill Proving

It is helpful to corroborate the self-report information provided by a needs assessment through the inclusion of some type 3 questions. They ask learners to perform as if they had no problem, as if the skills or knowledge central to the problem were already within their repertoire. Type 3 questions are like pre-test items and their construction assumes availability, known subject matter. They differ from a pre-test in that they do not test the majority of problem-related content; rather they sample slivers of the subject matter. This will show what the learners know about themselves in relation to the problem. The value of Type 3 questions must always be weighed against the impact of asking potential learners to do something that they might not have the foggiest notion how to do.

Examples:

3.1 Please examine this resume. It was prepared by an instructional developer who is seeking employment. Render a judgement on its strengths and weaknesses. List at least three strengths and weaknesses below.

3.2 Every day of the year corresponds to an astrological sign. Match the dates below with their sign. Please the number of the sign to the left of the date.

<table>
<thead>
<tr>
<th>Date of Birth</th>
<th>Astrological Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>12 May</td>
<td>Cancer</td>
</tr>
<tr>
<td>1 February</td>
<td>Taurus</td>
</tr>
<tr>
<td>26 August</td>
<td>Aries</td>
</tr>
<tr>
<td>12 August</td>
<td>Libra</td>
</tr>
<tr>
<td>4 July</td>
<td>Capricorn</td>
</tr>
<tr>
<td>25 December</td>
<td>Pisces</td>
</tr>
<tr>
<td></td>
<td>Leo</td>
</tr>
<tr>
<td></td>
<td>Aquarius</td>
</tr>
<tr>
<td></td>
<td>Sagittarius</td>
</tr>
<tr>
<td></td>
<td>Scorpio</td>
</tr>
<tr>
<td></td>
<td>Virgo</td>
</tr>
<tr>
<td></td>
<td>Gemini</td>
</tr>
</tbody>
</table>

3.3 As you know, our hotel is welcoming more and more guests from Mexico. How might you welcome them in their own language? Don’t worry about your accent or getting it exactly right. Just try to use a few appropriate Spanish words.

3.4 We are developing an instructional module to teach developers to construct needs assessments according to this typology. Write two instructional objectives which would assist you in developing this module. The objectives may be in a format which would make either Robert Mager or Robert Gagne smile.

TYPE 4: Finding Feelings

Type 4 questions seek learner feelings about the problem. While type 1 queries will ascertain whether or not learners think there is a problem, type 4 items look for the emotions and attitudes held by learners. In addition to seeking feelings about the problem, type 4 items ask for learner attitude towards being trained in this subject matter. Consider the problem of training learners who are opposed to the job functions you plan to teach them. Imagine planning development seminars for middle managers who are mildly or strongly critical of the quality circles about which you plan to teach. It is also crucial to find out if learners feel they are ready and competent to acquire the skills or knowledge you intend to deliver. Consider the problem of training veteran reporter to compose news stories using the VDT (computerized video display terminal.)

One of the things a developer needed to know prior to developing that training was that many of the reporters just didn’t consider themselves the kind of people who could use new technology.

Examples:

4.1 Which best describes your feelings about taking a class on alcohol abuse and automobile safety. Check only one.

a. Willing
b. Unwilling
c. Indifferent

4.2 The management development team has surveyed a random sample of middle level managers and found that more than 80% of our middle managers want to know more about quality circles. We are planning to use our corporate retreat at Lake Big Foot to conduct this experiential training. What are your feelings about participating in a two day, small group workshop for this purpose? Honestly describe your react-
tion to this method for informing you about quality circles.

4.3 As you may already know, the district has decided to devote in-service education hours to helping teachers become computer literate. Please circle the number which most honestly reflects how you feel about the statement. Circle 2 if you agree, 1 if you are neutral or unsure, and 0 if you disagree with the statement.

1. I am looking forward to this training:
   2 1 0

2. Computers can make a positive contribution to elementary education:
   2 1 0

3. I feel I will be good at working with computers:
   2 1 0

4. Computers are likely to dehumanize schools and classrooms:
   2 1 0

5. It is appropriate to use our in-service hours to acquaint teachers with computers:
   2 1 0

TYPE 5: Cause Finding

Type 5 questions ask for the cause of the problem. Do the learners think that new or increased skills/knowledge will solve the problem? Do they think it is caused by imperfect tools, incentives, or supervision? Is some combination of factors causing the problem? This is the developer's chance to find out what or who is contributing to the problem. It is not uncommon for supervisors to think training will solve a problem that learners attribute to poor management or improper tools.

Examples:

5.1 As you know, our Division is lagging far behind last year in sales of frangaramas. Which of the following are contributing to your problems selling frangaramas this year? (Check all that apply to you.)
   - a. unfamiliarity with new Frangarama features.
   - b. change in sales incentive plan.
   - c. the fact that the 1981 top salesmen got transferred to northern Maine.
   - d. improved competitive products.
   - e. unfamiliarity with the way Frangaramas compares to the competition.
   - f. the recession.
   - g. the absence of Frangarama demonstrators.
   - h. the Frangarama has become too complex to explain to potential customers.
   - i. other:

5.2 Place an asterisk beside the reason above which you think is the major cause for decreased corporate sales. Place only one asterisk.

5.3 I am calling you to find out why the parents of Indo-Chinese youngsters are not visiting the schools. Why do you think this is happening? What is causing Indo-Chinese parents to stay away?

5.4 The number of accidents at the plant has increased this year, in spite of a new safety committee. Why are accidents increasing this year? Please take a few minutes to describe the reason or reasons for this increase.

Control: Item selection also depends

"Nowhere is the presence of fervor and the absence of prescriptive detail more obvious than in the topic of needs assessment."

Item Selection

Understanding a performance problem means finding answers about what needs exist, what needs are priorities, how learners feel about the needs, the cause(s) of the needs and whether learners are accurate in their judgments of themselves in relation to the problem. These purposes for front end analysis flow from the literature and serve as the bedrock for the item typology. They also provide the basis for selecting items.

The item composition of any individual needs assessment is based on the purposes of that inquiry. How much does the developer already know about the problem, about the learner, the subject matter, and their relationships? These factors determine the percentage of different item types which will appear in any given needs assessment.

The Learner: How much does the developer already know about this learner? Will the developer be able to make repeated queries with the learner, as he/she becomes more informed? Under the best of circumstances, those situations where there is time and money to delve into what will best serve these learners, begin with type 1 and 5 questions, then add type 2 and 4 and finally include type 3 items. This assumes several opportunities to return to the learners to ask for their opinions.

Subject Matter: Some content is more available than others. Are there test items already on hand? Has a subject matter, task, or critical incident analysis provided sufficient detail to feel confident about including type 3 items in a needs assessment? If a needs assessment is made up of a large percentage of type 3 items, it is possible that the developer really wants to administer a pre-test and should do just that. Type 3 items do not compensate for failure to give pre-tests. What they will do is tell you if learners know what they know and what they don't know. That has obvious design and development implications.

Conclusion

I began to review the literature and ponder this problem because I was having trouble teaching my students to develop needs assessments. "Why is this content different from all others?" I wondered. Since they were mastering other front end techniques, I decided the problem was in the subject matter. Somehow it wasn't sturdy enough to
guide them in attacking each new instructional problem. This typology offers some guidance. It is a beginning.

It would be wonderful to be able to conclude this article with a report of significant differences found between the quality of needs assessments generated using this typology and other more haphazard approaches. There are no such findings. Not yet. The results of the typology are anecdotal, subjective...and real. They exist in improved instruments generated by practicing and aspiring developers; these students were kind enough to learn and use this typology on more than one hundred problems over the last eighteen months. We saw it make a difference. Better instruments were generated more quickly.

There are imitations in this presentation of the typology and the literature review. The focus here has been on querying learners for their perceptions. This purpose-based model for front end analysis can, with slight adaptation, be used to gather data from other sources like parents, supervisors, and customers. That adaptation is not included here.

This paper does not resolve the question of which source to consult first and which source shall have the last word. By focusing on a technique for assessing learner perceptions, I am urging at least some inclusion of learners in understanding their own performance problems.

Another limitation is the absence of discussion of actual item construction. There is ample tests and measurement literature to assist the developer, just as there is useful discussion of macro-techniques like interviewing and observing. (See, for example, Zemke and Kramerling, 1982.) The greater challenge is in planning the substance of the inquiry. Just what is the developer going to find out about?

Will this typology affect the quality of education and training programs? How? Will it be cost effective? Will it provide a means to examine what we are really doing when we attempt to conduct front end analysis? Will it facilitate analysis, presentation, and comprehension of the data? These questions are not answered here and the absence of answers presents a challenge to developers. Responding to that challenge is a worthy activity since there is no more important goal for a developer than to hone the tools we use to understand performance problems.

References

Archambault, R.D. The concept of needs and its relation to certain aspects of educational theory.


Kaufman, R. A possible taxonomy of needs assessments. Educational Technology, 1977, XXVII(11), 60-64.


Systematic Lesson Design for Adult Learners

Jodi Bonner
State Department of Education
Bureau of Evaluation
Baton Rouge, LA 70804

Abstract. It has often been the mistake of educators to treat instruction for adults like instruction for children. In recognizing adults as the unique learners they are, characteristics of adult learners are integrated with the lesson design level of the Gagne-Briggs model of instructional design to produce a design model which accommodates adult learning. The implications of learner characteristics such as experience, motivation, physiological barriers, psychological barriers, and memory are indicated for the components of the model, including objectives, instructional events, conditions of learning, media, and assessing learner performance. It is concluded that the Gagne-Briggs design model can be extended to a more holistic view of learning by attending to specific characteristics of adult learners.

Though much of the instruction developed by instructional designers is for adult learners, the fields of instructional design and adult education have quite different philosophical and theoretical emphases. The adult educator's approach to learning is frequently a combination of various philosophies of adult education with a primary emphasis on humanism. In humanistic adult education, the key ideas are related to "freedom and autonomy, trust, active cooperation and participation, and self-directed learning" (Elia & Morzam, 1980, p. 10). As presented here, instructional design is based on cognitive, particularly information-processing, and behavioral theories of learning. Given these different views of learning, approaches to instruction by adult educators and instructional designers differ significantly. Some adult educators do not believe the use of systematic instructional design will create the most efficient learning outcomes for adult learners because the theories on which it is based represent a less than holistic view of learning (Apps, 1981).

The model for lesson design presented in this paper is basically that of Gagne and Briggs (1979) where a lesson is defined as "the smallest unit for which instruction is usually planned" (Briggs, 1977, p. xix) and, as "the formal presentation of instructional stimuli to the learner" (Briggs and Wager, 1981, p. 137). The lesson level of instructional design consists of four stages:

1. Definition of Performance Objectives
2. Preparing Lesson Plans (or Modules)
3. Developing, Selecting Materials, Media
4. Assessing Student Performance (Gagne & Briggs, 1979, p. 23)

These stages do not exist independently of each other; hence it is somewhat difficult to discuss any one stage as distinct from the others. I have attempted to integrate characteristics of adult learners with each stage separately to make this information more readily applicable to the instructional designer who wishes to use it; however, some overlap remains.

The design model is intended for general application to a broad range of learners. Though determining learner characteristics is considered a component of the entire model (Andrews & Goodson, 1980), no procedures are presented to operationalize this component at the lesson design level. The designer takes responsibility for utilizing the design framework in view of the characteristics of the target group for which the instruction is being designed. The designer identifies the gross characteristics in the needs analysis; however, these are not the specific learner characteristics which may affect the design of lessons or materials.

Increased attention to the characteristics of learners has been identified as a future trend in the implementation of instructional systems (See Dick, 1981). As an instructional designer, there is no particular reason to believe that designing instruction should be totally different for adults than for youth since the learning and memory structure is considered to be the same for both. However, designers continue to make the mistake of treating instruction for adults like instruction for youth with little or no consideration of the characteristics of adults which have an impact on the teaching/learning process. In view of the fact that adults do possess many characteristics specific to how they learn, I believe that the Gagne-Briggs design model can be extended to account for those characteristics so we can design more effective instruction for adults.

Various definitions of "adult learner" have been proposed in the literature (See Verner, 1964; Knoules, 1978; Cross, 1979; Apps, 1981). For the purpose of this paper, adult learners are broadly defined as persons who are 22 or older and who are participating in a purposeful, planned learning experience after being removed from such an experience for at least two years. Such a learner may be participating in a single experience or a program related to higher education, basic skills, or leisure time. Participation may be for personal or professional reasons, and the activity may be credited or non-credited.

The characteristics of adult learners are those which have been identified by numerous educators and researchers in adult learning. A selected few prominent sources will be cited. These characteristics which are addressed are related to factors such as memory, reaction time, motivation, learning strategies, psychological barriers, and experience, and have been the basis for adult learning principles.

This attempt to synthesize procedures for systematic lesson design and principles of adult learning might be viewed...
as an attempt to integrate the humanistic with the cognitive and behavioral approaches to learning. Such a synthesis has not been evident in the literature. Each section presents some assumptions of the Gagne-Briggs design model and characteristics of adult learners relevant to aspects of the design model. Implications for instructional lesson design are noted with a bullet (*) throughout and summarized in the tables.

**Defining Performance Objectives**

Designers are well aware that lesson design begins with defining the objectives and they base subsequent lesson design decisions on the performance objectives which they have defined for the lesson. Needless to say, unless objectives are pre-set, a lesson cannot be systematically designed to achieve particular outcomes.

Briggs indicates that the role of the designer may be limited to this stage of lesson design when he states: "For adult learners such as graduate students, it may be necessary to agree upon the objectives; then the student teaches himself" (1977, p. 196).

The characteristics of adult learners which affect defining performance objectives include their motivation and their approach to the learning experience. Adults often have multiple motives or reasons for participating in learning experiences. In reporting the data from state studies, Cross (1979) presents a typology of motives along with the percentage of potential learners who reported such motives:

- (a) practical goals (increase in income, job promotion, new job)—about 50%
- (b) personal satisfaction or inner-directed personal goals—about 50%
- (c) to gain new knowledge (including learning for its own sake)—about 50% to about 75%
- (d) to achieve formal educational goals (degrees, certification)—about 8% to about 28%
- (e) to socialize—about 33%
- (f) to achieve societal goals—about 25%

Related to these motives is the adult's approach to learning. Knox (1977) states: "Most adults approach learning activities with expectations about what they will gain from the experience" (p. 425).

When defining performance objectives for adult learners:

- Explore the learners' expectations regarding what they expect to gain from the learning experience (Knox, 1977).
- Keep objectives realistic so that they are not overwhelming yet they remain challenging (Knox, 1977).
- Remain open to compromising your expectations with those of the learners so that the learners will not be so dissatisfied that they don't wish to achieve the objectives (Knox, 1977).
- Sequence objectives so that as many as possible are independent of each other. You can then present the learner with options regarding the order in which objectives will be achieved. Such options provide the learners with more involvement with objectives than they would have with a highly sequenced set of objectives. Of course this strategy is only available when the nature of the learning outcome does not require hierarchical sequencing.
- If the learners are to be on their own once objectives are agreed upon, anticipate objectives which may be of interest to them, so that materials can be prepared to help them meet these objectives. Such materials may include self-instructional packages which either contain all the materials needed by the learner, part of the materials with referral of the learner to other sources, or total referral of the learner to other sources.

"It has often been the mistake of educators to treat instruction for adults like instruction for children."

**Preparing Lesson Plans**

At this stage of the lesson design process, the designer writes prescriptions for the instructional events in the lesson. Basing each prescription on the conditions of learning for the learning outcome stated in the objective, the designer describes the media and the teacher and learner activities which will operationalize the instructional events. Though the instructional events are the same for each type of learning outcome, the specific conditions of learning differ for the different kinds of learning identified by Gagne (Gagne & Briggs, 1979). Briggs suggests that in addition to being specific for each instructional event, certain conditions of learning may be diffused throughout a lesson. Since the conditions of learning are a way of operationalizing the instructional events, they are also supportive of the internal processes of learning and memory.

What I think has been overlooked by instructional design due to its adherence to cognitive and behavioral theories is the potential for conditions of learning which support other aspects of learning—social, emotional, and physical aspects. For those designers using the lesson design component of the Gagne-Briggs model of instructional design, integrating the characteristics of adult learners with instructional events and conditions of learning can result in practical, useful information for designing lessons. By attempting the integration at a general level, I am proposing that learner characteristics in addition to, but not unrelated to, memory and learning processes are relevant bases for determining conditions of learning that promote effective, efficient learning.

The characteristics of adult learners support or indicate certain instructional events while at the same time indicating conditions of learning for those events. The section of this paper entitled "Instructional Events" presents those events as well as concomitant conditions of learning implied by certain characteristics of adult learners. The following section, "Conditions of Learning," presents characteristics of adult learners which imply certain conditions of learning and then that indicates the instructional events to which these conditions may be applicable. This organization results from the notion that certain characteristics of adult learning have implications for events first and conditions of learning second; and other characteristics have implications for conditions of learning first and events second.

**Instructional Events**

The instructional events of the Gagne-Briggs (1979) model of instructional design are:

1. gaining attention
2. informing the learner of the objective
3. stimulating recall of prerequisites
4. presenting the stimulus material
5. providing learning guidance
6. eliciting performance
7. providing feedback
8. assessing performance
9. enhancing retention and transfer

Characteristics of adult learners which hold implications for the instructional events of a lesson include learner sophistication, motivation and expectations for participating in a learning experience, the value placed on incidental learning, experience, and learning strategies.

"Social, emotional, and physical aspects of learning have been overlooked by instructional design."

Briggs (1977) states that the teacher or designer decides which events to supply for learners and which the learners may provide for themselves. He also suggests that adult learners can provide more events for themselves so that fewer events are provided by the teacher or class activities. Briggs is probably referring to learner sophistication which does not necessarily result from age. In addition, factors such as available time, ready access to resources, and self-directedness will affect whether or not adults provide themselves with the events needed to facilitate effective instruction. In planning for which events to include in the lesson, the designer should consider whether or not the learners are knowledgeable and skilled enough to organize and carry out their learning activities and whether or not they have the time and resources to do so.

Some characteristics of adult learners support the need for providing certain instructional events and others call for extending these events to account for the characteristics. I will illustrate this idea by examining most of the events.

Informing the learner of the objective. Instead of "informing the learner of the objective," the designer may think of this event as "choosing the objectives." Choices by the learner can contribute to interest, achievement, and application of the learning (Knox, 1977). Specific conditions of learning related to the event of choosing objectives include:

- Provide questions, prompts, organizers, or directions to guide attention when helping learners set realistic objectives (Knox, 1977).
- Help learners establish connections between known information and new information when helping learners define objectives (Knox, 1977).
- Provide examples in the form of a human role model, or a diagram or verbal description to help the learners clarify their expectations (Knox, 1977).

Adult learners place a high value on incidental learning. The gradual decline in incidental learning for older adults structures may be based more on experience than on the structure of content (Knox, 1977).

- Provide activities to assess recall of related learning, so that the learners can find out what is familiar and unfamiliar to them.
- Branch learners to unfamiliar areas.
- Provide an option for review of familiar areas.
- Diagnose how topics and problems are viewed (Knox, 1977).

Providing (Pre-)Learning Guidance. Though this event ordinarily occurs after the stimulus material has been presented, some characteristics of adult learners call for attention to learning guidance prior to presenting the stimulus. Thus it may be re-named as pre-learning guidance. Learning strategies, cognitive structure, and related learning of adults receive attention here.

Adults tend to acquire more learning strategies with age; but, older adults tend to rely on those strategies already held rather than to acquire new ones (Knox, 1977).

- Help older adults modify their learning strategies or increase their repertoire of learning strategies. For example: the learner has some knowledge of a topic, begins reading materials from beginning to end at a steady pace and then goes to the next activity. The suggested alternative for the learner might be to skim the materials with particular attention to main ideas identifying that with which they are and are not familiar and giving more of their attention to the unfamiliar (Knox, 1977).
- Include an objective in the lesson which would address learning strategies. Intersperse instruction for such an objective with other lesson objectives.
- Present the learner with a variety of optional strategies regarding how to learn the material being presented.

Knox (1977) suggests that adult learners be assisted in building cognitive structure. Frankly, I don't have much to suggest, and Knox only suggests two generalities:

- Base attempts at building cognitive structure on the assessment of how topics and problems are viewed. (Knox, 1977).
- Present questions and basic ideas (Knox, 1977).

Knox reports that studies of adult problem-solving have indicated that problem-solving effectiveness requires novel solutions declines with age. The accumulation of solutions over the years
forms a reservoir of solutions from which older adults tend to draw solutions rather than generate novel solutions.

- Help older adults compensate for deteriorations in problem-solving performance which result from interference from previous learning by assisting them in identifying prior ideas or practices that need to be unlearned and providing opportunities for such unlearning (Knox, 1977). Though unlearning is recognized as a sometimes necessary process, little if anything is known about how to assist learners with it.

Eliciting Performance, Providing Feedback, Assessing Performance. Knox (1977) reports that the adult's perception in attending to detailed and complex learning situations may be both useful and detrimental. The familiarity with information may enable the learner to use selective perception accurately or it may result in misunderstandings.

- Assess learning frequently to catch misunderstandings that may lead to cumulative failure (Wager, 1977).
- Relate feedback to progress toward goals. According to Kidd (1973), when the learning experience is voluntary, motivation for the adult learner is dependent on the adult being convinced that progress is being made toward his goals.
- Utilize peer review in providing feedback (Knox, 1977).
- Utilize comparisons with external standards in providing feedback (Knox, 1977).

Enhancing retention and transfer. If any event is likely to be left out of a lesson, it is that of enhancing retention and transfer. Since "adults usually engage in purposeful learning because they want to apply or transfer what they learn to a variety of conditions beyond the one in which the learning occurred" (Knox, 1977), this is a particularly important event for adult learners.

- Provide experiences in which learners can plan and rehearse the application of what was learned to daily life (Knowles, 1980).

Table 1 summarizes the instructional events and some specific and diffused conditions of learning for the events.

### Table 1

Instructional Events and Conditions of Learning Indicated by Adult Learner Characteristics

<table>
<thead>
<tr>
<th>Instructional Events</th>
<th>Conditions of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaining Attention*</td>
<td>Provide questions, prompts, organize, directions to guide attention in setting realistic objectives.</td>
</tr>
<tr>
<td>Choosing the Objective</td>
<td>Assist learner in establishing connections between known information &amp; what is to be learned.</td>
</tr>
<tr>
<td>Stimulating ( &amp; Assessing*) Recall of Prerequisites* of Related Learning Of Cognitive Structure</td>
<td>Assist learner in clarifying expectations using human role model, diagram, or verbal description.</td>
</tr>
<tr>
<td>Preventing the Stimulus*</td>
<td>Pre-test for related ideas. Identify ideas &amp; practices that need to be unlearned.</td>
</tr>
<tr>
<td>Providing Learning Guidance*</td>
<td>Provide opportunities for unlearning. Present learner with a variety of optional learning strategies.</td>
</tr>
<tr>
<td>Eliciting Performance*</td>
<td>Provide questions &amp; basic ideas regarding cognitive structure.</td>
</tr>
<tr>
<td>Providing Feedback*</td>
<td>Elicit performance frequently.</td>
</tr>
<tr>
<td>Assessing Performance*</td>
<td>Provide feedback regarding progress frequently, including extent &amp; type of change in competence.</td>
</tr>
<tr>
<td>Enhancing Retention &amp; Transfer*</td>
<td>Provide opportunity for learner to plan &amp; rehearse application of learning to daily living.</td>
</tr>
</tbody>
</table>

*events proposed by Gagne & Briggs.

for different types of learning (Gagne & Briggs, 1979), I have not made this distinction here. I consider the conditions of learning identified from experience and psychological barriers to be generalizable to different learning outcomes. Those conditions related to memory and reaction time may best be suited to verbal information learning since most of the research in these areas has been with verbal learning.

Memory. Knox (1977) describes problems adults have with memory (based primarily on studies of short-term memory) and gives some suggestions for practitioners regarding how to help adult learners overcome memory problems in learning. He describes three phases of memory: registration (exposure to stimulus, acquisition of information, encoding), retention (persistence of encoded information), and recall (search and retrieval). As age increases, there is an increasing registration deficit whether the stimulus is presented visually or auditorily with the deficit being greater for the visual than for the auditory. Information which is highly organized during the registration phase is more likely to be remembered. The strength of the registration also affects how well it is remembered. Strong registration occurs when the stimulus is presented at spaced intervals where the intervals are short and adequate time for attending is provided without distraction.

There is little decline in retention ability as age increases as long as what has been stored is meaningful, accurately coded, and not excessive in amount.

As age increases, there is some decline in recall ability, particularly for older adults with low verbal ability. Recall is greatest when the material is meaningful and when the recall conditions are similar to the conditions under which the material was registered. Much of the decline in recall results when the adult is trying to store and respond to new infor-
mation and recall old information at the same time. The process of recalling old information interferes with the new information. Even greater interference may occur when the older adult increases the time spent in searching through accumulated information. It has also been found that errors in recall are more often errors of forgetting than mistakes.

Knox (1977) states that factors related to memory seem to contribute to a decline in problem-solving performance for older adults. These factors include decline in short-term memory, and increased difficulty in organizing complex material, and in disregarding irrelevant aspects in the learning situation. Some of the ways he suggests for practitioners to help adults compensate for memory deficits and deterioration in problem-solving performance may serve as conditions of learning:

- Provide memory aids, e.g., paper and pencil for taking notes, lists of needed information for ready reference and summary materials.
- In presenting new information, use aids that help the learner organize the information, e.g., advance organizers, sets of categories, and generalized structures to assist in grouping information.
- Minimize distracting and irrelevant information and activities in the learning materials and setting.
- Review prerequisite ideas from prior lessons.
- Pace the learning for mastery and continuity.

Table 2 contains both specific and diffused conditions of learning based on research about adult memory. These conditions of learning are suggested for use by designers in conjunction with those posed by Gagne and Briggs (1979, p. 166), and by Briggs (1977, pp. 275-277). It should be noted that certain conditions derived from research and from Knox’s suggestions overlap with those of Gagne and Briggs.

**Experience.** One of the most distinctive aspects of adult learning is the wealth of experience adults bring to the learning situation. Kidd (1973) states that, to some extent, experience is the principal factor in adult learning. He notes three factors about adult experience as distinct from the experience of children:

1. Adults have more experiences
2. Adults have different kinds of experiences
3. Adults’ experiences are organized differently. (p. 46)

Adult educators emphasize the importance of the adult’s experiences for teaching and learning:

> The resource of highest value in adult education is the learner’s experience. . . . Too much of learning consists of vicarious substitution of some one else’s experience and knowledge . . . . In teaching children it may be necessary to anticipate objective experience by uses of imagination but adult experience is already there waiting to be appropriated. (Lindeman, 1961, pp. 6-7.)

Knowles includes the role of experience as a main assumption in adult learning theory:

This assumption is that as an individual matures he accumulates an expanding reservoir of experience that causes him to become an increasingly rich resource for learning, and at the same time provides him with a broadening base to which to relate new learning... to an adult, his experience is who he is. (1978, p. 56.)

Two types of experience that have an impact on adult learning are: experience which is a function of fulfilling adult roles (life experience), and experience related to feelings and ideas arising from pre-adult learning encounters. Bergevin, McKinley, and Smith (cited in Apps, 1981), call the combination of these two kinds of experience “internal knowledge,” as opposed to “external knowledge,” which is what is to be learned (p. 76).

Life experience and experience with prior learning (adult or pre-adult) may have positive or negative effects on a new learning experience. Apps (1981) points out that having a large amount of life experience often causes paradoxes for adult learners on examinations because it is difficult for them to choose a single answer.

Knowles (1980) addresses the implications of adult experience for educational practice. Some of these implications can serve as conditions of learning in designing learning experiences for adults:

- Emphasize practical application by illustrating new concepts and ideas with life experiences drawn from the learners.
- Build experiences into the lesson which help adults learn to learn from experience by providing opportunities for them to look at themselves more objectively and to free their minds from preconceptions.
- Gear presentation of resources to the levels of experience of particular educational development.

### Table 2

<table>
<thead>
<tr>
<th>Instructional Events</th>
<th>Conditions of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaining Attention</td>
<td>Diffused</td>
</tr>
<tr>
<td>Choosing the Objective</td>
<td></td>
</tr>
<tr>
<td>Enhancing Retention &amp; Transfer</td>
<td></td>
</tr>
<tr>
<td>Providing Pre-Learning Guidance</td>
<td>Specific</td>
</tr>
<tr>
<td>Stimulating Recall</td>
<td></td>
</tr>
<tr>
<td>Presenting the Stimulus</td>
<td></td>
</tr>
<tr>
<td>Providing Learning Guidance</td>
<td></td>
</tr>
<tr>
<td>Elitigating Performance</td>
<td></td>
</tr>
<tr>
<td>Providing Feedback</td>
<td></td>
</tr>
<tr>
<td>Assessing Performance</td>
<td></td>
</tr>
<tr>
<td>Enhancing Retention &amp; Transfer</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates Knox’s suggestions. **Indicates overlap with Gagne & Briggs.

---

**JOURNAL OF INSTRUCTIONAL DEVELOPMENT**

38
learners.

- Help learners apply new learning to their experiences to make learning more meaningful and integrated.

Experience with prior learning, both adult and pre-adult, has implications as diffused conditions of learning since these experiences will determine the learners' attitudes toward the learning situation and the style with which they approach the learning situation.

- Provide a supportive atmosphere, and establish a cooperative relationship between the learner and the instruction to facilitate positive attitudes toward learning.

Life experience in particular has implications for specific conditions of learning. Table 3 contains the conditions of learning implied by the wealth of experience the adult brings to the learning situation.

Reaction Time. Knox (1977) describes reaction time as the time it takes to respond to a stimulus, and as involving stimulus perception, transmission of information to the brain, and response selection. He describes changes in reaction time as a result of physiological changes in the brain and nervous system. In young adulthood, at about the age of twenty, reaction time peaks; in middle and old age, it slowly declines. Adults compensate for their reduction in reaction time by giving increased attention to accuracy, by carefully attending and responding to stimuli, and by avoiding situations that involve time pressures and potential surprises.

- Avoid placing the adult in timed, high pressure situations (Apps, 1981).

Related to reaction time is the speed or pace of the learning situation:

The speed or pace at which learning occurs is one of the major age-related influences on adult learning effectiveness. Adults of any age, but especially older adults learn most effectively when they set their own pace, take a break periodically, and fit the distribution of learning episodes to the content. (Knox, 1977, p. 410.)

- Help adults improve speed and accuracy by providing clear instructions and reinforcement procedures (Knox, 1977).

One of the reasons for using instructional events and conditions of learning in designing lessons and materials, particularly of the self-instructional type, is to promote efficiency in learning. Apps states:

For those instructors who hold efficiency in learning as a major guide for their activities, rethinking is necessary. Efficiency, meaning in this instance the speed at which learning can take place, is a problem for the adult learner. (1981, p. 87.)

Perhaps by accounting for the adult's slower reaction time in the conditions of learning used to design lessons and materials, designers can increase learning efficiency for the adult learner. The specific and diffused conditions of learning implied by the adult's slowed reaction time appear in Table 4.

Psychological Barriers. Apps (1981) identifies three psychological barriers of adults that interfere with learning: guilt feelings, recall of previous formal learning, and lack of confidence as a student.

The adult's feelings of guilt about the effects of his role as a student on his family (e.g., less time with family, less money coming in) cannot be dealt with as conditions of learning for just any type of content. However, in the event of enhancing transfer, opportunities could be provided that assist the learner in transferring the new learning to family situations when the content is appropriate for such transfer.

Recall of previous formal learning has been mentioned earlier in this paper as a part of experience which could have positive or negative effects on learning. Diffused conditions of learning were suggested to enhance positive attitudes toward the learning situation.

Lack of confidence as a student manifests itself in the adult learners' doubts about their ability to study and capacity to learn. Many adults fail to see that they are already learners in the informal learning situations in which they participate as parents, members of a community, and professionals. By drawing upon the experiences of adults in real-life learning situations, we can assist them in appreciating the value of informal learning experiences for formal learning.

Lack of confidence as a student implies several specific conditions of learning which are summarized in Table 5.
Table 4
Conditions of Learning
Implied by Reaction Time

<table>
<thead>
<tr>
<th>Instructional Events</th>
<th>Conditions of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diffused</td>
</tr>
<tr>
<td>Gaining Attention</td>
<td></td>
</tr>
<tr>
<td>Informing the Learner of the Objective, or Choosing the Objective</td>
<td></td>
</tr>
<tr>
<td>Stimulating Recall of Prerequisites</td>
<td></td>
</tr>
<tr>
<td>Presenting the Stimulus</td>
<td></td>
</tr>
<tr>
<td>Providing Learning Guidance</td>
<td></td>
</tr>
<tr>
<td>Eliciting Performance</td>
<td></td>
</tr>
<tr>
<td>Providing Feedback</td>
<td></td>
</tr>
<tr>
<td>Assessing Performance</td>
<td></td>
</tr>
<tr>
<td>Enhancing Retention &amp; Transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Knox

Table 5
Conditions of Learning Implied by Lack of Confidence as a Student

<table>
<thead>
<tr>
<th>Instructional Events</th>
<th>Conditions of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaining Attention</td>
<td>Remind the learner that he has learned concepts &amp; skills related to the learning at hand</td>
</tr>
<tr>
<td>Informing the Learner of the Objective, or Choosing the Objective</td>
<td></td>
</tr>
<tr>
<td>Stimulating Recall of Prerequisites</td>
<td></td>
</tr>
<tr>
<td>Presenting the Stimulus</td>
<td></td>
</tr>
<tr>
<td>Providing Learning Guidance</td>
<td></td>
</tr>
<tr>
<td>Eliciting Performance</td>
<td></td>
</tr>
<tr>
<td>Providing Feedback</td>
<td></td>
</tr>
<tr>
<td>Assessing Performance</td>
<td></td>
</tr>
<tr>
<td>Enhancing Retention &amp; Transfer</td>
<td></td>
</tr>
</tbody>
</table>

*Apps

Developing or Selecting Media

"Media are the physical means for presenting stimuli to the learner" (Briggs & Wager, 1981, p. 114), including books, charts, films, photographs, field trips, computer-assisted instruction, lectures, and discussion.

Gagne and Briggs (1979), and Briggs and Wager (1981), point out that learner characteristics are a factor in media selection. Gagne and Briggs state that agreement has not been reached on which characteristics are important, but that educators have posed characteristics such as learning style, reading ability, and family background (1979).

Knox (1977) states that the appropriateness of resources (media) for adults is dependent on such learner characteristics as interest in the topic, opportunity for application, level of education, and age. In addition, he states that the effectiveness of learning resources also depends on interests at different stages of adult development, memory, and pacing.

Vision. Apps (1981) describes vision as gradually declining from ages 18 to 40, sharply declining for many from ages 40 to 45, and less rapidly declining from age 45 up. After age 18, there is a slow decline in the ability to adapt to the dark, and the field of vision narrows somewhat. Ways to help adults compensate for age-related changes in vision (besides obtaining needed corrective lenses) should be considered in selecting, developing, and using media:

- Provide large, clearly produced visual materials (Apps, 1981).
- Make certain that light conditions are proper (Apps, 1981).
- Increase contrast by increasing illumination, reducing glare, closer seating, large type, and great contrast between type and background (Knox, 1977).
- Allow longer exposure time (Knox, 1977).
- Simplify sequences of information or exposure (Knox, 1977).
- Allow more time for adaptation between lighted and darkened surroundings (Knox, 1977).

Hearing. Knox (1977) states that ability to hear sounds gradually declines until the fifties, then impairments increase more rapidly. Pitch discrimination declines gradually between the twenties and fifties and then drops more abruptly. Apps (1981) states that as age increases, we hear more slowly and it takes longer to translate the meaning of sounds. "Older adults also have more difficulty screening out interfering noises" (Knox, 1977, p. 314).

Attention to changes in hearing should be considered in the selection, development, and use of media. Ways to help adult learners compensate for decline in hearing include the following:

- Enunciate clearly (Knox, 1977).
- Provide sound amplification in a large room (Apps, p. 86).
- Face the group so nonverbal cues can be received (Apps, 1981), enabling use of facial and lip cues (Knox, 1977).
- Reduce background noise (Knox,
Memory. Older adults can be given assistance in compensating for inadequacies in memory which result in difficulty with recalling and verbally expressing what has been learned (Knox, 1977).

- Use visual displays such as posters to evaluate learning (Knox, 1977)

Learning Strategies and Preferences. It is difficult for some adults to learn new ideas through reading, and easier for them to learn the same ideas from other media such as conversation or demonstration (Knox, 1977). Also, adults "tend to persist and learn better when they are able to use preferred resources" (Knox, 1977, p. 443).

- Accommodate their preferences by providing a variety of media or at least two media from which the learner can choose. Near the end of a lesson presented by a videodisc/microcomputer system for example, the learner is given a choice of two kinds of review—review of a short video segment illustrating the achievement of the purposes of an interview, or review of a list of the purposes to be achieved in an interview.

"Compared to children, adults have more experiences; adults have different kinds of experiences; and adults' experiences are organized differently."

Cross (1979) reported that surveys have indicated that adults favor a variety in learning methods, with 75 to 80 percent favoring something other than lecture. She also reports that most adults prefer more interactive and action-oriented learning to passive, non-interactive learning; and, that it is believed that more active learning modes would be especially appealing to the educationally disadvantaged. Cross attributes this preference for active learning to the fact that adults usually want to be able to use the knowledge and skills they learn outside of the learning situation.

Experience. Knowles (1980) suggests that the use of experiential techniques such as group discussion, case studies, simulation, role-play, skill-practice experience, field projects, demonstrations, and seminars help adult learners use their individual experiences as well as those of others as resources for learning. Knox (1977) states that these kinds of learning experiences help the adult learner bring organized learning and personal experience together.

Assessing Student Performance
Kidd (1973) has indicated that self-assessment is important for adults, and that the adult learner needs guidance in how to go about such evaluation. In addition to evaluating planned learning, he suggests evaluating incidental learning.

Knowles has stated (rather strongly) a rationale for the use of self-assessment with adult learners:

Nothing makes an adult feel more childlike than being judged by another adult; it is the ultimate sign of disrespect and dependency, as the one who is being judged experiences it. (1980, p. 49.)

He views self-evaluation as a mutual undertaking by the learner and instructor where the instructor serves as a role model by accepting feedback about himself and establishing a supportive atmosphere for self-evaluation. Also, the instructor has responsibility for involving learners in developing and carrying out "mutually acceptable criteria and methods" (Knowles, 1980, p. 38) for self-measurement of progress toward the learning objectives. Knowles suggests that in addition to performance tests and student products, adult learners can be evaluated using case studies and job performance records. He acknowledges that case studies are time consuming, however, the benefit is that effects of the learning experience on the whole person can be detected including changes in outlook, adjustment, and habits. He indicates that job performance records are especially appropriate for learning experiences related to professional performance.

Providing for self-evaluation can serve as a condition of learning for the instructional events, eliciting performance, providing feedback, and assessing performance. Case studies and job performance records could serve as media to implement these events.

Conclusion
The proposed integration of the characteristics of adult learners into the Gagne-Briggs model of instructional design has resulted in suggestions for components in each of the four stages of the lesson design process. These suggestions have been made to assist designers in developing effective lessons and materials for adult learners. Many areas for further investigation can be identified from the ideas presented here. The following list of questions proposes some areas for investigation which I have not addressed and which I believe merit further consideration.

1. Are there any differences in learning from experiences designed by the Gagne-Briggs model as opposed to experiences designed by the same model extended to account for the characteristics of adult learners? Specifically, what differences exist?

2. Which aspects of learning (cognitive, social, emotional, physical) are enhanced by attention to the characteristics of adult learners? For example: Does attention to adult learner characteristics increase positive attitudes toward learning; and, does this in turn facilitate achievement of the primary objectives of the instruction?

3. Which characteristics of adult learners should be considered in designing instruction for adults? Perhaps some or all of the characteristics presented in this paper should be given attention. Perhaps characteristics not addressed in this paper should be considered, such as time perception, decline in physical strength, and other characteristics. Which characteristics vary with culture, and how do they vary?

4. Which instructional events and conditions of learning derived from characteristics of adult learners are most effective for the different types of learning outcomes; and, which ones are applicable to all learning outcomes?

5. How do we go about analyzing characteristics of adult learners, such as experience, to determine how, when, and where to utilize these characteristics in designing learning experiences for adults?

6. How do we assist adult learners in such processes as unlearning and building cognitive structure?

7. How are other components of instructional systems design such as course organization, delivery systems, needs assessment, and formative evaluation
specifically affected by characteristics of adult learners.

It is my opinion that the Gagne-Briggs model of instructional design is a clear and useful model for designing instruction for adult learners of any age for any type of learning experience. It is limited, however, in that it is based on principles of learning and memory and does not consider other aspects of learning (social, emotional, physical) which may contribute to learning as a more than temporary change in behavior.

Attention to specific learner characteristics can extend the Gagne-Briggs design model to a more holistic view of learning, thus promoting more effective and efficient learning for adults.

References


Allison Rossett, Book Review Editor
Professor of Educational Technology
San Diego State University
San Diego, CA 92182-0311


Kent Gustafson has written Survey of Instructional Development Models as an 'Information Analysis Product' for the ERIC Clearinghouse on Information Resources. Survey of Instructional Development Models can also be identified by its ERIC code, IR-54. It is a 52-page paperback monograph (plus a six-page annotated bibliography) intended to provide exactly what its title implies—a survey.

Model enthusiasts will be disappointed. The monograph does not (and was not meant to) tell everything there is to know about ID models. It makes no attempt to locate and identify all or even most of the ID models that have been created over the years. It doesn't even provide a list of models-in-use. It does provide more than enough information for all likely readers except those seeking a definitive work on models.

The author begins by identifying his four intended purposes: (1) to update and expand upon an original paper by Tweker, Urback & Buck (1972), (2) to present a taxonomy for ID models, (3) to report upon the limited degree of testing to which most ID models have been subjected, and (4) to provide an annotated bibliography prepared by Rashidah Shuib.

Considering that an updating and expansion of the paper by Tweker et al. is Gustafson's first stated purpose, it seems odd that neither the nature nor the substance of the earlier paper is described except vaguely in passing. (Tweker et al. described and compared five ID models. The five sets of process steps were presented in a way that provided a rationale for legitimizing a sixth model—the three-stage, nine-step, IDI model.) Of the six models in Tweker, half survive in IR-54. To those three enduring models Gustafson has added nine others for the current survey.

At first, this reviewer was tempted to speculate upon the selection of some models and rejection of others. For one thing, some personal favorites were selected and others were not. For another thing, one must wonder whether it was modesty or a seasonable opinion which prompted Gustafson to omit his own 1971, non-linear version of the IDI model. However, the purpose of this review should not be to assess the omissions in IR-54, or even to judge IR-54 on the basis of how well a few examples were selected from a large number of models. Rather, to judge this survey fairly we must turn our attention to the manner in which the selected models are categorized, analyzed, and explained.

Each model is identified, illustrated, classified in the taxonomy, and briefly discussed. Comments are appropriate and insightful. Both strengths and weaknesses are noted. In some instances (e.g., the Banathy model) the commentary provides useful information about unillustrated substeps which Gustafson has gleaned from the primary sources. The explanations are clear, yet nothing is belabored. The resulting simplicity is welcome.

The second stated purpose of IR-54 is the crux of Gustafson's message. The taxonomy that he offers is superimposed as the organizational framework of the entire piece. Essentially he suggests that ID models can be classified into four categories: those with classroom focus, product focus, systems focus, and organizational focus. The categories are not necessarily considered to be mutually exclusive. Perhaps it is quibbling, but the four proposed categories seemed to me to be more a taxonomy of ID prac-
tice and context than of ID models. Oh, well.

Under classroom focus, where the goal is for the existing teacher to improve his/her instruction, five models are given as examples. They are those of Gerlach & Ely (1971, 1980), Kemp (1971, revised 1977), Davis, Alexander & Yelon (1960, 1974), Briggs, (1970), and DoCocco (1968).

Only two models are given as examples of product focus—a category where the goal is production of one or more specific instructional products.” These examples are Banathy’s (1968) model and the Baker & Schutz model (1979).

The third category, system focus, is documented with three acronyms—ID1 (1971), IP/ISD (1975), and CDP (1979)—and with discussion of the contribution of Gilbert (1978). Gilbert’s work is germane but is not really an example of an ID model.

Finally, organizational focus is described as a category where the goal is to improve instruction and modify or adopt the organization to a new environment. The examples supplied are Blondin’s SAIDI model (1977) and the model of Blake & Mouton (1971).

By telling us so little about the testing of ID models, Gustafson tells us a lot. He reports what there is to report—nothing. Still, he made his point, and many readers will agree with him when he says, “It can only be hoped that in the future some ID models will be subjected to rigorous scientific validation.” So much for his third purpose.

How about the fourth purpose, the annotated bibliography? It is there. It is useful. It could be much more extensive.

This is an excellent small book, but even excellent books sometimes contain an author’s faux pas. IR-54 has one. Gustafson praises the ongoing value of a chapter containing a list of heuristics in the (Robert) Baker & Schutz book. Unfortunately he failed (inadvertently, I assume) to clarify that another Baker (Eva) and James Popham wrote the chapter cited. This is no big thing since high praise is due to both the Baker & Schutz book as a whole and the Baker & Popham chapter.

In spite of its diminutive size, Survey of Instructional Development Models may very well have lasting impact upon the evolution of instructional development theory. Just as the Twelker document served to validate the IDI model, so may this pamphlet establish widespread acceptance of Gustafson’s taxonomy. The notion that several different structural versions of ID may be applicable to different settings is inherent in the taxonomy. If such an idea has lasting merit and gains broad acceptance, we could be entering into a multi-model era of pluralistic ID. Or maybe (probably) we have been there all of the time, and Kent Gustafson has offered a theoretical conception which will help us to focus upon the realities of the ID business.—Reviewed by Roberts A. Braden, Instructional Developer, Virginia Tech, Blacksburg, VA 24061.

Reference


Industrial psychologist Ernest J. McCormick’s guide to job analysis offers answers to everything one needs to know about work analysis, and therein lies both its strengths and weaknesses. The author surveys, summarizes, documents, and evaluates data compiled from the study of human work, and suggests practical applications for this data. The information is unbiased, balanced, and thorough. Nevertheless, the reader closes the book with a disturbing sense of disorientation about where to go from there.

The text is organized into four sections, reflecting the author’s primary objectives:

Section 1—An overview of the current world of work

Section 2—A presentation and discussion of methods of job analysis

Section 3—The definition of job inter-relationships and the establishment of job classification systems

Section 4—A discussion of the application of job-related information

This is a book about ergometrics: the systematic application of psychometric principles and procedures to the study of human work. This field of investigation draws from theories of human behavior, psychological measurement, and job analysis. McCormick feels that the scientific approach, which has become the hallmark of any legitimate field of exploration, should be applied to the study of human work. Although work occupies the major part of human life, most people don’t go through an intentional process of choosing a vocation. They drift into whatever types of jobs are available; their work commitment grows almost randomly from an accidental selection process. McCormick contends that this discrepancy between the optimal and real work experience is vast, discouraging, and wasteful.

One factor contributing to the discrepancy is the standard goals of job design. Typically, jobs are developed to achieve functional effectiveness—increased productivity and efficiency—which is an accepted economic objective. But there is another approach, in which the well-being and comfort of the worker is paramount. McCormick is particularly interested in this method—human factors engineering—which focuses on fashioning the equipment, facilities, and environment of the worker so as to enhance and maintain health, safety, job satisfaction, protection from occupational disease, and avoidance of unnecessary physical and psychological stress.

A good place to start redesigning jobs and job systems is with specific data about job characteristics, and Job Analysis contains an abundance of data about work and its related components. In a detailed and painstaking manner, the author explores the world of work. He defines theories, terms, and concepts, cites research by agencies and individuals, offers statistical analysis regarding the validity, reliability, and stability of each method (where applicable), presents charts, graphs, questionnaires, equations, flowcharts, tables, grids, matrices, excerpts from selected studies, strengths and weaknesses of various methods, poses unanswered questions—and more. It’s all there, from micromotion study (the analysis of basic body motions or therbligs), based on the early 20th century work of Frank and Lillian Gilbreth, to J.L. Holland’s Theory of Vocational Choice (where the type of work selected expresses personality type). It’s this profusion of information that disfresses the text’s impact, for it’s hard to get a gut feeling about which protocols make sense in job analysis: what really works best. A practicing instructional developer involved in work analysis needs a lean, efficient, and consistent model to work from, rather than a massive compendium of research, theory, and methodology.

It would have been helpful if Mr. McCormick, who has forty years experience in ergometrics, had culminated his presentation with a standard procedure
for conducting and evaluating a work activity analysis. Employers and employees need a symbiotic process to use in matching the right person with the right job, instead of the prevailing hit-or-miss method.

The book is tedious reading; the author's language is turgid and ponderous:

"Although it is not likely that circumstances within the foreseeable future will enable the vast majority of people to have jobs optimally compatible with their abilities and interests, this does not mean, however, that one should decla a moratorium on the efforts to achieve this objective." (p. 220)

His summations lack incisiveness:

"Although one might wish for clearly defined formulations about human behavior to serve as the basis for developing practical policies and practices, the complexities of human behavior frequently preclude such clear-cut answers. Continued research efforts sometimes can bring about some great insight." (p. 235)

Defining a job is the first step in redesigning it and precedes teaching people how to do it, testing their competence, changing it, making it safer or more satisfying. People involved in personnel, human resources, and curriculum development functions might use Job Analysis as a reference tool, provided they already knew something about work analysis procedures. The text provides a detailed, thorough, well-documented, up-to-date survey of the western style of work.—Reviewed by Karen Morse Project Psychologist, Children's Hospital, San Diego.

**Barbara B. Minor**
ERIC Reports on ID Editor
ERIC Clearinghouse on Information Resources
Syracuse University


Data for a study conducted to identify any unique programs or trends evident in the instructional development programs of selected universities were gathered during site visits to 14 institutions. Staff members and clients were interviewed to determine reporting arrangements, mission, public relations activities, physical facilities, and evaluation methods. The interviews were also concerned with the relationship of instructional design programs to other campus units which might have responsibility for activities related to faculty development. Findings are reviewed under the headings of agency impact, activities which help emphasize teaching, broadening missions, instructional development teams, interest in microcomputers, and other agency features. Five references are listed.

—Microfiche 91 cents, paper copy $2.00 plus shipping as document ED 207 528.


The process of teaching and learning is defined as the interaction of teacher, learner, content, and instruction, and the theoretical and practical elements of this process are examined in the context of a model that explains the key elements: identification, prescription, application, and evaluation. The identification phase receives special emphasis in an analysis of these elements, which includes self-exploration exercises, a bibliography directs teachers to more comprehensive sources of information. —NEA Distribution Center, 8800 Wisconsin Avenue, Silver Spring, MD 20910. $2.00.


This examination of procedures for designing the first stage of a systematic plan to incorporate computer technologies in elementary and secondary schools is based on the rationale that a computer-literate faculty must be available to make decisions on effective computer use. A paradigm for training teachers to be computer literate is recommended as the initial step in achieving the goal of matching instructional and learner objectives. Categories outlined for this initial introduction to computer technology include information systems, information collection and retrieval, communications with a computer, computers in the marketplace, and computers in education. Suggested activities for generating additional competencies include programs on (1) the automatic control of processes; (2) the concept of input-process-output; (3) coding systems; (4) preparation of input and interpretation of output; (5) using computer program packages; and (6) hardware and software in context. Sixteen references are cited. —Microfiche 91 cents, paper copy $2.00 plus shipping as document ED 108 668.